

Part II

Advances of Kiln Manufacture in China

Porcelain Manufacturing of the Pre-Qin Period in Zhejiang

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Abstract: This essay offers a perspective on the main kiln complexes in the Jiangnan region. Among them, the Dongtiao River Basin, centering on the Deqing area, was outstanding in its antiquity, the size of its kiln complexes, its high firing temperatures and the quality of its products, and occupied a highly significant position in the history of Chinese ceramics. Particularly crucial are the following research results: a) providing a material basis for exploring the origin, development, and maturity of porcelain; b) finding the place of origin for some of the proto-porcelain products unearthed anywhere; c) providing a wealth of material information for the establishment of the chronology of proto-porcelain of the Pre-Qin period in Taihu area; d) enriching the research on the archeological culture of the Shang and Zhou Dynasties in the Taihu area. These led us to realize that the firm technical basis for the emergence of developed celadon in the Han Dynasty was established in this area.

Keywords: Proto-porcelain, dragon kilns, Deqing, Dongtiao River Basin, celadon

6.1. Introduction to proto-porcelain of the Pre-Qin period

The Pre-Qin period saw the origin and early development stage of porcelain; the porcelain of that period is called proto-porcelain, another name for original porcelain. Because proto-porcelain is mostly celadon, it is sometimes called proto-celadon.¹ Proto-porcelain or proto-celadon is generally considered to be the celadon product in its original state, made of a porcelain clay body, coated with lime glaze, and fired at a high temperature above 1100°C. After the clay body has sintered, it is grayish white or brown, and it can make a crisp sound when it is tapped (Feng ed. 1998). Proto-porcelain is the product of the transition from pottery to porcelain. It can also be said that proto-porcelain is porcelain that is still at a lower stage. In the practice of firing pottery, the ancient Chinese people created the proto-porcelain while constantly improving the selection and treatment of raw materials as well as increasing the firing temperature and glazing the surface of the pottery (the Chinese Ceramic Society ed. 1982). Proto-porcelain appeared in the late Xia Dynasty, matured in the early Shang Dynasty, developed initially in the early Western Zhou Dynasty, flourished in the early Warring States period, and declined in the late Warring States period.² It

was distributed in Henan, Hebei, Shandong, Shanxi and Gansu in the north, Zhejiang, Jiangsu, Jiangxi, Hubei, Hunan, Fujian and Guangdong in the south and other areas, mainly concentrated in Zhejiang and other areas adjacent to Zhejiang, including southern Jiangsu, southeast Anhui, northeast Jiangxi and northwest Fujian (Fig. 6.1). It has been widely unearthed in the tombs and ruins of those periods. Among proto-porcelain vessels, ritual vessels accounted for a considerable proportion, including the Zun vessel, Dou vessel, tripod, Gui vessel, You vessel, Tilianghe kettle and Jian vessel. In the Warring States period, there appeared similibronze musical instruments, such as the Yong bell, Bo bell, Chunyu, Goudiao and Zheng, as well as weapons, tools and farm implements, etc., which covered all almost kinds of bronze wares, except for chariot fittings and harnesses. There were also some daily utensils.

The proto-porcelain kiln sites of the Pre-Qin period, in which the proto-porcelain was fired, are currently concentrated in the south, mainly in Zhejiang, including Jiangxi, Fujian and Guangdong, which are adjacent to Zhejiang. Throughout China, up to the present, proto-porcelain kiln sites have been found in Zhejiang, Jiangxi, Fujian, Guangdong and other provinces.

6.2. Proto-porcelain kiln sites of the Pre-Qin period in the Dongtiao River Basin in the north of Zhejiang

To date, the vast majority of proto-porcelain kiln sites discovered through archeology have been located in

¹ The proto-porcelain is mainly celadon. However, in addition to celadon, there is also some black glazed porcelain. Black glazed porcelain is mainly distributed in the mounded tombs in central and western Zhejiang. Due to the lack of unearthed materials, the context of the formation, development and decline of black glazed porcelain is not very clear.

² During the period between the decline of proto-porcelain in the late Warring States period and the emergence of mature celadon represented by such kiln sites as Shangyu Dayuanping and Xiaoxiantan in the late Eastern Han Dynasty, a kind of celadon ware was popular in Zhejiang. Its glaze was similar to that of the proto-porcelain of the Shang and Zhou dynasties, but there were great changes in the texture of the clay body. It was traditionally called high-temperature glazed pottery, which is called

proto-porcelain by some scholars. There are great differences between such ware and the proto-porcelain of the Shang and Zhou dynasties in terms of the clay body, the glaze and the types of vessels. Its inheritance from the proto-porcelain of the Shang and Zhou dynasties remains to be studied further.

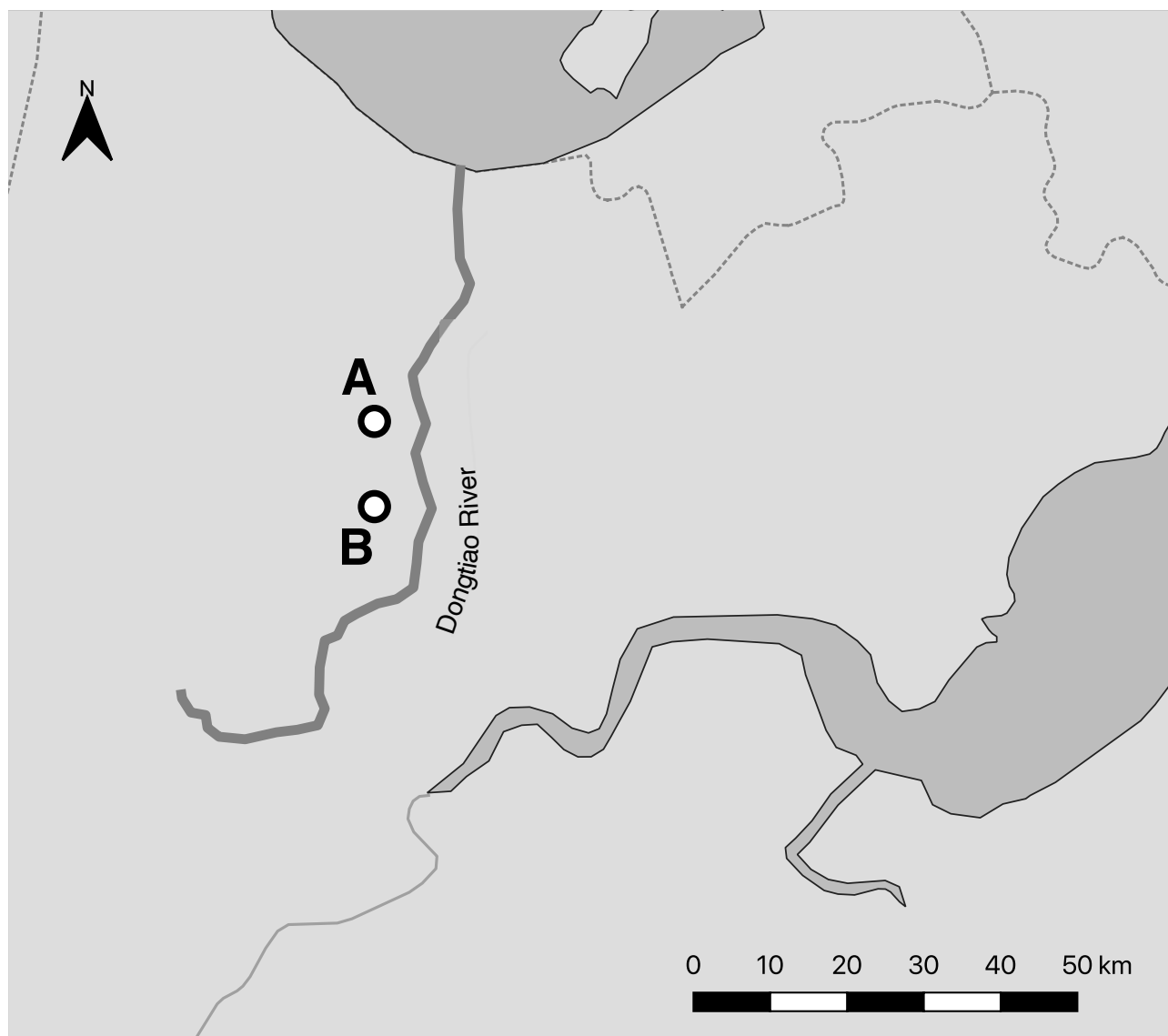


Figure 6.1. Kiln sites of the Shan Dynasty period in the Dongtiao River Basin. A: Huzhou Qingshan area, B: Deqing Longshan area.

Zhejiang. The proto-porcelain kiln sites discovered in Zhejiang are distributed in two areas: the Dongtiao River Basin, with Deqing as the center, and the Puyang River Basin, with Xiaoshan as the center, while the former is the main distribution area.

The Dongtiao River is located on the western edge of the Hangjiahui Plain in the north of Zhejiang Province. It originates at the southern foot of Tianmu Mountain in Lin'an District, Hangzhou City. It flows from northwest to southeast into Qingshan Lake in Lin'an District, flows eastward through Liangzhu Town and Pingyao Town in Yuhang District, then flows northward into Deqing County, runs through the central area of Deqing County and enters the urban area of Huzhou City, where it joins the Xitiaoxi River and flows northward into Taihu Lake. To the west of the Dongtiao River are the Tianmu Mountains, while to the east is the Hangjiahui Plain. Deqing County and southern Huzhou City, which the Dongtiao River passes through, represent a hilly area in the transition between

the western mountainous area and the eastern plain. With undulating low mountains and crisscrossing rivers and lakes, the area is rich in porcelain clay and fuel, and the water transportation there is convenient, which is very favorable for making porcelain.

Up to now, a total of more than 140 kiln sites of the Pre-Qin period have been discovered, which can be classified into two large groups of kiln sites: the Longshan group of kiln sites in Deqing County and the Qingshan group of kiln sites in Huzhou City, with the former as the main body.

The Longshan group of kiln sites in Deqing County are mainly located at the south and east foot of Longshan Mountain, which is the boundary mountain between Huzhou City and Deqing County. The south foot of Longshan Mountain is mainly located in the former Longshan Township (current Wukang Town in Deqing County), and part of it is located in Luoshe Town, while the east foot of Longshan Mountain is located in Daixi Town,

Huzhou City. So far, a total of more than 120 kiln sites have been discovered in this group; the periods when these kilns were built include the Xia Dynasty, the Shang Dynasty, the Western Zhou Dynasty, the Spring and Autumn period and the Warring States period. The Qingshan group of kiln sites in Huzhou City is located in the former Qingshan Township (current Donglin Town) in Huzhou City, with a total of more than 20 kiln sites built mainly in the Shang Dynasty. The products of both groups of kiln sites are mainly proto-porcelain, and also include a certain number of pottery products with impressed patterns. The kiln sites excavated in this area so far include Piaoshan kiln site, of the Xia Dynasty; Nanshan kiln site and Nigushan kiln site, of the Shang Dynasty; Huoshaoshan kiln site, developed from the Western Zhou Dynasty to the Spring and Autumn period; and Tingziqiao kiln site, of the Warring States period.

6.2.1. Piaoshan kiln site

Piaoshan kiln site is located at Piaoshan Mountain, Donghong Village, Daixi Town, Huzhou City (Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2015). It is distributed across two locations, about 400 m apart, facing each other across the gully. Area II of Piaoshan kiln site was excavated in 2012 (Fig. 6.2: 1). The distribution area of Piaoshan kiln site is not very large, at about 300 m². The kiln remains and rich stratigraphic accumulation have been cleaned up (Fig. 6.2: 2). The kiln site has abundant accumulation, about 1 m thick at the thickest point, which can be divided into two periods: the early period corresponds to the late Xia Dynasty, and the late period to the Shang Dynasty. A large number of product specimens have been unearthed. One kiln which was discovered and cleaned up had been seriously damaged (Fig. 6.2: 3). The kiln tail did not exist. Part of the firebox was preserved, but the walls on both sides were not well preserved and were almost completely destroyed. The residual length of the kiln is 4.2 m, the width of the uphill end to the west end 2.9 m, the width of the downhill end to the east is 2.2 m, the direction is 105 degrees, and the slope is 22 degrees. The unearthed product specimens are basically proto-porcelain and stamped hard pottery. The shape of the proto-porcelain is very original, and the clay body is consistent with the hard pottery: The colors of clay bodies are darker, most of them being grayish black, cinerous, purplish red and earthy yellow and not pure. Most of the clay bodies resemble a sandwich biscuit, grayish black inside and earthy yellow outside, or earthy yellow inside and cinerous outside, etc. The texture of the clay bodies is loose, with a large number of pores of different sizes and a high water absorption rate (Fig. 6.2: 4). The clay bodies are harder due to higher firing temperature. Except for some under-fired clay bodies, almost no soft pottery has been discovered. The types of vessels mainly include the bowl, tripod plate, long-necked jar, large jar with a folding rim, Dou vessel, sinker-shaped clay objects, pad and clapper. The glazed part is mostly the upward part of the vessel, such as the inside of the tripod plate and the

shoulder and rim of the jar. The thicker glaze layer tends to be concentrated on one side of the vessel, such as the shoulder and neck of the jar or one side of the handle of the Dou vessel. The glazing line is not clear, and the glazing thickness gradually thins from the glazed part to the non-glazed part. The glaze layer of most vessels is very thin. Only in a small area of local glaze is the glaze layer thicker, gradually thinning at the perimeter and showing a very thin spot shape. The glaze was not well distributed in the area with thick glaze, showing a spot of coagulated glaze. The degree of vitrification is high and the glass texture is strong, but the glaze peeling is severe due to poor combination of the glaze with the clay body. The glaze color shows darker black-brown, tan or cyan (Fig. 6.2: 5). For the unglazed part of the vessels, including hard pottery, the surface shows a darker black-brown or tan coat or membrane. There are two kinds of hard pottery: plain hard pottery and stamped hard pottery. These are basically the long-necked jar and the jar with a folding rim, with zigzag decorative patterns. For both the proto-porcelain and the stamped hard pottery, the inner belly of the large small-mouth jar is uneven; there are many pits in it, and the pits in the stamped hard pottery are denser and deeper. The outer belly of the proto-porcelain is bright and clean. Many vessels can be seen with very fine lateral smear marks on the outer belly, and most of the spiral patterns along the rim are regular, though some are also irregular. It can be determined that such vessels were formed by dishing up hand-made clay strips. Small vessels, such as bowls, are bright and clean inside and outside, so they were probably formed by wheeling clay.

Piaoshan kiln site is the earliest proto-porcelain kiln site discovered and excavated so far. It can be dated to the late Xia Dynasty. The porcelain excavated from this kiln site is quite primitive in both clay and glaze. These characteristics are very similar to those of hard ceramics, and it is possible to understand the process by which hard ceramics were transformed into primitive porcelain.

6.2.2. Nanshan kiln site

Nanshan kiln site is located in Nanshan Village, Donglin Town, Huzhou City (Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2015). Thanks to the excavation, the remains of three kilns and two ash pits were exposed, and a large number of proto-porcelain wares were unearthed. The remains of all three kilns represent long-strip sloped dragon kilns (Fig. 6.2: 6). Kiln no. 3 is the best-preserved one, with an inclined length of 7.1 m and a width of 2.2–2.4 m. The kiln is considerably original: The whole kiln body is short; the firebox is long and narrow, while the firing chamber is short. The floor of the firing chamber is uneven, and there is no bottom sand in it. It is from the early stage of the development of the dragon kiln, and it is also the earliest proto-porcelain dragon kiln excavated so far. The specimens of unearthed products are all basically proto-porcelain. The types of vessels represented include the Dou vessel, jar and lid, Gui vessel, Zun vessel, basin, plate, bowl and vase. Most



Figure 6.2. Kilns and ceramic in the Dongtiao River Basin 1 (Courtesy of Zheng Jianming).

of the vessels would have been intended for use as ritual vessels. The texture of the clay bodies of most vessels is relatively fine and firm. The soil for the clay body was carefully selected, but the clay body contained a certain amount of impurities, the treatment of which needs to be further improved. The traces of artificial glazing are obvious: A small number of vessels are full of glaze inside and outside. The glaze color is green. The glaze layer is well distributed, the clay body is well combined with the glaze, and the glass texture is strong, but the glaze layer of most vessels is very thin, and its color is uneven. The body of the vessels was only partially glazed, and the glazing technology was still at the exploratory stage. In terms of shaping, forming by wheeling clay was combined with manual scraping (Fig. 6.2: 7). Nanshan kiln site started its firing in the early Shang Dynasty and lasted until the late Shang Dynasty.

6.2.3. Nigushan kiln site

Nigushan kiln site is located in Zhaiqian Natural Village, Shacun Village, Luoshe Town, Deqing County. In 2012, nearly 200 m² of Nigushan kiln site were excavated; the remains of one dragon kiln were cleaned up (Fig. 6.2: 8), and several product specimens were collected. The kiln was not well preserved, and only the firebox remained. The pot shape is sunken, with a gray sintering surface. The upper half of the firing chamber was entirely absent. Based on the morphological analysis, it would have been a dragon kiln. The accumulation of this kiln site was seriously damaged. The stratum is not thick, and the preserved area is not large. There are a large number of sintered clay agglomerates and a small number of product specimens in the preserved stratum, including plain hard pottery and stamped hard pottery, and no proto-porcelain has been discovered. Therefore, this kiln would have fired the pure pottery instead of proto-porcelain. The types of stamped hard pottery wares represented mainly include various kinds of pots or jars. The clay bodies are mainly reddish brown (Fig. 6.2: 9). The stamped decorative patterns are mostly thick and large rhombic cloudscares, diamond patterns or broken line patterns (herringbone patterns), but there are also small and shallow fine rhombic cloudscares. Some of the vessels are plain, with a very thin glaze layer on the surface, and the clay body is close to that of the hard pottery. Based on the decorative patterns and types of the products and other aspects, the era of the kiln site was around the Shang Dynasty.

So far, this is the only hard pottery kiln site of the Shang Dynasty to have been cleaned up in the Dongtiao River Basin in Zhejiang Province. The main observation to note is that some products have an extremely thin glaze layer, which is of great significance for understanding the pottery firing technology in this area and the relationship between the pottery firing technology and the proto-porcelain, and also adds a new type to the porcelain production in the Pre-Qin period.

6.2.4. Huoshaoshan kiln site

Huoshaoshan proto-celadon kiln site is located at both ends of the dam of Juebuling Reservoir, Longshan Village, Wukang Town, Deqing County (Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2008). It is an ancient kiln site for firing proto-celadon dating from the late Western Zhou Dynasty to the late Spring and Autumn period. Thanks to the excavation, three kilns and more than 10 ash pits were exposed (Fig. 6.3: 1). All the kilns discovered were located on the hillside, with a certain slope and length which meet the basic conditions of the dragon kiln. The products of this kiln are extremely abundant, but almost no stamped pottery has been discovered. It is a kiln site purely for firing proto-porcelain. The products mainly include bowls, plates, jars, water vases, pots and basins, which are used as practical utensils, and they also include You vessel, tripod (Fig. 6.3: 2) and Gui vessel shapes, which are bronzeware-imitated pottery for ritual. From the end of the Western Zhou Dynasty to the early Spring and Autumn period, this kiln was in its heyday. Its products were rich in variety, exquisite in production and decorated with a large number of decorative patterns, and the glaze color was excellent. Bronzeware-imitated pottery for ritual discovered mainly dated to this period, and their bellies are often decorated with elaborate decorative patterns, mainly including: connected cloud patterns, fine disordered cloud patterns, double-hook line “S” shapes, cloudscares and symmetrical arc patterns. The decorative patterns are large in size, extensive in style and disorderly in arrangement, and often overlap with each other (Fig. 6.3: 3). During this period, although the phenomena of under-firing and glaze peeling were the most severe and the clay body was not well combined with the glaze, the glaze layer was thick, the glaze color was dark, and the glass texture was generally strong.

After the middle Spring and Autumn period, bronzeware-imitated pottery for ritual vessels almost disappeared, the bowls absolutely dominated, and a small number of plates and jars were also produced as practical utensils. Both the number and range of decorative patterns decreased sharply, and basically only two kinds of decorative patterns, the symmetrical arc pattern on the jar and the longitudinal fine water-ripple pattern on some bowls, were retained. The style was fine and orderly, and the overlapped stamping phenomenon was rare. Compared with the early period, the texture of the clay body was more compact, finer and smoother; the glazing technology was obviously improved; the clay body was better combined with the glaze; the frequency of under-firing and glaze peeling decreased sharply; the glaze layer became thinner; the glaze was well distributed; and the glaze color became light and showed a light cyan color. In the late Spring and Autumn period, continuing the trend seen in the middle Spring and Autumn period, the number of vessels was further reduced; there were basically only two kinds of cup-type bowls, the bowl with a lid that fits tightly and the bowl with a sharp round rim, with a cylindrical body and a flat bottom. The production technology of the clay body and the glaze were also further



1. Dragon kiln at Huoshaoshan kiln Site



2. Proto-porcelain *Ding* from Huoshaoshan kiln Site (late Zhou to early Spring and Autumn period)



3. Patterns of proto-porcelain from Huoshaoshan kiln Site (late Zhou to early Spring and Autumn period)



4. Kiln no. 2 at Tingziqiao kiln Site



5. Proto-porcelain loop-handled teapot from Tingziqiao kiln Site



6. Proto-porcelain *Chanyu* from Tingziqiao kiln Site



7. Layer of failed ceramics at Tingziqiao kiln Site



8. Proto-porcelain *You* from Huoshaoshan kiln Site (Spring and Autumn period)



9. Proto-porcelain *Ding* from Tingziqiao kiln Site (Warring States Period)



10. Clay body of Proto-porcelain from Tingziqiao kiln Site



11. Various glaze colors from Tingziqiao kiln Site (Warring States Period)



12. Support tool for firing from Tingziqiao kiln Site (Warring States Period)

Figure 6.3. Kilns and ceramic in the Dongtiao River Basin 2 (Courtesy of Zheng Jianming).

improved. In terms of firing technology, a large number of nearly conical pottery supports dating to the middle Spring and Autumn period were discovered, and one group consisted of three beads used as spacers. Huoshaoshan kiln site is rich in strata and continued to be used for a long time. Through this excavation, it is possible to establish a

more detailed basic chronological sequence from the late Western Zhou Dynasty to the end of the Spring and Autumn period. Moreover, the place of origin has been discovered for similar vessels unearthed from Jiangnan mounded tombs, especially for bronze-ware-imitated pottery for ritual including the tripod, You vessel and Gui vessel.

6.2.5. Tingziqiao kiln site

Tingziqiao kiln site is located in Longsheng Village, Wukang Town, Deqing County. The remains of all seven kilns unearthed were built on the gentle slope of a small hill, with a long strip plane (Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2011). They are dragon kilns with southern characteristics, among which the remains of kiln no. 2 are the best preserved. The kiln floor and firebox are basically intact, with a thorough inclined length of 8.7 m. The kiln appears to be very wide, with a width of 3.32–3.54 m. Generally, it is short and wide, with local features (Fig. 6.3: 4). The kiln wall was not built with brick-shaped adobe, but was made of grass mixed with mud paste, with a residual height of 0.2–0.4 m. The firebox is rectangular. Tons of product specimens and kiln furniture have been unearthed. The products are mainly fired proto-celadon and a small number of fired stamped hard pottery wares. The proto-celadon vessels were formed by wheeling the clay. The shapes of the vessels are standardized. The texture of most of the clay bodies is fine, smooth and compact. There are some products fired at a high temperature, for which the texture is hard, the glaze is even and shiny, the glass light sense is strong, and the quality is superior. These products are comparable to the mature celadon of the Eastern Han Dynasty. In addition to the general bowls, plates, cups, handle-less cups, vases, pots, boxes and other daily utensils, the types of the vessels are mainly a large number of bronzeware-imitated pottery for ritual and musical instruments. The types of ritual vessels represented include the tripod, Dou vessel, basin, three-legged basin, plate, three-legged plate, loop-handled teapot (Fig. 6.3: 5), Tilianghe kettle, the flask with openwork pattern on its body, Zun vessel, Gui vessel, Lei vessel, jar, three-legged pot, Fang vessel and Jian vessel. The types of musical instruments represented include the Yong bell, Chunyu, Goudiao, a three-legged percussion instrument made of clay, a dangling bell and a hanging drum seat, with rich types and diversified forms. These bronzeware-imitated pottery for ritual and musical instruments are standardized and dignified in shape as well as exquisite and meticulous in workmanship. Most of them are large and heavy, appearing solemn and majestic. They can be regarded as the best among the proto-celadon in terms of molding technology, firing technology and product quality.

From the perspective of products, during the Warring States period, Tingziqiao kiln site was a kiln site mainly for firing high-grade bronzeware-imitated proto-celadon ritual vessels and musical instruments for the Yue region. As far as the whole southern region and even the whole country are concerned, it is the first example discovered of a kiln for firing these kinds of proto-celadon. This is an extremely important discovery in the archeology of porcelain kiln sites in China. Thanks to the discovery of Tingziqiao kiln site, the definite place of origin and kiln have finally been found for a large number of similibronze proto-celadon ritual vessels and musical instruments unearthed from the tombs of Yue nobles in the Jiangsu

and Zhejiang areas, indicating that the kiln for firing high-grade living and funeral porcelain for the Yue royal family and upper-class nobles during the Warring States period was in the current Deqing County, Zhejiang Province. At the same time, it also indicates that Tingziqiao kiln site was a kiln dedicated to the production of high-grade living and funeral porcelain for the Yue royal family and upper-class nobles, so it may to a large extent be something in the nature of an early official kiln. Among the proto-celadon unearthed from Tingziqiao kiln site, many products appear to have been fired at a high temperature. The texture of the clay body is exquisite and firm, the glaze is even and bright, the glaze color is blue and green, and the clay body is well combined with the glaze. The product quality has reached the level of mature celadon. In particular, among the products of this kiln site, there are a large number of well-fired large vessels with a huge and heavy body. From the molding process to the method of loading and firing and then to the control of firing temperature, there were high requirements for and difficulties associated with firing such large vessels with an extra thick clay body. The successful firing of these large vessels represents the highest level of proto-celadon production in Tingziqiao kiln site, and also reflects the fact that Tingziqiao kiln site had a relatively mature porcelain-making technology. Therefore, the excavation information from Tingziqiao kiln site in Deqing County is of great academic significance for recovering the important position and role of the proto-celadon of the Warring States period in the emergence of mature celadon, and for studying the development history of Chinese porcelain, especially the origin of mature celadon in China.

6.2.6. Changshan kiln site

Changshan kiln site is located in the north of Shizhai Natural Village, Luoshe Town, Deqing County. A total of four kilns in two locations were excavated and cleaned up, and a large number of exquisite specimens were unearthed. The kilns in one of the two locations were well preserved, and represented the superposition of three kilns one over another, numbered Y1–Y3, while the kiln in the other location, numbered Y4, was severely damaged. Among these, Y1 was the best preserved: The square firebox is about 20 cm lower than the floor of firing chamber. The dark gray sintering surface at the bottom of the firebox is obvious. The bottom of the firing chamber is covered with fine yellow sand. Y2 is located to the southeast of Y1, broken by Y1, and Y3 is located to the southeast of Y2, broken by Y2. In the southern section, the superposition relationship of the three kilns is clear. Y4 was basically destroyed, but judging from the preserved sintering soil, it was undoubtedly a kiln. A large number of proto-porcelain specimens were unearthed from the piles on both sides of the kiln, most of which were of high quality: The texture of the clay body is exquisite and firm; the clay body is excellently combined with the glaze; the glaze is well distributed; the glaze color is verdant or cyan; the glass texture is strong; and the clay body and glaze are close to those of the mature celadon of the late

period. In addition to the bowls used as practical utensils, there are also a considerable number of ritual vessels and musical instruments: tripod, pot, jar, Yong bell, Chanyu (Fig. 6.3: 6) and Goudiao, etc. These ritual vessels and musical instruments were discovered in large tombs, such as the Yue Tomb in Hongshan, Wuxi City, and were distinguished articles for nobles' use only. Changshan kiln site, like Tingziqiao kiln site, originated in the Warring States period. It is of great value for exploring the origin of Chinese porcelain, the evolution of China's kiln system and even the origin of the official kiln system. After a series of excavations of kiln sites and systematic investigation in this area, the profile of the kiln industry in the Dongtiao River basin is basically clear, and displays the following characteristics.

First, the kilns emerged early and lasted for a long time. The kiln sites emerged in this kiln area in the Xia Dynasty, and continuously developed during the Shang Dynasty, the Western Zhou Dynasty, the Spring and Autumn period and the Warring States period, almost without break. So far, this kiln site group is the earliest, longest-used and most complete Pre-Qin kiln site group known in China.

Second, the kiln sites were concentrated, with a large production scale. According to the materials available, there were nearly 150 kiln sites in this period. Many kiln sites, such as Tingziqiao kiln site, had a large distribution area and thick accumulation layer, and the product output had reached a considerable scale (Fig. 6.3: 7).

Third, there were many kinds of products. In addition to the production of bowls, plates and dishes for daily use, a large number of bronze ware-imitated pottery and musical instruments were fired and produced, which symbolized identity and status and had special significance. They included the You vessel (Fig. 6.3: 8), tripod (Fig. 6.3: 9), Gui vessel, Zun vessel, Dou vessel, kettle, Lei vessel, jar, pot, plate, basin, Jian vessel, three-legged plate, the flask with openwork pattern on its body, loop-handled teapot, Tilianghe kettle, gourd-shaped ladle and earthen bowl, which were used as ritual vessels, and they also included the Yong bell, Goudiao, Chunyu, Zhen and hanging drum seat, which were used as musical instruments. The production of these large ritual vessels and musical instruments has only been discovered in this kiln area so far.

Fourth, the quality of products is high. Many products from this kiln area, especially those from the Warring States period, are large in size, standardized in production, exquisite and firm in the texture of the clay body (Fig. 6.3: 10), verdant and smooth in the glaze color (Fig. 6.3: 11), and have well-distributed glaze and a strong glass texture, which are almost comparable to those of the celadon from the Eastern Han Dynasty.

Fifth, an independent kiln area emerged. Starting from the Shang Dynasty, a special kiln area was formed in the Dongtiao River Basin. At least starting from the

late Western Zhou Dynasty, the kiln area was basically specialized in firing proto-porcelain only.

Sixth, the kiln furniture has various shapes, and the loading and firing process was mature. During the Spring and Autumn period, a large number of support beads were used as spacers, which were small in shape and meticulous in manufacture, which could effectively protect the glaze and increase the quantity of loading and firing. During the Warring States period, a variety of support firing tools emerged endlessly: they were shaped like a straight cylinder (Fig. 6.3: 12), trumpet, tray, shallow plate, etc. Different support firing tools were used for firing different vessels, which successfully provided for the loading and firing methods of Yong bell and Goudiao instruments, and the loading and firing technology was quite mature.

Therefore, the kiln area of the Shang and Zhou dynasties in the Dongtiao River Basin, with Deqing as the center, is unique and outshines others in terms of production time, kiln-site scale, product category and product quality. It occupies a very important position in the history of Chinese porcelain. It is the first peak in the history of Chinese porcelain-making, and it is also the source of Chinese porcelain.

6.3. Proto-porcelain kiln sites in the Puyang River Basin on the south bank of the Qiantang River

The Puyang River takes its source at the south foot of Xianhua Mountain, Pujiang County, Jinhua City, central Zhejiang Province. It flows through the Zhuji and Xiaoshan areas, and joins the Qiantang River at the mouth of three rivers in Xiaoshan. It is the largest tributary of the Qiantang River, and it passes through low-mountain hilly areas.

During the Pre-Qin period, the kiln sites in the Puyang River Basin were mainly concentrated in the middle and lower reaches of the Puyang River, with Jinhua Town in the south of Xiaoshan as the center, including the adjacent Shaoxing and Zhuji areas. The kiln sites mainly include Maowanli kiln site, Qianshan kiln site and Anshan kiln site in Xiaoshan District, Fusheng kiln sites in Shaoxing City, and Tuoshanwu kiln site in Zhuji City, among which Maowanli kiln site is the largest. The kiln sites that have been excavated so far in the area include Qianshan kiln site and Anshan kiln site in Xiaoshan District as well as Fusheng kiln sites in Shaoxing City.

6.3.1. Xiaoshan Qianshan kiln site

Qianshan kiln site is located in Shaojiata Village, Jinhua Town, Xiaoshan District, Hangzhou City (Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2005). Thanks to the excavation, two dragon kilns were exposed, and a large number of specimens of proto-celadon and stamped hard pottery were obtained. This is a kiln site for firing proto-porcelain and stamped hard pottery together, active during the Spring and Autumn period and

the Warring States period. Of the two dragon kilns, Y2 was well preserved; part of it was directly built on the raw soil, with kiln-protection soil on both sides. The firebox and the back wall of the kiln tail are basically in good condition. The head of the kiln is at the south and the tail at the north, with a direction of 184 degrees, a slope length of 13 m and a slope of about 15 degrees. The dragon kiln consists of the firebox and the firing chamber. The plane of the firebox is semicircular, and the bottom is slightly inclined from the back to the front. The back wall is 2.3 m wide and 0.6 m high, and it is 1.5 m away from the stokehole. The inner side, back wall and bottom of the firebox were sintered into a cinerous hard surface, and the sintering degree of back wall was higher. The inclined length of the firing chamber is about 11 m, and the width of the kiln bottom is 2.3–2.4 m, with almost the same width at both the rear and the front. The vault of the kiln has collapsed, but the collapsed block at the top of the kiln is basically flat at

the bottom of the kiln. The vault was made of clay mixed with straw. On the sintered surface of the top, inside the kiln, there are traces of tied branches and woven bamboo strips. The products mainly include stamped hard pottery and proto-porcelain.

According to the distribution of fragments in the dragon kiln, the front section of the firing chamber may have been used mainly for firing proto-porcelain, while the rear section of the firing chamber may have been used mainly for firing stamped hard pottery when the dragon kiln was firing these two types of products in the same kiln. Whether for proto-porcelain or for stamped hard pottery, the variety is relatively simple, and basically represents small daily utensils. Mainly two types of stamped hard pottery are represented, altars and jars, the mouth rims of which have been scraped by the wheel. The decorative patterns of the stamped hard pottery mainly include the



1. Proto Porcelain bowl from Qianshan kiln Site (Warring States Period)



3. Proto Porcelain *Zhong* from Anshan Kiln Site (Warring States Period)



4. Stamped hard pottery from Anshan Kiln Site



2. Dragon kiln at Anshan Kiln Site

Figure 6.4. Proto-porcelain kiln and vessels (Courtesy of Zheng Jianming).

checkered pattern, rice-sieve pattern and checkered filling line pattern. The proto-porcelain is another main product of Qianshan kiln site. The types of vessels represented include bowls (Fig. 6.4: 1), cups, dishes, plates and lids. They were all made by wheeling. The shapes are small and basically plain. A small number of curved bellied bowls have water-ripple patterns on the inner belly.

6.3.2. Xiaoshan Anshan kiln site

Anshan kiln site is located in Jinhua Town, Xiaoshan District, Hangzhou City (Shen 2009). Three dragon kilns (Fig. 6.4: 2) from the Spring and Autumn period and the Warring States period were excavated and cleaned up. Y1, built on the southeast slope of Anshan, is composed of the firebox and the floor of the firing chamber, with a total inclined length of 10.5 m. The plane of the firebox is a rounded rectangle with 2.75 m in width and 0.35 m in height. The rear wall is 1.25 m away from the stokehole. The connection between the rear wall of the firebox and the floor of firing chamber projects out in a slight arch. There are kiln-protection buildings on both sides of the firebox. Y2 and Y3 are located on the west slope of Anshan, and their structures are basically the same as those of Y1. There are two types of unearthened products: proto-porcelain and stamped hard pottery. The types of proto-porcelain wares represented include bowls, jars, dishes, plates and handle-less cups (Fig. 6.4: 3). The texture of the clay body is fine and smooth. The glaze is blue or yellow. The stamped hard pottery includes jars (Fig. 6.4: 4) and altars. The decorative patterns of the stamped hard pottery include the large Hui character pattern, checkered pattern, rice-sieve pattern, Mi character pattern, water-ripple pattern, checkered filling line pattern, and Hui character crisscross pattern. The stamped hard pottery was fired at a higher temperature, to a hard texture. The period of producing the stamped hard pottery was from the middle to late Spring and Autumn period to the early Warring States period. The kiln furniture is mainly of the small, round support plate shaped spacer type. According to analysis of the unearthened remains, it is speculated that Y1 started firing and manufacturing the products in the middle to late Warring States period, Y2 started in the early to middle Warring States period, and Y3 started the earliest, in the middle to late Spring and Autumn period.

6.3.3. Fusheng kiln sites

The Fusheng kiln sites are located in Changzhuyuan and Zhujiashan, Fusheng Town, Shaoxing City (Shaoxing County Cultural Relics Management Committee 1979). Among others, after a simple cleaning of the Changzhuyuan kiln site, the remains of a kiln with a length of 3 m and a width of 2.42 m was exposed. The bottom of the kiln was covered with sand. It was a slope-shaped dragon kiln. Only the middle and rear sections of the kiln were preserved. A few fragments of proto-celadon, geometrically stamped hard pottery and flat round support beads were discovered in the kiln, demonstrating that the kiln was for firing stamped hard pottery and proto-celadon together. A large number of examples of proto-porcelain and stamped hard

pottery were unearthened in the stratum. The proto-celadon was made of porcelain clay, with a fine and hard texture and a high firing temperature. Most of the products unearthened were gray-white, while some of them were gray. The shapes of the vessels were standardized, with circles of fine spiral patterns on the inner bottom and numerous cutting-line traces on the outer bottom. A thin glaze with a yellowish tint was applied inside and on the outside of the vessels. The glaze layer was not well distributed, with obvious coagulated glaze, and most of the outer bottoms were not glazed. The types of vessels represented include bowls, plates, dishes, pots, lids and other small daily utensils, lacking variety. The geometrically stamped hard pottery includes containers such as jars and altars. The bone of the clay body is dark purple, purple-black or dark gray, and the texture of the clay body is strong. The outer wall of the pottery is stamped with geometric patterns such as rice-sieve pattern, Mi character pattern, checkered pattern, mat pattern and Hui character pattern. The period of production for these vessels was from the middle to late Spring and Autumn period to the early Warring States period.

6.3.4. The main kiln sites in this area, other than the excavated kiln sites described above

In terms of product category, this group of kiln sites mainly produced stamped hard pottery and a small number of proto-porcelain wares; in terms of age, this group of kiln sites started from the middle to late Spring and Autumn period, flourished in the early Warring States period, and declined in the middle Warring States period; and in terms of the types of proto-porcelain, this group of kiln sites basically produced small daily utensils such as bowls and dishes and occasionally produced small jars, but no large proto-porcelain ritual vessels or musical instruments have been discovered. This group of kiln sites must be a supplement to the group of kiln sites of the Pre-Qin period in the Dongtiao River Basin, with Deqing as the center.

The largest group of kiln sites in this area is located in Maowanli. Although it has not been formally excavated, the profile and distribution of this group of kiln sites have been basically clarified through several years of investigation: This group of kiln sites covers an area of about 20,000 m². It is composed of several kiln sites in Qiujiashan, Shizishan and Wusongtui. It was mainly for firing stamped hard pottery and proto-porcelain together. The proto-porcelain mainly includes bowls, plates, dishes, pots and other daily utensils. No large ritual vessels and musical instruments have been discovered. The quality of the glaze and of the clay bodies of some vessels is high. The stamped hard pottery mostly includes jars and altars. Their decorative patterns are relatively simple, mainly including the checkered pattern, double Hui character and Shi character crisscross patterns, rice-sieve pattern and checkered filling line pattern. These vessels were fired in the dragon kiln. The kiln was relatively mature, and the use of space was reasonable. This area was an important distribution area of early dragon kilns. These kilns started

from the middle to late Spring and Autumn period and lasted into the Warring States period.

6.4. Basic pattern and significance of proto-porcelain kiln sites of the Pre-Qin period in Zhejiang

Among the proto-porcelain kiln sites of the Pre-Qin period in Zhejiang, the group of proto-porcelain kiln sites of the Pre-Qin period in the Dongtiao River Basin, with Deqing as the center, is unique and outshines others in China in terms of production time, kiln-site scale, product category, product quality and firing technology. It occupies a very important position in the history of Chinese porcelain. It was the first peak in the history of Chinese porcelain-making, and laid a solid technical foundation for the emergence of mature celadon in the Han Dynasty. However, the group of proto-porcelain kiln sites of the Pre-Qin period in the Puyang River Basin, with Xiaoshan as the center, is not only small in scale, but also has a relatively simple variety of products. The products of these kilns mainly included small daily utensils such as bowls and plates. The period of activity for these kilns was mainly from the late Spring and Autumn period to the early Warring States period. This group of kiln sites was an important supplement to the group of proto-porcelain kiln sites of the Pre-Qin period in the Dongtiao River Basin. Its emergence was closely related to the conflict between Wu and Yue in the middle and late Spring and Autumn period and the retreat of Yue culture to the south of the Qiantang River (Zheng 2019).

The group of proto-porcelain kiln sites of the Pre-Qin period in the Dongtiao River Basin has important academic value in the following respects.

6.4.1. Providing an important material basis for exploring the origin, development and maturity of porcelain

The proto-porcelain kiln sites discovered in this area can be traced back to the Xia Dynasty or the period between the Xia and Shang dynasties. In terms of the clay bodies, glaze and molding technology of the products and the loading and firing technology of the kilns, these kilns were both mature and original. The products of these kilns had the characteristics of an early form of porcelain. They are the “proto” porcelain. This provides important material information for exploring the origin of porcelain and the development history of China’s porcelain. The discovery of large-scale proto-porcelain kiln sites in the Dongtiao River Basin fully proves that this area is an important origin point for Chinese porcelain. And the continuous development of the proto-porcelain kiln sites during the Western Zhou Dynasty and Eastern Zhou Dynasty formed the first peak in the history of Chinese porcelain-making.

6.4.2. Finding the place of origin for some of the proto-porcelain products unearthed elsewhere

The proto-porcelain wares unearthed in Jiangnan and Northern China, including the Yinxu area and Zhouyuan,

are similar to the products from the kiln sites in the Dongtiao River Basin in terms of type, shape, clay body, glaze and other characteristics, and can be preliminarily identified as the products of this basin. Therefore, the investigation and excavation of a series of kiln sites in the Dongtiao River Basin provides very important information for exploring the place of origin for the unearthed proto-porcelain. The discovery of kiln site products of this basin in the capitals of the Shang and Zhou dynasties, such as Yinxu and Zhouyuan, not only proves that the proto-porcelain was a kind of high-grade vessel symbolizing identity and status during the Pre-Qin period, but also further proves that the northern proto-porcelain was probably produced in the south.

6.4.3. Providing a wealth of material information for the establishment of the chronology of proto-porcelain of the Pre-Qin period in the Taihu area

The proto-porcelain kiln sites of the Pre-Qin period in the Dongtiao River Basin lasted for a long time, and the evolution of the vessels was clear. From the Xia and Shang dynasties to the late Warring States period, a complete chronological sequence of the proto-porcelain of the Pre-Qin period in the Taihu area can be basically established. Considering that not many sites in this area have been excavated and dateable materials are not abundant, the age of the site could be disproved, which is conducive to establishing a more detailed chronology of Pre-Qin archeological culture in this region.

6.4.4. Enriching the research on the archeological culture of the Shang and Zhou Dynasties in the Taihu area

It is one of the most important characteristics of Yue tombs that proto-porcelain ritual vessels were buried with the dead instead of bronzes. Therefore, proto-porcelain plays an extremely important role in Yue and Pre-Yue culture. Its significance is similar to that of bronzes in the Central Plains, where the use of bronzes was a symbol of the identity and status of the user. The large-scale production of proto-porcelain during the Pre-Qin period showed that the proto-porcelain production at that time was no longer dependent on the kiln site, but formed an independent kiln area, which is an important basis for exploring the social division of labor at that time. The emergence of a large number of proto-porcelain ritual vessels, musical instruments, tools, weapons and farm implements reflects the unique ritual vessel system in the region. The emergence of the products of this kiln area in Yinxu, Zhouyuan and other capital cities provides an important clue for exploring the contacts between the Central Plains and the Taihu area.

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References

- Chinese Ceramic Society ed. 1982. *The History of Chinese Ceramics*, Culture Relics Press. [中国硅酸盐学会编《中国陶瓷史》]
- FENG Xianming ed. *An Illustrated Book of Ancient Chinese Ceramics*, Culture Relics Press, 1998. [冯先铭主编：《中国古陶瓷图典》]
- Shaoxing County Cultural Relics Management Committee, 1979. Fusheng Kiln Sites of the Warring States Period in Shaoxing City, Zhejiang Province, *Archaeology*, 1979–3. Beijing. [绍兴县文物管理委员会《浙江绍兴富盛战国窑址》，《考古》]
- SHEN Yueming 2009. *Xiaoshan Anshan Kiln Site*, Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. *Zhejiang New Era of Archaeology*, Science Press. Beijing. [沈岳明《萧山安山窑址》，见浙江省文物考古研究所编《浙江考古新纪元》]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2005. Excavation Bulletin of Qianshan Kiln Site in Xiaoshan District, Zhejiang Province. *Cultural Relics*. 2005–5. Beijing. [浙江省文物考古研究所等：《浙江萧山前山窑址发掘简报》，《文物》]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2008. *Deqing Huoshaoshan*, Culture Relics Press. Beijing. [浙江省文物考古研究所等《德清火烧山》]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2011. *Deqing Tingziqiao*, Culture Relics Press. Beijing. [浙江省文物考古研究所等：《德清亭子桥》]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2015. *Proto Porcelain Kiln Sites of the Xia and Shang Dynasties in Dongtiao River Basin*, Culture Relics Press. [浙江省文物考古研究所等《东苕溪流域夏商时期原始瓷窑址》]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, etc. 2015. *Proto Porcelain Kiln Sites of the Xia and Shang Dynasties in Dongtiao River Basin*, Culture Relics Press. Beijing. [浙江省文物考古研究所等《东苕溪流域夏商时期原始瓷窑址》]
- ZHENG Jianming, 2019. The Decline of Proto Porcelain and the Southward Movement of Wu Culture in the Middle and Late Spring and Autumn Period, *Southeast Culture*, 2019–5. [郑建明《春秋中晚期原始瓷的衰落与吴文化的南下》，《东南文化》]

Value Construction of Proto-Porcelain Skeuomorphs in the Yue State in Southeast China

Michèle H. S. Demandt

Abstract: Proto-porcelain, made of kaolin clay and fired at a temperature of 1100–1200°C, was the preferred medium for imitating bronze objects in Southeast China during the Yue Bronze Age (circa third to sixth century BC). This chapter firstly focuses on the characteristics of this special skeuomorphic tradition and explores the value construction of proto-porcelain vessels. Secondly, the process which transformed proto-porcelain into the main component of grave-good assemblages in the Yue region is analyzed. Proto-porcelain consumption seems to have been impacted by both complex socio-political processes on a transregional scale and socio-technical decisions on a local communal level. Moreover, the main component of proto-porcelain seems to have been sourced locally, was used over multiple generations, and can therefore be envisioned as a historical agent through which the inhabitants of Southeast China stressed their local “Yue” origin.

Keywords: Proto-porcelain, Bronze Age China, Yue State, skeuomorphs, ceramic production

7.1. Introduction

Since the Early Bronze Age (ca. 2000 BC), the river valleys of Zhejiang province in Southeast China have been inhabited by people who produced a diverse set of ceramic materials for both daily and ritual use. Far removed from the traditional center of power located in the Central Plain, this early ceramic tradition was remarkable for its highly specialized production of a new type of material, proto-porcelain, in locally developed dragon kilns. In particular, the Dongtiaoxi river valley, in modern Huzhou City, is often considered to be the birthplace of proto-porcelain due to the overwhelming archeological evidence of large-scale kilns producing a variety of proto-porcelain products. Stimulated by the unprecedented growth in ceramic production that took place in the Yue State (ca. 600/500–330 BC), the craft of proto-porcelain was brought to perfection through the practice of skeuomorphism. Proto-porcelain skeuomorphs, mainly imitating bronze objects, became a distinctive craft product and an essential part of mortuary rituals in the Yue State. This being said, the choice to select proto-porcelain as a medium for the production of key burial goods, instead of other “customary” materials representing status and wealth, is still not well understood and is often explained in terms of functionality and material scarcity. In addition, despite growing evidence of local autonomy and regionally coordinated developments, outside stimuli are still seen as the underlying cause guiding the consumption of proto-porcelain. This chapter will investigate this specific instance of material preference and attempts to provide an alternative explanation by considering different factors in tandem. Two main questions will be considered:

Why did people in this region consider proto-porcelain to be valuable? And why was proto-porcelain selected as a fundamental component of grave good assemblages? Through the analysis of the process of value construction of proto-porcelain skeuomorphs, and its relationship with the selected prototype and skeuomorphic material, it will be argued that proto-porcelain consumption was largely impacted by complex socio-political processes related to the display of power, status and regional identity on a transregional scale. Furthermore, the value of proto-porcelain skeuomorphs seems also to have been socially constructed on a local level and involved specific technical decisions. Moreover, the people that produced and used proto-porcelain might have envisioned proto-porcelain as a historical agent that stressed their local origin as inhabitants of the Yue land and recalled an emotional bond with the ancestral past, which was evoked by its material source, e.g. kaolin clay, and its consistent use over different generations in the Yue region.

7.2. Setting the scene: proto-porcelain and the Yue State

Proto-porcelain is a ceramic material, made of kaolin clay and fired at a temperature of 1100–1200°C, that started to circulate in various parts of China before and during the Shang Dynasty (1250–1046 BC) (Lu 2015: 354–55). Although its name and place of origins is controversial (Xie 2012: 69–71), proto-porcelain is often seen as occupying an intermediate stage on the evolutionary scale between earthenware and porcelain, and can be categorized as a special type of stoneware. Furthermore, the technical ability to produce proto-porcelain is seen as a

first and “essential” step towards the production of “real” porcelain, as happened during the Han Dynasty (206 BC–AD 220) and which would reach its apogee during the Yuan Dynasty (AD 1279–1368). However, while the craftsmanship and beauty of porcelain has been admired all over the world, the history of its stoneware “predecessor” has been obscure. This seems perplexing considering the overwhelming archeological evidence testifying to the prominent use of proto-porcelain in early China, and especially in the early societies inhabiting Southeast China.

Many scholars agree that the majority of proto-porcelain products were produced on the southeastern periphery, far removed from the dominant cultural realms situated in the Central Plain, and were superior in terms of appearance, hardness and porosity (von Falkenhausen 1999: 530; Shen & Zheng 2015: 13–22). More specifically, from the third millennium BC until the sixth century BC, the region comprising the Dongtiaoxi river valley, in modern Zhejiang province, was one of the most important production centers of proto-porcelain (Fig. 7.1). Currently, archeologists call this period the “Yue Bronze Age” and the people living in this area the “Yue people.” However, the “Yue” term first appeared in historical sources from the Central Plain, such as the *Zuo Zhuan* (*Zuo’s Commentary*), to denote a state that was founded in northern Zhejiang in the sixth century BC: the Yue State (ca. 600–333 BC). To complicate

matters even more, the concept of “Yue” has also been used to refer to people living in other peripheral regions in China’s southeast, such as the Minyue and Dongyue, and is “not limited to a single ethnicity or group” (Brindley 2005: 65). This chapter exclusively deals with historical events originally taking place in the region comprising modern-day Zhejiang province and, therefore, “Yue” will only designate the Bronze Age culture, region, people and state of this region (Fig. 7.2).

Until today the archeological cultures situated in the Central Plain have enjoyed the majority of the scholarly limelight, and the origin and development of the Yue State has received far less attention. Often considered to be of less importance in the grander scale of things that were happening during this period, the Yue State has often been described in very few words or lumped together with its neighbor: the Wu State. Reasons for this range from the restrictive focus of written sources, and the attraction of splendid artifacts found at Anyang (Loewe and Shaughnessy 1999: 14–15), to aspirations to prove the indigenous origin of Chinese civilization and the concentration of construction projects (Zhang 2006: 54). In regards to the Yue State, Eric Henry (2007: 1) has complained that “the history of Yue lies scattered and submerged, awaiting an exhumers to attempt some sort of reassembly.” Although the present study only touches the surface of the Yue cultural realms, it can offer some initial

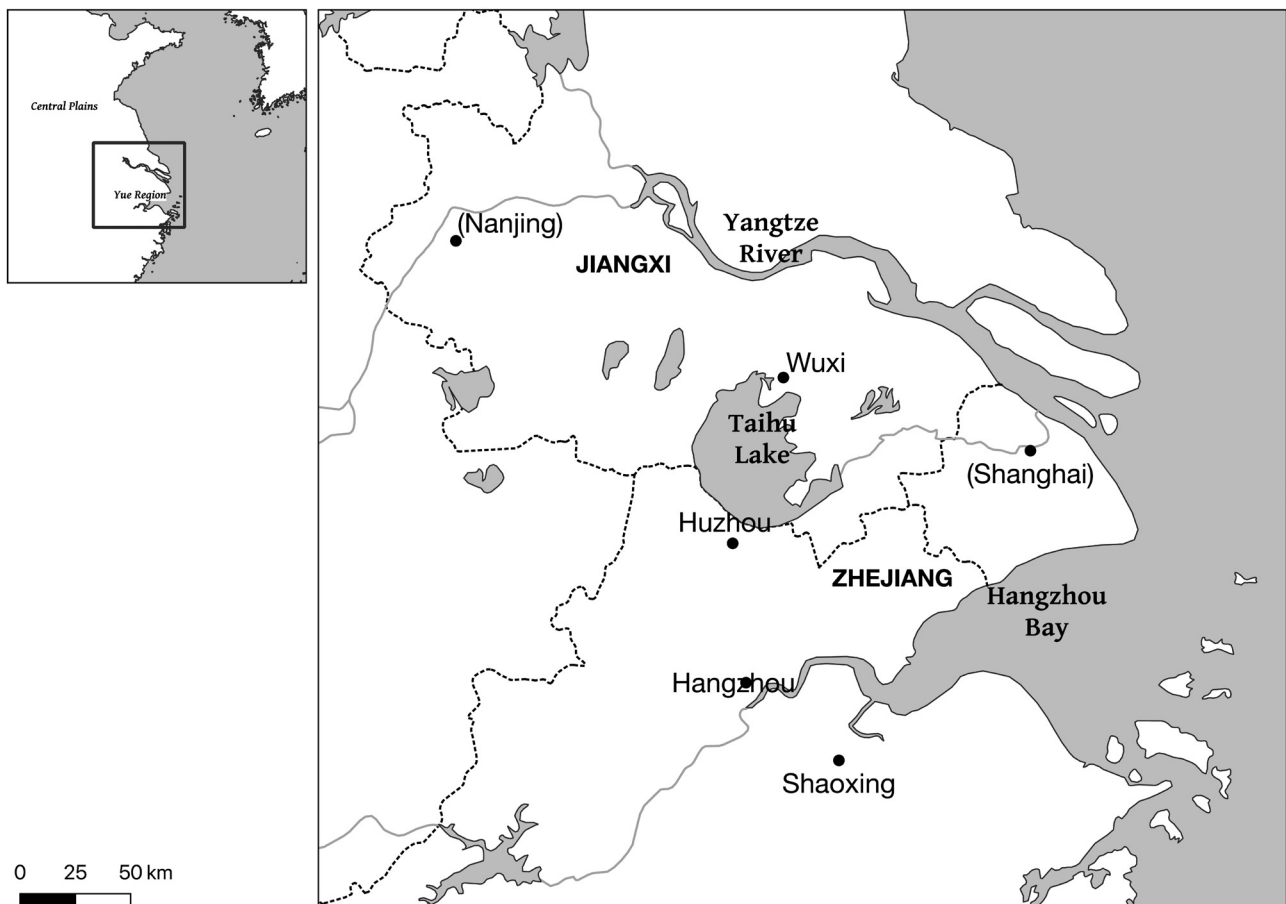


Figure 7.1. Map of Warring States China and the Yue State.

Central Plain	Northern Zhejiang
Eastern Zhou (770 – 256 BC) Warring States (475 – 221 BC) Spring and Autumn (770 – 475 BC)	Chu Occupation (333 – 223 BC) Yue State (ca. 600 – 333 BC) Middle – Late Period (473 – 333 BC) Early – Middle Period (ca. 600 – 473 BC)
Western Zhou (1046 – 770 BC) Shang (1250 – 1040 BC) Erligang and Erlitou (1900 – 1250 BC)	Yue Bronze Age (ca. 1200 – 600 BC) Maqiao Culture (1950 – 1250 BC)
Late Neolithic (3000 – 1900 BC) Middle Neolithic (5000 – 3000 BC) Early Neolithic (7000 – 5000 BC)	Pre-Yue Neolithic Qianshanyang – Guangfulin (2500 – 2000 BC) Liangzhu (3300 – 2200 BC) Songze (3800 – 3300 BC) Majiabang (5000 – 3800 BC) Hemudu (5050 – 3050 BC)

Figure 7.2. Chronology of the cultural sequence of the Central Plain and Northern Zhejiang (Liu & Chen 2012: 123, 169, 213, 253, 350, Meng 2010: 184–90, Cao 2015: 147, 149).

insights on selected matters related to political complexity, interregional contact and internal social dynamics. More specifically, the reasons for selecting proto-porcelain over bronze and the process underlying the value construction of proto-porcelain will be discussed in greater detail.

Besides being used for the manufacture of simple ceramic forms, such as daily utensils and cooking vessels, proto-porcelain produced in the Yue region played an important role in burial customs. It often appeared together with low-fired earthenware and geometric stamped stoneware, as a third category of ceramic materials that were selected as a medium for burial assemblages. At the height of the Yue State, proto-porcelain production reached an unprecedented level, with the appearance of intricately crafted skeuomorphs that were often close imitations of imported bronze goods. This is evidenced by the discovery of individual elite tombs, such as Zhujiashan M1, Xiaojiashan M17 and Xiaohuangshan M13 in Shaoxing (Zhejiang Provincial Institute of Cultural Relics and Archaeology et al. eds. 2016: 54–127), and Bizishan in Huzhou City (Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. 2009: 48–100), as well as several burial complexes, such as Hongshan in Wuxi City (Nanjing

Museum et al. ed. 2007), Huangheshan (Shen 2003: 27–29), Dongpoling in Huzhou City (Zhejiang Provincial Institute of Cultural Relics & Deqing District Museum 2018: 46–55) and Shangyu in Shaoxing City (Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. 2002: 96–177), which contained a large variety of high-quality proto-porcelain skeuomorphs. Nonetheless, with some exceptions, the selection of ceramic surrogates as key burial goods was atypical in the regional burial rituals characterizing this period, often referred to as the Warring States period (475–221 BC). Although other states, such as Chu, Zhongshan and Yan, also produced and used ceramic skeuomorphs (Wu 1999: 729–32), the appearance and quality of these objects was quite different. For instance, ceramics found in Warring States burials of the Yan State often had a gray color and were covered by a blackish glaze. Moreover, on an intraregional level proto-porcelain seems to have ranked lower on the overall value scale of materials used to produce burial goods. For instance, elite tombs in other regions typically featured bronze burial goods, which were accompanied by a smaller selection of ceramics and sometimes other types of status goods, such as lacquerware and silk. On the contrary, the majority of Yue tombs discovered contained no bronze goods at all.

The decision to omit bronzes has often been explained as being the result of practical and economical concerns (Zheng 2007: 240–44). Moreover, when it was first discovered, archeologists did not even entertain the notion that the inclusion of proto-porcelain could have been a deliberate choice. Instead, it was believed to be the result of looting practices (Chen 2011: 33). Only recently, after the discovery of undisturbed tombs of the Yue State, such as Xiaohuangshan M13 and Bizishan (Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. 2009), has it been accepted that burial assemblages solely consisting of proto-porcelains represent the original finding context. Another problem characterizing the study of the Yue State and its proto-porcelain is the belief that cultural contact with the core region of Warring States China, i.e. the Central Plain, was the main instigator of change. This has led to the dominant view that proto-porcelain consumption was strongly influenced by outside forces, and in particular by the political and ritual system of Central Plain states, which were formerly united under the Zhou Dynasty (Wang H. 2017; Zheng 2019). Although the impact of the Zhou cultural realms on the Yue State, often via its neighboring state Chu, cannot be ignored, it should also not be exaggerated. Instead, it needs to be acknowledged that local continuities and regional developments might have also played a role. Chen Yuanfu (2015) has tried to break with these research conventions and has offered a more nuanced explanation of the appearance of proto-porcelain. In addition to the impact of the ritual system of the Central Plain, he mentions the practice of *mingqi* or ritual articles, e.g. specially produced burial goods, and the persistence of local traditions as two additional causes. However, although his analysis should be commended and partially explains the appearance of proto-porcelain skeuomorphs, it lacks a detailed discussion and consideration of the socio-political climate and internal developments of the Yue State.

Finally, research about proto-porcelain has also been unbalanced in focus. Generally speaking, most research about proto-porcelain has concentrated on its technical features and glaze, and issues related to its provenance and chemical composition (Chen T. et al. 1997; Wu J. et al. 2011a; Wu J. et al. 2011b; Yin et al. 2011). In addition, several detailed studies exist about the construction and development of the specialized elongated kilns (so-called dragon kilns) which were used to fire proto-porcelain (Wang Y. 2010; Wang H. 2017; Xie 2012). These technology-focused studies are critical for understanding some aspects of the proto-porcelain phenomenon, but, on the other hand, they push aside research topics of equal importance. In particular, questions regarding the function of proto-porcelain and the reasons why it became a socially valued material have not been answered in a meaningful way. Therefore, this chapter hopes to introduce the topic of “proto-porcelain” and focus on both the technical and social features of this unique material. This will be done by reconstructing the value of proto-porcelain in early Southeast China, and more specifically in the Yue State.

7.3. Foundations of the Yue State: literary and archeological evidence

The Yue State’s origin is murky, and it first appears by name in the *Chunqiu* (Spring and Autumn Annals), which records events taking place from the mid-sixth century BC to 476 BC, and other literary sources, such as the *Shi ji* (Historical Records), *Zuo zhuan*, and the *Yuejue shu* (The Glory of the Yue). In chapter 41 of the *Shi ji*, it is recorded that the famous Yue king, Goujian (r. 496–465 BC), descended from Yu the Great of the “semi-legendary” Xia Dynasty, and founded a capital in Kuaiji, near modern Shaoxing in Zhejiang. The historicity of Goujian is confirmed by the discovery of a beautiful bronze sword inscribed with “Goujian, King of Yue” in a Chu tomb in Jiangling, Hubei (Lin 1987). Historical sources further note that the Yue State rose to power during the late Spring and Autumn period (770–476 BC) and became entangled in a bloody feud with its neighboring state, Wu. Several battles, led by King Goujian and King Fuchai of the Wu (r. 495–474 BC), were fought for control over precious rice-growing lands in the lower Yangtze region. From its foundation the Yue State was located in northern Zhejiang and centered in the Ningshao plain, the Hangjiahu plain and the Jinqu hills in Shaoxing. However, after their victory over the Wu in 473 BC, parts of Shandong, Jiangxi, Anhui and eastern Jiangsu were also integrated, and in 469 BC the capital of the Yue was moved to Langye in western Shandong (Meng 2010: 2–5). Although it is debated (See Henry 2007: 13–16; Brindley 2015: 92), conventionally, 333 BC, the year King Wei of the Chu state conquered and annexed the lands of the Yue, as recorded in chapter 41 of the *Shi ji*, is seen as the end date of the Yue State. However, their cultural influence did not end here, and some of the Yue people seem to have dispersed further south, possibly into present-day Fujian province.

In the last two decades, scholars have acknowledged the strong impact of local factors on state development in the lower Yangtze region, rejecting earlier theories that prioritized the role of outside stimuli, such as socio-political contacts with state-level societies in the Central Plain (von Falkenhausen 1999: 529–39; Zhang 2006; Brindley 2015: 13–20). As is the case for many pre-imperial cultures in South and Southeast China, the Yue and Wu are now recognized as independent states with a distinctive archeological repertoire. Their roots can be traced back to the Liangzhu culture (3300–2200 BC), situated in the Lake Taihu region, which was famous for its exquisite jade-crafting, early rice cultivation and large-scale urban planning (Ling and Liu 2020). The most distinguishable feature of the Yue and Wu is their preferred use of earth-mounded tombs (*tudun mu*) instead of the vertical pits popular in the Central Plain. These tomb structures started to appear during the Late Bronze Age (ca. 1200 BC–ca. 500/600 BC) and can be subdivided into two types: simple earthen mounds and mounds containing a stone burial chamber (von Falkenhausen 1999: 527). Because of these and other similarities, such as their mastery of bronze-casting, their use of “bird script” or

niaoshu (bird-shaped characters that are derivative of northern seal script) on bronzes and swords, and their consumption of geometric stamped ceramics, the Wu and Yue are often considered in unison as the “Wuyue” culture (Zhao 2017), and separate discussions about their cultural features are rare. However, the Yue’s large-scale ceramic production and special mortuary use of proto-porcelain sets it apart. Based on archeological evidence, the Yue State was likely already in existence before it became popularized in the written record. Moreover, before power became centralized, northern Zhejiang was already inhabited by different complex societies that were familiar with rice-based cultivation, sericulture, metallurgy and specialized craft production. These people also initiated burial customs that included proto-porcelain grave goods and mounded tombs.

To date, in the Dongtiaoxi valley, the “birthplace” of proto-porcelain, over 144 kiln sites have been discovered, which have yielded proto-porcelain made of local kaolin clay and which range in date from 1950 BC to 333 BC (Zhejiang Provincial Institute of Cultural Relics and Archaeology et al. eds. 2015: 20). Among these, Piaoshan and Nanshan in Huzhou are the sites with the earliest evidence of proto-porcelain made in dragon kilns (Zhejiang Provincial Institute of Cultural Relics and Archaeology et al. 2015). Other important kiln sites are Huoshaoshan and Tingziqiao, also located in Huzhou. At the Huoshaoshan site, dated roughly to between the ninth century BC and the fifth century BC, numerous kilns remains, fire pits, post holes and remains of small vessels, such as bowls, plates and jars with various colors of glaze, have been found (Zhejiang Provincial Institute of Cultural Relics and Archaeology et al. 2008). This kiln site has a clear stratification and was used continuously for four centuries. This site, therefore, provides important information about the evolution of stoneware types and proto-porcelain technology as it developed before the foundation of the Yue State. The Tingziqiao kiln site, dated to roughly between the fourth century BC and 223 BC, contained a large number of high-quality proto-porcelain objects, including ritual vessels, such as small eating and drinking vessels and large storage containers, but also a small number of musical instruments (Zhejiang Provincial Institute of Cultural Relics and Archaeology & Deqing County Museum eds. 2011: 148). Many of these objects are exquisitely crafted and are exact copies of bronze prototypes popular in the Central Plain. Moreover, it is believed that Tingziqiao might have been part of an official kiln complex that was supervised by the Yue administration and produced mortuary items for royalty and the upper elite class (Zhejiang Provincial Institute of Cultural Relics and Archaeology & Deqing County Museum eds. 2011: 149). This argument is also supported by the discovery of mounded elite tombs dated to the Yue State period which contained large amounts of proto-porcelain. The most important (and unlooted) ones are Bizishan, Xiaohuangshan M13, and the large burial complex of Hongshan (Zhejiang Institute of Cultural Relics and Archaeology ed. 2009; Nanjing Museum et al. ed. 2007).

7.4. Skeuomorphism, technology and ceramic materials

Skeuomorphism is the manufacture in one material of objects, i.e. the skeuomorph, intended to evoke the appearance of other objects, i.e. the prototype, regularly made in another material (Manzo 2003: 17). The first focus in this process of imitation lies on the material transformation and the nature of the medium selected for the skeuomorph. As a result, skeuomorphism has often been linked to economic factors and the desire to mimic a more prestigious material, such as metal, in a more common one, such as stone or ceramics (Vickers 1989). Based on this reasoning, raw materials used to produce a skeuomorph are almost always placed on a lower value scale than those of the original prototype. In particular, scarcity and the geographic distance that needs to be travelled to acquire certain materials are seen as critical elements in the value construction of the prototype, as opposed to the “cheaper” substitute material used for skeuomorphs. A second goal skeuomorphs fulfill is the signification of similarity. As a result of this, their appearance can be linked to certain aesthetic and stylistic demands (Blitz 2015). For instance, during the process of skeuomorphism, shapes and decorative motifs as well as physical attributes that reference the original material of the prototype are copied. In some instances, the complete appearance of a prototype is imitated. However, an explanation solely based on the origin and prestige of the imitated material or the visual appeal of the prototype does not consider the impact of the physical properties as well as the visual, social and stylistic qualities of the material selected for skeuomorphism.

Timothy Insoll (2015: 239) has argued that skeuomorphism “can indicate technical virtuosity superior to those needed to work in the original material.” Clay, in particular, is a material with technical advantages, because it can easily be used for both additive and subtractive technological purposes (Insoll 2015: 230). With a similar focus, Bhan et al. (1994) have suggested that certain craft products whose raw materials were relatively common or easy to obtain can also be considered valuable because of the complex character of the technologies involved. In particular, goods that involve elaborate pyro-technological processes, such as certain types of stoneware and their glazes, fall into this category. For instance, Arretine ware, a type of Roman fine ware with a red glossy slip, stood out among other ceramics due to its high quality and distinctive firing process, despite being made with plain, local clays (Bhan et al. 1994: 143). Naturally, proto-porcelain as well as other types of celadon and porcelain produced in later periods also belong to this category. In most of these cases, the final object was made of “common” and easily accessible raw materials but gained value through technically complex actions and the resulting physical properties.

Some of these properties were utilitarian, such as thermal shock resistance, permeability, durability and heating/

cooling effectiveness (Gille 1978; Skibo & Shiffer 2008), while others were of an aesthetic nature, such as texture, decoration patterns and surface color. Moreover, actions, such as creating certain colors, adding a specific motif or glaze, or polishing could have transformed ordinary skeuomorphs into more prestigious objects that possibly matched the value of their original prototype. On another level, ceramic materials could have also been imbued with stylistic and symbolic qualities that were socially constructed and could participate in processes of information exchange. This made ceramics suitable for broadcasting information about, for instance, relative identity and group affiliation (Wobst 1977; Wiessner 1983). Moreover, Knappett (2002: 108–10) has noted that “the relationship between skeuomorph and prototype is not restricted to the objects, but extends to those groups habitually using them, themselves symbolically represented by the vessels they consume.” In this way, skeuomorphs were part of the entire social structure of a society. Furthermore, possession of them might have conferred prestige and could have been used to legitimize and sustain power and authority, as well as to reflect group identities and social memory. Finally, the value of skeuomorphs might be completely unrelated to material or artistic considerations, and instead be connected to sympathetic magic (Knappett 2002: 111). In other words, the production of skeuomorphs could have been regarded as magical because the ability to transform one material into another showcases control over ritually transformative processes. For these reasons, the skeuomorphic material selected to imitate a prototype might have had a higher position on the value hierarchy, and craftsmen might have consciously employed specialized technological knowledge to acquire an end result that transcended the original meaning and purpose of the prototype.

7.5. Proto-porcelain skeuomorphs in the Yue State

7.5.1. Technically based value

From a technical point of view, the southern proto-porcelain tradition, originating in the Dongtiaoxi river valley, has three main characteristics: firstly, it is made of kaolin clay, which is not completely purified; secondly, it is covered by a thin layer of vitric glaze; and thirdly, it has a firing temperature between 1100°C and 1300°C (Wu et al. 2011a; Zhejiang Provincial Institute of Cultural Relics and Archaeology et al. eds. 2015: 247–50). The raw materials for making proto-porcelain were abundant and locally available in the river plains of northern Zhejiang. As early as the Maqiao period (1950–1250 BC), potters were experimenting with kaolin clay, mainly composed of low amounts of aluminum and high concentrations of silicate, until finally reaching a stable formula during the Yue State period (Zhou et al. 2015; Li et al. 2015). For instance, EDXRF analysis of samples from Huoshaoshan shows an aluminum content that is lower than 20wt%, a silica content of around 75wt%, and an LOI in the range of 0.93–5.65% (Xiong 2008). Although the iron content gradually decreased, some impurities were left in the paste recipes,

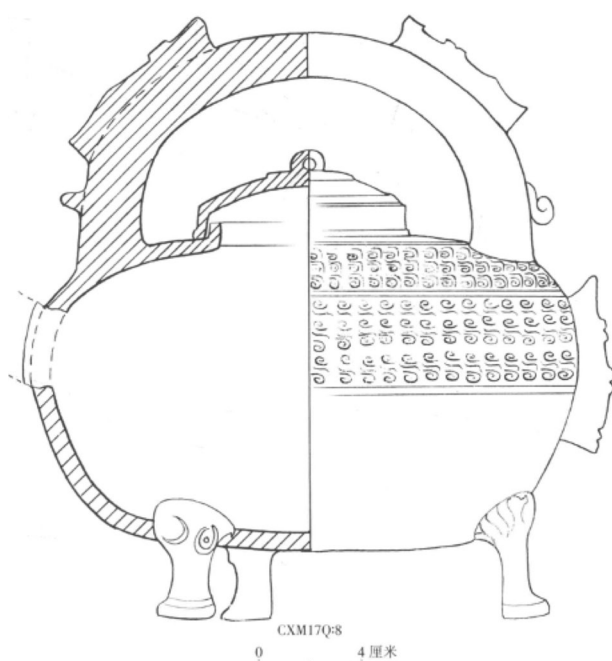
causing the difference between white-bodied “mature” porcelain and proto-porcelain featuring darker pigments (Wu et al. 2011a). There exist some color differences between products of different kilns in Dongtiaoxi, but we cannot know for sure if potters intentionally adapted and purified china clay for this reason. Glazes, on the other hand, were most likely the result of predetermined actions such as the deliberate application of ash from organic vegetation onto ceramic vessels. Technical properties that would result from adding glaze include water-tightness and mechanical strength (Wu J. et al. 2011b). Two types of glazes fluxed by calcium oxide have been recognized through chemical analysis of proto-porcelain samples from Tingziqiao and Huoshaoshan (Zhou et al. 2015). The first type is a high-fired glaze with a calcium oxide flux of between 10 and 20 percent that is found on the majority of studied samples. The second type is only found on five samples from Tingziqiao and has a relatively low calcium oxide content (between 2 and 6 percent). Scholars believe these differences might be related to the use of different sources of plant materials for the preparation of glaze recipes (Wu et al. 2011b). These improvements to the paste and glaze recipes were responsible for the technical as well as aesthetic superiority of proto-porcelain vessels as opposed to other ceramic types.

Proto-porcelain was fired in dragon kilns constructed on the inclined surface of a slope or hill and made up of a fire chamber, a firebox and a flue. The earliest remains of dragon kilns have been found at Piaoshan, dated to 2070–1600 BC, and Nanshan, dated to ca. 1200–1000 BC (Li et al. 2015). The Nanshan dragon kiln is quite well preserved: it is 7 m long with a 20-degree slope and a firebox occupying almost one third of the total kiln (Zheng 2019: 15). From the early Bronze Age to the period of the historical Yue State the dragon kiln structure evolved and reached a more mature stage. For instance, the seven dragon kilns found at the Tingziqiao site are between 8 and 10 m long with a 10-degree slope and a rectangular fire chamber (Zheng 2019: 15). The width of the firebox also increased at this site. For instance, kiln Y2 was between 3.32 and 3.54 m wide and had kiln walls as thick as 30 cm (Zhejiang Provincial Institute of Cultural Relics and Archaeology & Deqing County Museum eds. 2011: 152). In addition, also at Tingziqiao, archeologists have discovered kiln furniture and vessels being stacked together. This is not only the earliest evidence of this practice in China, but also testifies to the progress of setting techniques. For instance, there are unique pieces of kiln furniture that were specially designed to guarantee the even firing of musical instruments (Zhejiang Provincial Institute of Cultural Relics and Archaeology & Deqing County Museum eds. 2011: 148). Smaller utilitarian objects, such as cups and bowls, were stacked and positioned in lower areas, resulting in products that were not completely fired and of lower quality. The improved kiln design and the use of kiln furniture indicates that craftsmen understood how to control kiln temperatures and were aware that objects could be fired more efficiently when placed higher or inside other vessels.

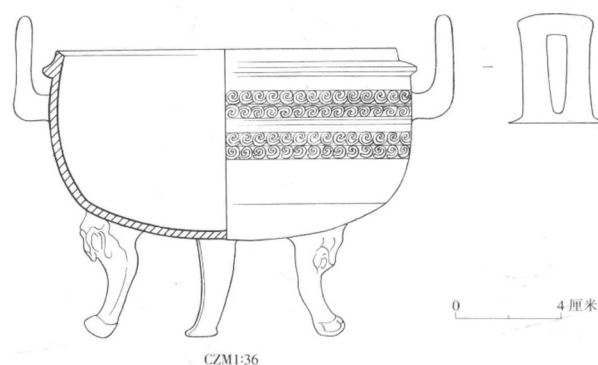
7.5.2. Funerary consumption of proto-porcelain skeuomorphs

The appearance of proto-porcelain skeuomorphs was part of a larger regional development influencing funerary rituals: in particular, the phenomenon of mingqi, which were imitations of burial goods having a utilitarian or ritual function. Although mingqi were usually made from ceramic materials, their value seems to have been less determined by medium or form, but was based on ritual function and symbolism (Wu H. 1999: 733). Moreover, mingqi did not have any real practical value and were specially produced to accompany the deceased in the afterlife. Proto-porcelain vessels seem to have shared some of these features. However, while mingqi are generally seen as a by-product that accompanied more valuable funerary goods, such as bronzes and jades, proto-porcelain skeuomorphs were the central component of Yue burials. Based on their function, proto-porcelain skeuomorphs can be divided into five different categories: 1) utilitarian vessels (Fig. 7.6), 2) ritual vessels (Fig. 7.3), 3) musical instruments (Fig. 7.4 & Fig. 7.5), 4) tools and 5) personal ornaments etc. Despite this variety, the majority of objects are vessels used for pouring alcohol, serving food or storage. There are a number of vessels that could be used in both ritual and ordinary occasions, for instance “ding” tripod vessels like Fig. 7.3b. In these cases, differences in quality and more elaborate decorations are thought to reflect ceremonial uses. In addition, due to their less frequent occurrence in burials, ritual vessels and musical instruments that imitate bronze prototypes from the Central Plain are also considered to be more valuable.

The majority of proto-porcelain skeuomorphs dated to the Yue State period have been discovered in elite tombs. These tombs, covered by a large earthen mound, are usually rectangular-shaped with a tomb entrance leading to the burial chamber, which contains a wooden coffin and is sometimes paved by cobble stones. Furthermore, it seems that status differences between Yue elites were often expressed through the scale of the tomb structure, as well as the amount and types of burial goods that were gifted. Higher-ranking tombs usually included larger numbers of high-quality jades and/or proto-porcelain skeuomorphs, including musical instruments and ritual vessels. For instance, at the Hongshan burial complex, seven Yue elite tombs have been excavated that can be divided into five levels (Nanjing Museum et al. eds. 2007). The Qiuchengdun tomb, belonging to level 1, was the largest and richest tomb of this complex and contained 1098 grave goods, of which 581 were proto-porcelains. These included both utilitarian goods and skeuomorphs of ritual goods and musical instruments, such as yongzhong bells like Fig. 7.4b. By way of comparison, the Laofendun tomb (belonging to level 5), contained only 52 goods, including five proto-porcelain cups, and no skeuomorphs. Of interest is the fact that sometimes a shallow pit for burial goods, including proto-porcelain skeuomorphs, is found outside the main tomb. For instance, in the Bizishan tomb 62 ceramic burial goods were found in the tomb chamber, and 47 in the outside pit (Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. 2009: 57–93). Most of these were made from proto-porcelain and were imitations of large bronze musical vessels (Fig. 7.5). Additionally, only a small number of burials belonging to lower-ranking elites have been published, and usually these contain



图II-3-3-8 小家山 M17Q 出土原始瓷提梁壶



图II-2-4-1c 祝家山 M1 出土原始瓷附耳鼎

Figure 7.3. Proto-porcelain ritual vessels. a: He vessel from Xiaojaoshan M17Q Tomb b: Ding vessel from Zhujiashan M1 Tomb. (Zhejiang Provincial Institute of Cultural Relics and Archaeology eds. 2016: 85, 60).

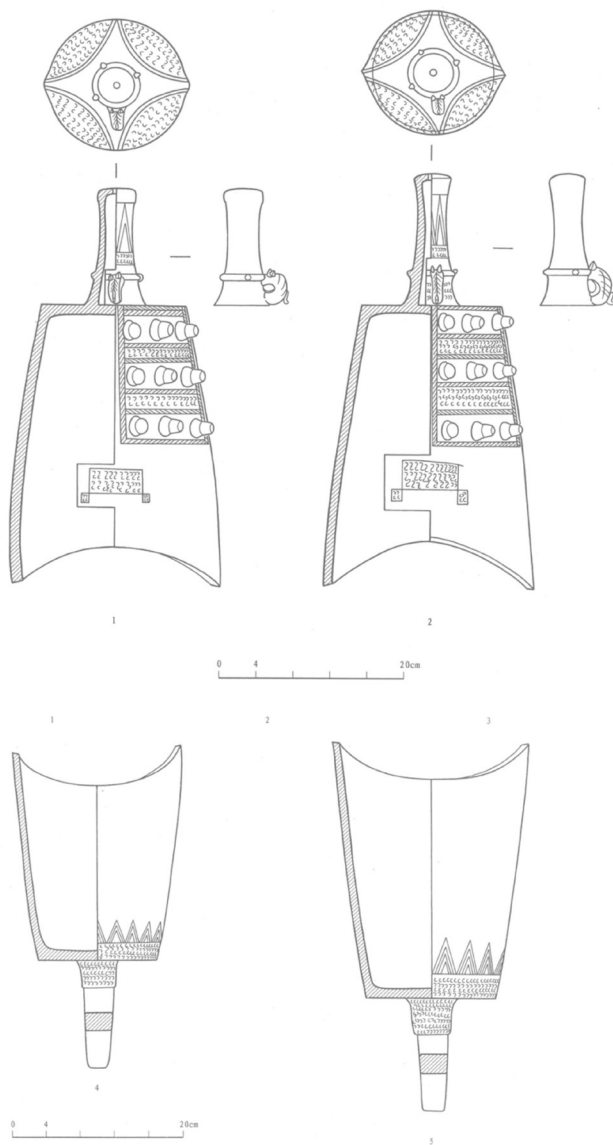


Figure 7.4. Proto-porcelain musical instruments. a: Yongzhong bell from Qiuchengdun M1 Tomb. b: Jugou bell from Laohudun DI Tomb (Nanjing Museum et al. eds. 2007: fig. 185 & 109).

fewer proto-porcelain vessels, and these are of a lower quality. Moreover, in these types of tombs the majority of grave goods are utilitarian vessels, made of other types of ceramic materials (Fig. 7.6a). At the Huangheshan burial complex, situated in Banshan, Hangzhou City, for instance, a number of burials contained fewer than 10 grave goods with only one proto-porcelain object (Shen 2003: 27–29). All of these goods were simple and small utilitarian objects.

7.5.3. Regional and historical contextualization of proto-porcelain value construction

As mentioned before, the reason why proto-porcelain was the preferred medium for mingqi in the Yue State is not well understood. Previous research has often stressed practical concerns, such as limited resources and labor, as the main motives for switching to proto-porcelain.



Figure 7.5. Proto-porcelain Yongzhong Bell from Bizishan M1Q Tomb (Courtesy of Zhejiang Provincial Institute of Cultural Relics and Archaeology).

Scholars have further argued that the Yue State lacked the economic capacity and sufficient bronze resources to produce bronze burial goods and instead had to prioritize the manufacture of agricultural tools and weapons (Zheng 2007: 240–44). To some degree this explanation makes sense. For one thing, the production process of proto-porcelain compared to that of bronze goods was less expensive and less complex. Also, the raw materials for making proto-porcelain were widely available in the Yue region and therefore much easier to acquire than those for bronze. However, both historical and archeological sources testify to the military and economic strength of the Yue State. For instance, the Yue's victory over the Wu State and their mastery of casting bronze swords are mentioned in the Yuejue shu (chapters 1 and 13) and the Shi ji (chapter 41) (Milburn 2010; Sima 1959). The discovery of specialized kilns and large-scale mounded tombs is also inconsistent with the weak state theory. Moreover, if the Yue's economic ability was this limited, why were they producing so much proto-porcelain? Proto-porcelain surely required more effort and specialized labor than less demanding types of ceramics. The production of copies of elaborately decorated musical instruments would also not have been cost-effective. Finally, discussions often forget that the decrease in the number of bronze vessels in burial contexts was a regional phenomenon during the Warring States period and other states were also prioritizing the production of bronze weapons.



Figure 7.6. Utilitarian Ceramics: a: Geometric Stamped Pot from Bizishan M1(21). b: Proto-Porcelain Pot from Bizishan M1(60)(Courtesy of Zhejiang Provincial Institute of Cultural Relics and Archaeology).

Alternatively, the increased appearance of proto-porcelain skeuomorphs can be linked to certain technical properties of the material it is made of. Many scholars have acknowledged that clay is a substance that has been widely used for the creation of skeuomorphs because of its plasticity and malleability (Insoll 2015: 207). Thus, by using clay, the shapes and attributes of bronze prototypes could be easily copied and reproduced. Additionally, compared to other types of ceramics, proto-porcelain had some technical benefits. For instance, its impermeability mimicked one of the desired qualities of bronzes and made it so that proto-porcelain could perform similar functions to bronze vessels used for pouring and serving. While technical features played an important role in the value construction of proto-porcelain they were not the only determinants responsible for the selection of this specific material. If this were the case, we would have observed a more limited repertoire of skeuomorphs within the archeological record of the Yue State, but instead proto-porcelain was used for the reproduction of a diverse group of objects, some of which were specially produced for ritual reasons. In addition, at times proto-porcelain was also used as a surrogate for stone, jade and possibly organic objects (for instance horn-shaped objects). Therefore, an explanation that is based solely on economic or technical factors also does not hold up, and we need to consider additional reasons for the selection of proto-porcelain. As mentioned before, the appearance of skeuomorphs is closely linked to the social groups using them and the symbolic role attributed to them. Consequently, to understand how proto-porcelain as a skeuomorphic material involved enrolled in ritual consumption in the Yue State, we first need to consider in more detail the socio-political background of its consumption.

The Yue State rose to power during the Warring States period, which was characterized by intense social

turmoil and fragmentation, but also by an unprecedented flourishing of the arts, literature and intellectual life. After the collapse of the Jin State, whose inhabitants were the last remaining descendants of the Zhou Dynasty, in 475 BC, a number of territorial states rose to power, eventually being dominated by the Chu in the South, the Qi in the northeast and the Qin in the north. The Warring States period represented the decline of the Zhou political order based on feudal kinship and the beginning of an autocratic tradition of state building governed by hereditary kings. Although these territorial states had clearly demarcated borders, they were constantly competing over new territory and the title of hegemon (ba), a new structure of authority that had appeared during the Spring and Autumn period (Li 2013: 162–66). These waves of constant conquest and annexation would give the final blow to an already crumbling ritual system and its physical representation: bronze vessels. During the Western Zhou bronze vessels were important symbols of political legitimization and were mainly involved in rituals for religious communication and gift-giving feasts performed by the Zhou king, but starting from the sixth century BC this ritual system was challenged in a number of ways: firstly, local rulers no longer followed the strict ritual prescriptions outlining the types and quantities of bronzes that could be used as burial goods; secondly, bronze styles were being adapted to regional needs and new cultural influences; thirdly, rather than adopting the Zhou political ideology, bronzes became a tool for self-aggrandizement and expressing regional identity (Cook 1995). This resulted in bronze being used for the production of a very wide range of objects that represented luxury and elite life, including personal ornaments, horse-riding equipment, oil lamps etc. Moreover, over the course of the Warring States period, the use of Zhou-style bronzes diminished even more, and new types of status goods, such as gold, silver

or turquoise inlaid bronzes and finely painted lacquerware vessels became popular.

The more standardized and widespread use of proto-porcelain in the Yue State not only took place against this backdrop of political competition and territorial expansion, but also corresponds with the high point of political power of the Yue State, under the rule of King Goujian and his successors. Historical sources, such as the *Yuejue shu*, record that after annexing the Wu Kingdom in 473 BC the Yue moved their capital further north and strived to be recognized as hegemon among the states of the north (Henry 2007). Moreover, over the years the Yue kings used different strategies to curry favor with other states against the Qin, including pursuing alliances and sending tribute. For instance, in 312 BC, the Yue sent 300 boats, 5 million arrows, together with horns and ivory to the Wei State (Henry 2007: 13). Therefore, although often omitted in general discussion about the territorial states of the Warring States period, the Yue kings were clearly also engaged in interregional politics and power struggles.

The impact of the geopolitical climate on the identity construction of the Yue State clearly finds its expression in local burial practices. In particular, the shift in political loyalties that took place during the Warring States period and was replaced by a focus on the political and military accomplishments of regional rulers had an enormous impact. No longer being places for offerings and worship, burials were now centered around the practice of boasting and replicating the elite's lavish lifestyle. Besides *mingqi* and luxury objects, concrete evidence of this includes changes in the typology and arrangement of grave goods. For instance, as is the case with bronze burial goods in other territorial states, proto-porcelain *skeuomorphs* found in Yue burials no longer adhere to strict rules and are found in different quantities and combinations. Moreover, while tombs still contain a high number of musical instruments, and pouring and serving vessels, these seem to be part of the increased popularity of secular feasts and banquets (Cook 1995). Similarly, the discovery of different types of luxury objects mirroring local traditions also reflects trends towards self-aggrandizement. Another artistic development influencing burial customs in the Yue State was the use of alternative media to produce burial goods (Wu 1999: 684). For instance, in the Chu state there was the emerging prominence of other materials, such as lacquered wood and woven textiles, to challenge the supremacy of bronze as the material of choice and prestige (Cook & Major 1999: 34). Moreover, as mentioned before, the use of ceramic surrogates has also occasionally been observed in tombs of the Chu, Yan and Zhongshan states (Wu 1999: 729–32). This all indicates that the higher class of the Yue State expressed status and wealth in a similar way to other autocratic rulers: opposing ideas and materials associated with the former Zhou Dynasty and selecting new types of social valuables to legitimize their rule and display their wealth to rivals.

Although it is clear that the Yue followed some regional trends, they seem to be doing so in a very selective way.

Many contemporary autocratic rulers expressed their wealth and power through monumental burials and the internment of non-ritual and personal belongings made of valuable materials and decorated with elaborate motifs. Compared to this, the burial assemblages and tombs of the Yue elite seem to be more modest. Other status objects, such as bronze mirrors, lacquerware, inlaid bronzes and bamboo strips were also almost non-existent in these burials. Moreover, it seems that the Yue were less concerned with copying the extravagant lifestyle of their neighbors, and were more interested in expressing local systems of belief and tradition. The popularization of proto-porcelain in the Yue State seems to have been in line with this aim. Moreover, proto-porcelain, literally made of the land of the Yue, is not only a material symbolizing ownership, but can also be considered to materialize the long-distant past. Over centuries proto-porcelain as a physical substance and surrogate had been continuously produced and had also performed a prominent role in burial rituals. For instance, as mentioned in section 7.3, all over Zhejiang numerous tombs, dating to the Yue Bronze Age, have been found containing proto-porcelain vessels that loosely copied Western Zhou bronzes. Of interest is the fact that these tombs also seem to have lacked bronzes. Furthermore, in continuing this tradition it is likely that the Yue people were aware of the associated memory and history of proto-porcelain. This use of ceramics as historical agents has also been observed in other early states. For instance, the Aztecs might have legitimized their status in the basin of Mexico through the use of a Black-on-Orange pottery that was associated with the earlier Toltec civilization (De Lucia 2018). In a similar way, proto-porcelain as a reminder of the ancestral past of the Yue could have served political purposes and strengthened state identity. This argument can be taken one step further with the assumption, as suggested by Knappett (2002), that *skeuomorphs* might have been seen as magical imitations and been produced in order to take control of the original objects. In this way, pyro-technological processes might have been imbedded with a magical dimension because of the way they transformed foreign symbols related to political power into local indexes of power.

7.6. Conclusion

Situated on the southeastern periphery, the Yue people were culturally and ethnically different from other independent states dominating the Spring and Autumn and Warring States periods, in other words, roughly the eighth through third centuries BC. Another distinctive feature was their mastery of proto-porcelain, which was of superior quality in terms of appearance, hardness and porosity. After defeating the Wu State in 473 BC the Yue State extended their territory and became a strong contender for hegemony. This process of political consolidation was accompanied by another technical advancement in the proto-porcelain craft system, which was the creation of realistic and high-quality *skeuomorphic* burial goods. This chapter has argued that two types of decisions were involved in the production process of proto-porcelain

skeuomorphs. Firstly, decisions related to the selection of a prototype and the degree to which the original material and shape of this prototype should be referenced in the final product. It is known that during the production process of proto-porcelain skeuomorphs the materiality of the prototype was altered, but, at the same time, some signifying attributes and a certain degree of similarity was maintained. In this way, it has been argued that skeuomorphs could be utilized as surrogate objects for legitimizing power and might have been imbedded with specific stylistic and symbolic information courtesy of the prototype. Secondly, the decision to select proto-porcelain for the production of skeuomorphic goods, to the degree that it became the dominant medium, has been discussed. Proto-porcelain as a material was socially valued, and although its main component, i.e. kaolin clay, was not technically superior, it had certain technical properties, such as its plasticity and malleability, that made it very suitable as a skeuomorphic material. In addition, other properties, such as its mechanical strength, translucency and impermeability, might have been attractive for the Yue people. Nonetheless, kaolin clay also expressed aesthetic and symbolic qualities, whose importance extended beyond economic and material values. Proto-porcelain as a material had a long history in the Yue region and represented traditional values and materials that were socially imbedded and passed from one generation to the next. As a result, proto-porcelain might have evoked social memories and notions of a shared local history.

On an intraregional scale the custom of proto-porcelain skeuomorphs seems to have been in line with regional tendencies that prioritized individual status and ownership, as opposed to ritual and ancestor worship. This is especially obvious when considering the new developments in burial customs that were taking place all over the territorial states, such as the looser application of rules, an increased focus on locally produced status goods, and the inclusion of ceramic imitations of bronze goods. Although the value construction of proto-porcelain was impacted by these intraregional developments in Warring States China, and echoed some ritual practices of the former Western Zhou Dynasty, it was deeply grounded in the local territorial landscape of the Yue State and involved a complex chain of decision-making. Moreover, while clearly expressing stylistic and political information about their prototypes, proto-porcelain objects also acted as mnemonic devices and were able to highlight Yue identity through the use of local materials and decoration motifs. Therefore, the selection of proto-porcelain as the preferred material for copying bronze vessels was not solely based on economic or technical factors, but should be contextualized in the regional landscape as well as in the longer history of the Yue people.

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References

- BHAN Kuldeep Kumar, VIDALE Massimo, KENOYER Jonathan Mark, 1994. Harappan Technology: Theoretical and Methodological Issues. *Man and Environment* 19, 141–157.
- BLITZ John H, 2015. Skeuomorphs, Pottery, and Technological Change. *American Anthropologist* 117(4), 665–678.
- BRINDLEY Erica, 2015. Ancient China and the Yue: Perceptions and Identities on the Southern Frontier, c. 400 BCE – 50 CE. Cambridge, Cambridge University Press.
- CAO Jun, 2015. Cultural Changes in the Taihu Lake regio before and after the Formation of Civilization. *Academic Monthly* 47 (7): 147–152. [曹峻:《文明形成前后太湖地区的文化变迁》,《学术月刊》]
- CHEN Yuanfu, 2011. Discussion of the Burial Custom of Ceramic Ritual Vessels and Musical Instruments in Elite Tombs of the Yue State. *Cultural Relics* 4, 33–40. [陈元甫:《越国贵族墓随葬陶瓷礼乐器葬俗探论》,《文物》]
- CHEN Yuanfu, 2015. Analysis of the factors behind the high development of proto-porcelain production during the warring states period in Zhejiang. In: SHEN Yueming, ZHENG Jianming eds., *Collection of Research Papers on the Origin of Proto-porcelain*. Beijing: Cultural Relics Press, 36–46. [陈元甫:《浙江地区战国原始瓷生产高度发展原因探析》,见沈岳明、郑建明:《原始瓷起源研究论文集》,文物出版社]
- CHEN Tiemei, RAPP G.Jr., JING Zhichun, HE Nu, 1991. Neutron Activation Analysis Study of the Production Region of Shang Period Proto-porcelain. *Archaeology* 7, 39–52. [陈铁梅、Rapp G.Jr.、荆志淳、志淳:《中子活化分析对商时期原始瓷产地的研究》,《考古》]
- COOK Constance A., 1995. Scribes, Cooks, and Artisans: Breaking Zhou Tradition. *Early China* 20, 241–277.
- COOK Constance A, MAJOR John S., 1999. *Defining Chu: Image and Reality in Ancient China*. Honolulu, University of Hawai'i Press.
- DE LUCIA Kristin, 2018. Style, Memory, and the Production of History. *Current Anthropology* 59(6), 741–764.
- GILLE Bertrand, 1978. *Histoire des Techniques*. Paris: Gallimard.
- HENRY Eric, 2007. The Submerged History of Yue. *Sino-Platonic Papers* 176, 1–35.
- INSOLL Timothy, 2015. *Material Explorations in African Archaeology*. Oxford, Oxford University Press.
- KNAPPETT Carl, 2002. Photographs, Skeuomorphs and Marionettes: Some Thoughts on Mind, Agency and Object. *Journal of Material Culture* 7.1, 97–117.

- LI Feng, 2013. *Early china: A Social and Cultural History*. Cambridge, Cambridge University Press.
- Li Yu, ZHANG Bin, CHENG Huansheng, ZHENG Jianming. 2015. The Earliest Chinese Proto-Porcelain Excavated from Kiln Sites: An Elemental Analysis. *PLoS One* 10 (11): 1–16.
- LIN Huadong, 1987. The Sword of King Goujian. *Zhejiang Academic Journal* 3. [林华东:《越王勾践剑》,《浙江学刊》]
- LING Qin, BIN Liu eds. 2020. *Liangzhu Culture: Society, Belief, and Art in Neolithic China*. London, Routledge.
- Li Yu, ZHANG Bin, CHENG Huansheng, ZHENG Jianming. 2015. The Earliest Chinese Proto-Porcelain Excavated from Kiln Sites: An Elemental Analysis. *PLoS One* 10 (11): 1–16.
- LOEWE Michael, SHAUGHNESSY Edward L. eds. 1999. *The Cambridge History of Ancient China*. Cambridge, Cambridge University Press.
- LOEWE Michael, SHAUGHNESSY Edward L. 1999. Introduction. In: LOEWE Michael, SHAUGHNESSY Edward L. eds., *The Cambridge History of Ancient China*. Cambridge, Cambridge University Press.
- LU Yongxiang ed., 2015. *A History of Chinese Sciences and Technology (Volume 2)*. Berlin/Heidelberg, Springer.
- MANZO Andrea, 2003. Skeuomorphism in Aksumite Pottery? Remarks on the Origins and Meanings of Some Ceramic Types. *Aethiopica* 6, 7–46.
- MENG Wenyong, 2010. Draft of the History of the Yue State. Beijing, China Social Sciences Press. [孟文镛:《越国史稿》,中国社会科学出版社]
- MILBURN Olivia. 2010. *The Glory of the Yue: An Annotated Translation of the Yuejue shu*. Leiden, Brill.
- Nanjing Museum, Jiangsu Institute of Archaeology, Cultural Relics Management Committee of Xishan, Wuxi City eds., 2007. *Excavation Report of the Yue Tombs in Hongshan*. Beijing, Cultural Relics Press [南京博物馆、江苏省考古研究所、无锡市锡山区文物管理委员会:《鸿山越墓发掘报告》,文物出版社]
- SHEN Yueming, ZHENG Jianming eds., 2015. *Collection of Research Papers on the Origin of Proto-porcelain*. Beijing: Cultural Relics Press. [沈岳明、郑建明:《原始瓷起源研究论文集》,文物出版社]
- SHEN Xinyu, 2003. Study of the Warring States Period Proto-porcelain excavated in Banshan, Hangzhou city. *Fujian Wenbo* 3, 27–32. [沈芯屿:《杭州市半山出土战国原始瓷研究》,《福建文博》]
- SIMA Qian, 1959. Shi Ji. Zhonghua Book Company. [司马迁:《史记》,中华书局]
- SKIBO James M., SHIFFER Michael Brian, 2008. *People and Things: A Behavioral Approach to Material Culture*. New York, Springer.
- VICKERS Michael, 1989. The Cultural Context of Ancient Greek Ceramics: An Essay in Skeuomorphism. In: MC GOVERN P.E., NOTIS M.D. eds., *Cross-craft and Cross-cultural Interactions in Ceramics*. Westerville, The American Ceramic Society, 45–63.
- VON FALKENHAUSEN Lothar, 1999. The Waning of the Bronze Age: Material Culture and Social Developments, 770 – 481 BC. In: LOEWE Michael, SHAUGHNESSY Edward L. eds., *The Cambridge History of Ancient China*. Cambridge, Cambridge University Press, 450–544.
- WANG Huiwen, 2017. *A Simple History of the Southern Proto-porcelain*. Beijing: China Waterpower Press. [王汇文:《南方原始瓷简史》,中国水利水电出版社]
- WANG Yifeng, 2010. *A Study of Proto-porcelain production in South China*. Beijing, China Press. [王屹峰:《中国南方原始瓷窑业研究》,中国书店]
- WIESSNER Polly, 1983. Style and social information in the Kalahari San projectile points. *American Antiquity* 48(2), 253–276.
- WOBST H. Martin, 1977. Stylistic Behavior and Information Exchange. In: CLELAND Charles E. ed., *The Uses of Style in Archaeology*. Cambridge, Cambridge University Press, 105–112.
- WU Hung, 1999. The Art and Architecture of the Warring States Period. In LOEWE Michael, HAUGHNESSY Edward L. eds., *The Cambridge History of Ancient China*. Cambridge, Cambridge University Press, 651–744.
- WU Juan, ZANG Maolin, WU Jianming, LI Qijiang, OU Yangxiaosheng, CHEN Yuanfu, ZHENG Jianming, 2011a. Technical Study of Proto-porcelains excavated from the Tingziqiao Kiln site, Deqing. In: Zhejiang Provincial Institute of Cultural Relics and Archaeology, Deqing County Museum eds., *Tingziqiao, Deqing: Report on a Proto-porcelain Kiln Site of the Warring States Period*. Beijing: Cultural Relics Press, 156–168. [吴隽、张茂林、吴军明、李其江、欧阳小胜、陈元甫、郑建明:《德清亭子桥窑址原始瓷的科技研究》,见浙江省文物考古研究所、德清县博物馆,《德清亭子桥:战国原始瓷窑址发掘报告》,文物出版社]
- WU Juan, ZHANG Maolin, WU Junming, LI Qijiang, LI Jiazhi, DENG Zequn, JIANG Xia, 2011b. Study on the diversification of origins and primary development of Chinese porcelain glazes. *Science China Technological Sciences* 54(1), 99–104.
- XIE Xiying, 2012. Summary of the Research about the Shang Zhou Proto-porcelain vessels. *Cultural Relics of the East* 2: 68–77. [谢西营:《商周原始瓷器研究综述》,《东方博物》]
- XIONG Yingfei, 2008. X-ray Fluorescence Analysis of the Chemical Components of Proto-porcelain excavated in Deqing. In: Zhejiang Provincial Institute of Cultural

- Relics and Archaeology, The National Palace Museum, Deqing County Museum eds. 2008. Huoshaoshan, Deqing: Excavation Report of a Proto-porcelain Kiln Site. Beijing: Cultural Relics Press, 157–160. [熊樱菲:《能量色散 X 荧光分析德清出土原始瓷化学组成》,见浙江省文物考古研究所、故宫博物馆、德清县博物馆:《德清火烧山:原始瓷窑址发掘报告》,文物出版社]
- YIN Min, REHREN Thilo, ZHENG Jianming, 2011. The earliest high-fired glazed ceramics in China: the composition of the proto-porcelain from Zhejiang during the Shang and Zhou periods (c. 1700–221 BC). *Journal of Archaeological Science* 38(9), 2352–2365.
- ZHAO Xin, 2017. Retrospect to the Origins of the Wuyue Culture. *Regional Culture Study* 1, 47–60. [赵欣:《吴越文化溯源》,《地域文化研究》]
- ZHANG Liangren, 2006. Wucheng and Shang: A New History of a Bronze Age Civilization in Southern China. *Bulletin of the Museum of Far Eastern Antiquities* 78: 53–78.
- Zhejiang Provincial Institute of Cultural Relics and Archaeology ed. 2002. Excavation Report of the Lu Hang Yong Highspeed Public Road. Beijing: Cultural Relics Press. [浙江省文物考古研究所:《沪杭甬高速公路考古报告》,文物出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, The National Palace Museum, Deqing County Museum eds. 2008. Huoshaoshan, Deqing: Excavation Report of a Proto-porcelain Kiln Site. Beijing: Cultural Relics Press. [浙江省文物考古研究所、故宫博物馆、德清县博物馆:《德清火烧山:原始瓷窑址发掘报告》,文物出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology ed., 2009. The Yue Tombs of Zhejiang. Beijing, Science Press. [浙江省文物考古研究所,《浙江越墓》,北京:科学出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, Huzhou Municipal Museum, Deqing County Museum eds., 2015. The Proto-Porcelain Kiln Sites of Xia and Shang Periods in Dongtiaoxi Creek Basin. Beijing, Cultural Relics Press. [浙江省文物考古研究所、湖州市博物馆、德清县博物馆:《东苕溪流域夏商时期原始瓷窑址》,文物出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, Deqing County Museum eds., 2011. Tingziqiao, Deqing: Report on a Proto-porcelain Kiln Site of the Warring States Period. Beijing: Cultural Relics Press. [浙江省文物考古研究所、德清县博物馆:《德清亭子桥:战国原始瓷窑址发掘报告》,文物出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, Shaoxing City Institute of Cultural Relics and Archaeology, Shaoxing City Keqiao District Cultural Development Center, Shengzhou Cultural Relics Management Office eds, 2016. Yue Tombs of Shaoxing. Beijing: Cultural Relics Press. [浙江省文物考古研究所、绍兴市文物考古研究所、绍兴市柯桥区文化发展中心,绍兴市柯桥区文化发展中心:《绍兴越墓》,文物出版社]
- Zhejiang Provincial Institute of Cultural Relics and Archaeology, Deqing District Museum. 2018. Short Report of the Excavation of The Warring State Period Tombs of Dongpoling, in Deqing, Zhejiang Province. *Southeast Culture* 5, 44–55. [浙江省文物考古研究所、德清县博物馆:《浙江德清东坡岭战国墓发掘简报》,《东南考古》]
- ZHENG Xiaolu, 2007. Research about the Zhou Dynasty Bronzes of the Wuyue and Baiyue Regions. Beijing: Science Press. [郑小炉:《吴越和百越地区周代青铜器研究》,科学出版社]
- ZHENG Jianming, 2019. New Progress of Pre-Qin Zhejiang Archaeology in the First Decade of the New Century. *Ancient Civilizations* 13, 1–27. [郑建明:《新世纪头十年浙江先秦时期考古的新进展》,《古代文明》]
- ZHOU Shaohua, PEI Chuchu, NI Lin, 2015. Material Science and Craft Study of Shang – Zhou period Proto-porcelain of the Dongtiaoxi River Valley. In: SHEN Yueming, ZHENG Jianming eds., *Collection of Research Papers on the Origin of Proto-porcelain*. Beijing: Cultural Relics Press, 140–172. [周少华、裴楚楚、倪琳:《东苕溪流域商周时期原始瓷的工艺与材料学研究》,见沈岳明、郑建明:《原始瓷起源研究论文集》,文物出版社]

Tile Kilns and Roof-Tile Production in Ancient China

Yūsuke Mukai

Abstract: This essay describes the development of roof-tile production, discussing how craftsmen began to divide into groups working for pottery kilns and those working for roof-tile kilns from the Western Zhou to the Han period. The firing chamber of flat kilns is easy to widen and enlarge, and so they are appropriate for firing goods used in architecture like tiles and roof tiles. The kiln shape and structure that were perfected during the Han period continued to be used for centuries without major changes, mainly in northern China. During this process, the influence of roof-tile production technology and kiln structure spread widely through East Asia. It is significant that a separate history of kiln technology was revealed, different from that of porcelain and celadon-producing kilns.

Keywords: Roof tiles, structural changes in kilns, division of labor, Western Zhou, Qin and Han period

8.1. Introduction

Most of the roof tiles disseminated throughout East Asia are well known to originate in China. There is evidence for the manufacture and use of roof tiles in China during the Western Zhou period, some 3000 years ago, and there are some reports of roof tiles dating back even earlier. In the Han period, 2000 years ago, Chinese roof tiles traveled as far as the Korean peninsula in the east and Vietnam in the south, spreading throughout East and Southeast Asia in subsequent centuries. The investigation of ancient Chinese roof tiles and their production is thus also an investigation of the origins of roof tiles throughout East Asia.

In recent years, ceramic objects that resemble flat tiles have been unearthed in the Shang city at Zhengzhou in Henan Province, and there are reports of their use as construction materials in palaces of the early Shang period (Henan Provincial Institute of Cultural Relics and Archaeology 2007). At the Taosi site in Shanxi Province, which dates back some 4000 years to the late Neolithic period, many sheet-shaped ceramic objects thought to be roofing materials have been unearthed in locations where the remains of large buildings cluster within the enclosure (Shanxi Archaeological Teams of the Institute of Archaeology CASS et al. 2005). Further, at the Qiaozhen site in the city of Baoji (Baoji Municipal Institute of Archaeology 2011) and the Lushanmao site in Yan'an City (Shaanxi Academy of Archaeology et al. 2019), both in Shaanxi Province, there have been reports of round and flat tiles from the Longshan period of the late Neolithic, increasing the possibility that partial use of roof tiles dates back to the late Neolithic period.

However, while scattered discoveries of roof-tile-like remains dating from the late Neolithic to the Shang period

have been made, such tiles were clearly not in continuous use. It is not possible to find a lineage that connects the roof-tile remains from the Shang period and earlier that have been discovered so far. Most likely, the roof tiles of this era were undergoing a process of trial and error in which they repeatedly appeared and disappeared. Likewise, because the kilns used to fire them have not been discovered, it is difficult to pin down the specifics of their production.

The full-scale production and use of roof tiles came into its own in the Western Zhou period (Owaki 2002; Mukai 2012). The only remains of kilns that were certainly used to fire roof tiles that have been reported so far date from the Western Zhou and later; therefore, this paper will address shifts in tile kilns from the Western Zhou to the Qin and Han periods in northern China, centering on the Yellow River area. Ceramic kilns were used in China well before the tile kilns that have been found, and the earliest roof tiles were fired in kilns that had the same structure as those used for ceramics. This paper will first briefly outline previous research on shifts in kiln forms, then discuss examples from each period, and finally consider workers and modes of operation involved in kiln-firing.

8.2. Structural shifts in kilns

The kilns used for firing roof tiles in ancient China, particularly during their earliest period, were structurally almost identical to ordinary ceramic kilns; in fact, roof tiles and other ceramics were often fired in the same kilns. Here, following the example of prior research, we begin with an overview of shifts in kiln structure, mainly in the Yellow River region.

The kilns that appeared from the mid-Neolithic Cishan period through the early Yangshao period used a structure

that guided the flame from the stokehole and firebox (fuel-burning space) of the kiln laterally or diagonally to the firing chamber (where ceramics or roof tiles were placed) and discharged smoke from a flue at the top. During the late Yangshao period, while the basic structure remained the same, a flame-passage hole was added in some kilns that led between the firebox and firing chamber (Fig. 8.1: 1). This became more widespread in the late Neolithic Longshan Culture. In the Shang period, kilns generally came to use a two-layer structure, guiding the flame from the firebox below through a flame-passage hole to the firing chamber above (Fig. 8.1: 2), and this remained widely in use through the Zhou period (Ozawa 1993). All of these were updraft kilns that conveyed the heat generated in the firebox upward or diagonally to the firing chamber and then discharged the heat and smoke upward from there.

By contrast, the kilns that appeared in the Western Zhou period were semi-downdraft kilns (Fig. 8.1: 3), called flat kilns in Japanese archeology due to their shape. The floor of the front half of these kilns is further depressed and forms the firebox, while the raised back half forms the flat-floored firing chamber. The heat that is generated in the former rises to the top of the latter and then is drawn down to the flue at the base of the back wall of the firing chamber for discharge. This structure likely made it easier to control the flame, allowing for the firing chamber to be enlarged. Tile kilns used this structure almost without exception from the Warring States period through the Qin and Han periods as they grew larger and larger.

8.3. Tile kilns and roof-tile production in the Western Zhou

Most the roof tiles found from the Western Zhou period (from the eleventh century BCE until 771 BCE) have been discovered around Zhouyuan in western Shaanxi. The plateau southeast of Mt. Qi on the north bank of the Wei River may be where the Zhou Gugong Danfu established his base at Zhouyuan. He built a castle and created a village

at the site. His grandson, King Wen, transferred the Zhou capital to what is now the southwest suburbs of Xi'an City, naming it Fengjing. Then his son, King Wu, brought down the Shang Dynasty and replaced it with the Zhou, building his capital city Haojing. The area of Chang'an County in Shaanxi where the Fengjing and Haojing remains are scattered has also yielded many Western Zhou roof tiles.

8.3.1. Western Zhou period roof tiles

8.3.1.1. Early Western Zhou roof tiles

Beginning in the 1970s, large architectural remains from the Western Zhou period have been discovered in the village of Fengchu, Qishan County, and the village of Zhaochen, Fufeng County, both in Shaanxi (Zhouyuan Archaeological Team in Shaanxi Province 1979; 1981). Investigation of these remains has clarified the state of early Western Zhou roof tiles, which were invariably flat (Luo 1987). In the Zhouyuan region, round roof tiles began to appear in addition to flat ones only in the middle Western Zhou period. Clay coils were built with paddles and anvils to form clay cylinders, and these were then cut into flat tiles. The flat tiles unearthed from the lower building levels in Zhaochen are 47 cm long, 30 cm by 29 cm wide, and 1.3 cm thick, showing traces of paddling with a rough cord-wrapped paddle on the sides and edges as well as on the exterior. Some of these tiles have cord marks on their interiors as well. It is likely that the clay cylinders were cut when still soft, and their insides and edges were adjusted. Additionally, some flat tiles have interior or exterior clay protrusions to facilitate their fixation on roofs. Some also have holes near both ends, and these are thought to be for string-threading to bind tiles together.

8.3.1.2. Mid-Western Zhou roof tiles

The roof tiles found at the upper building levels in Zhaochen largely belong to the mid-Western Zhou period, with little material from the late period (Zhouyuan Archaeological Team in Shaanxi Province 1981). The major changes in

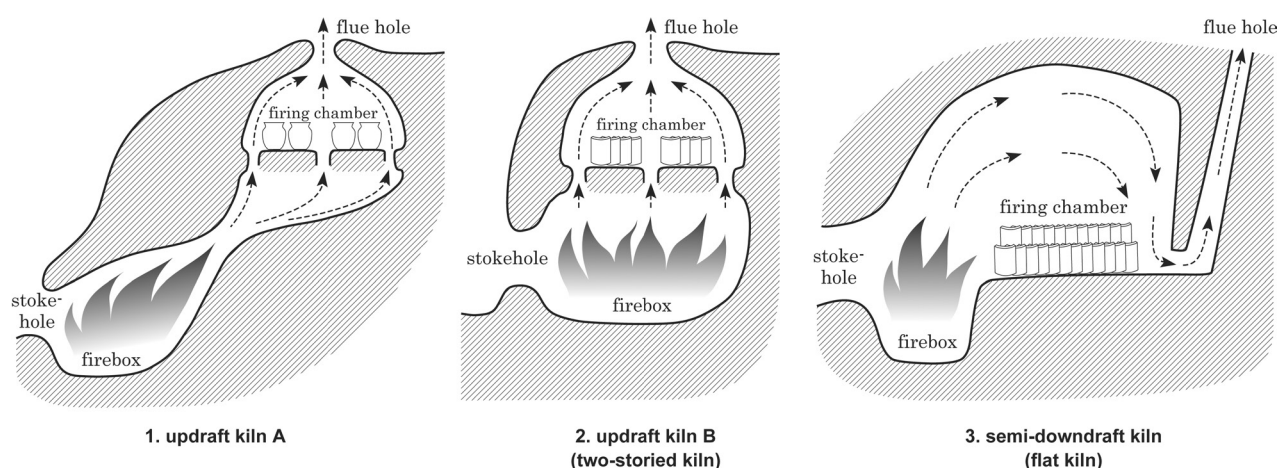
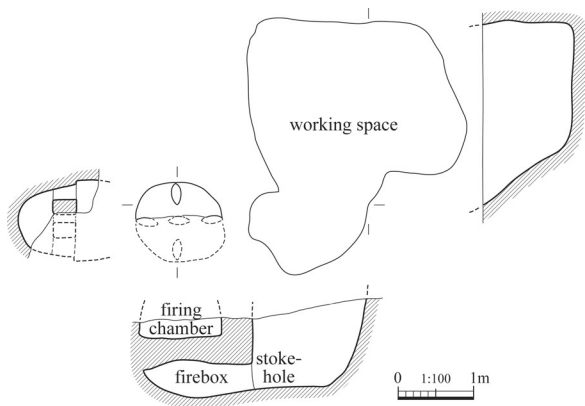


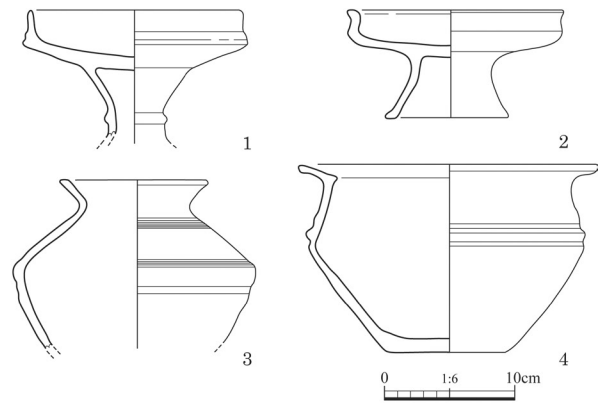
Figure 8.1. Structural shifts in kilns.

the middle period include the appearance of round tiles in addition to flat ones, as well as half-round eave-end tiles. Each type of roof tile appears in large, medium and small sizes, probably divided according to their intended

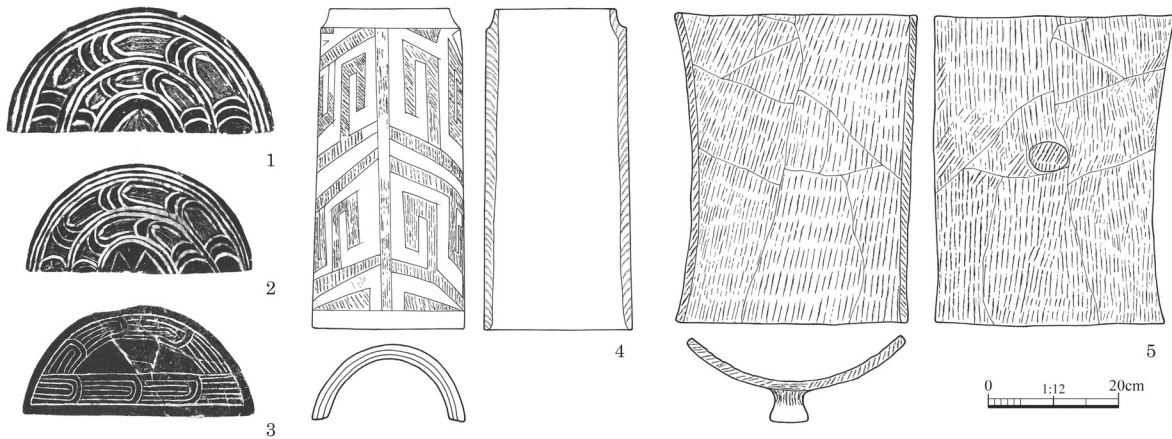
place of use. The half-round eave ends include some with patterns made by spatulas and some undecorated ones; the former display concentric arc patterns on the half-round eave-end side (Fig. 8.2: 3.1, 2, 3). Both round and flat



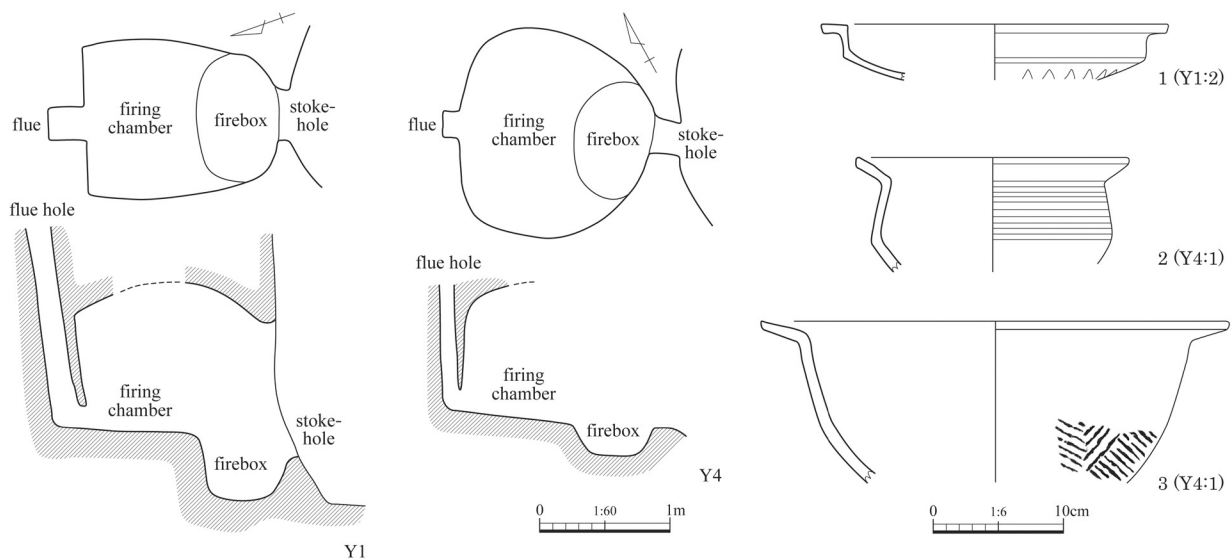
1. Western Zhou ceramic kiln (Y5) at Luoshui village



2. Western Zhou ceramics unearthed from kiln Y5



3. Roof tiles unearthed from Western Zhou building foundations at Zhaochen (1-3), Yuntang and Qizhen (4,5) in Fufeng



4. Kilns and ceramics unearthed at Liliavao site

Figure 8.2. Ceramic and tile kilns from the Western Zhou to early Spring and Autumn period (traced from Feng Hao Archaeological Team 1963, Zhouyuan Archaeological Team 1981, 2002 and Sanmenxia Municipal Archaeological Team 1993).

tiles were made by cutting clay cylinders formed with paddles and anvils, and cord-wrapped paddle marks were left on their exteriors. Some exteriors of round tiles have had their cord marks smoothed away and borders made by spatulas and geometric patterns added. The addition of protrusions to both flat and round tiles is even more common in the middle period, where tiles have conical, cylindrical or mushroom-like forms, and many also have loop handles.

8.3.1.3. Late Western Zhou roof tiles

Investigations conducted in 1999 and 2000 found two late Western Zhou period building groups in the villages of Yuntang and Qizhen, Fufeng County (Zhouyuan Archaeological Team 2002). The tiles unearthed from the sites were essentially the same as the tiles from the middle period described above. The half-round eave-end tiles had concentric arc patterns made with a spatula; the round tiles were undecorated on the inside and had geometric patterns on the outside. The flat tiles were marked on the exterior with a relatively fine cord-wrapped paddle, and they were undecorated on the inside (Fig. 8.2: 3.4, 5). There were no major changes in the types, forms or methods of production of roof tiles during the late Western Zhou, but tiles were thinner and more uniform than those of the middle period and had finer cord marks on the surface (Luo 1987). The late period also exhibited fewer protrusions for roof-fixing.

Overall, the major changes that occurred within the Western Zhou period were in its middle period: the production of round tiles began alongside flat tiles; eave-end tiles were produced for the first time; and buildings appeared whose entire roofs were covered with tiles. In other words, from the middle Western Zhou period forward, there was a clear increase in the types and number of roof tiles used in a single building. However, even so, the use of roof tiles was limited to the major architecture of the royal capitals, such as palaces and ancestral shrines. While there was demand for large numbers of roof tiles for new constructions at this time, such demand was not consistent; it is likely that the workers who normally manufactured ceramics would temporarily switch to roof tiles to meet the demand as it arose. The close ties between the production of roof tiles and ceramics during the Western Zhou period can be deduced not only from commonalities in their methods of production but also from their being fired within the same kilns.

8.3.2. Western Zhou period tile kilns

In the southwest suburbs of Xi'an, Shaanxi Province – the location of Haojing, one of the capitals of Western Zhou – an excavation in 1961–62 discovered six kiln remains from the late Western Zhou period in the western part of the village of Luoshui (Feng Hao Archaeological Team 1963). All of these were two-layer kilns with fireboxes below and firing chambers above, and had a work shaft that was dug in front of the stokehole (Fig. 8.2: 1). When the site

was excavated, the kiln body and shaft interior were found buried in earth mixed with ash, from which ceramic shards and roof tiles were unearthed, as well as raw clay pieces. Jars were the most common type of artifact (Fig. 8.2: 2), followed by pedestaled dishes and roof tiles, with a few pots (including three-legged pots). The other kilns appear to be in a similar state, with operations seeming to have been largely focused on ceramics while also including roof tiles.

In the village of Liulongzui, Qishan County, Shaanxi, two Western Zhou kiln remains were discovered in 1979 (2.5 km west of the village of Fengchu, where buildings from the early Western Zhou period have been found) (Ju 1989). The first kiln was 1.75 m in diameter; its upper structure is unclear, but it was probably two-layered. Many round and flat tile shards and unfired tiles were found, along with a few pieces of ceramics in the upper layer. The second kiln had a similar structure, and it revealed many jars and other ceramic artifacts. Researchers theorized that the first kiln was dedicated to roof tiles alone, and the second fired only ceramics, but the two were just 0.5 m apart and had the same structure. Even if the products to be fired were separated by type, it is inarguable that the production of roof tiles and ceramics took place in closely adjacent locations, if not in the same kiln.

At the Lijiayao site in Sanmenxia City, Henan Province, six kilns from the late Western Zhou or early Spring and Autumn period have been found (Sanmenxia Municipal Archaeological Team 1993). The flat type includes horseshoe and round shapes, and both small flat kilns are no more than 1.5 m long in total, with a single flue on the back wall (Fig. 8.2: 4). Many ceramic pieces, including pedestaled dishes, have been unearthed from the kiln remains and surrounding pits, along with many round and flat tiles, including half-round eave-end tiles without decoration. These roof tiles may have been supplied to Shangyang, the capital of the Western Zhou vassal Guo State.

8.4. Tile kilns and tile production in the Spring and Autumn and Warring States periods

Full-scale tile-roofed buildings developed in the Western Zhou period only in those regions that were directly governed by the Western Zhou Dynasty, such as Zhouyuan, Fengjing and Haojing. At this time, the use of tiles was monopolized by the Western Zhou Dynasty, and only scattered examples have been found in other regions. However, during the Spring and Autumn period of the early Eastern Zhou (770 BCE to 453 BCE), tile production and usage had spread to other major states, and diversely decorated tiles appeared widely in the Warring States period of the late Eastern Zhou (453 BCE to 221 BCE). Below, we describe the status of tile kilns and tile production in this period, with reference to states where evidence for tile production and use has been excavated: Qin, Zhou, Yan, Qi and Chu.

8.4.1. Tile production in Qin Yongcheng

Roof tiles from Spring and Autumn period Qin have been unearthed mainly at the Yongcheng site in Fengxiang County, Shaanxi. Yongcheng thrived as the Qin capital for some 280 years, from 677 BCE, when Duke De acceded to his position and began building the city, until the capital was moved to Yueyang during the Warring States period. Excavations have found the remains of many large buildings within the Yongcheng enclosure, including palaces and ancestral shrines from the Spring and Autumn period. Outside, to the southwest, contemporaneous mausolea have been found.

Within the Yongcheng remains, the status of the roof tiles unearthed at the Majiazhuang No. 1 Building Group Site – which is thought to have been an ancestral shrine – is well known (Archaeological Team of Yongcheng 1985). The roof tiles that have been unearthed from around the site's central building include unusual flat tiles with a U-shaped cross-section. Some feature a triangular decoration that wipes out half of the exterior cord marks; these tiles are thought to have been laid on roofs with the decorated part projecting from the eaves. There are also half-round eave-end tiles that combine cord marks and arc patterns, as well as round tiles that have their exterior cord marks brushed away in patterns. It is also notable that many marks on the round and flat roof tiles from this site were inscribed with spatulas. According to the archaeological report, these marks appear on almost all of the round and flat tiles and are in 70 to 80 types. Their number and frequency indicate that they may be manufacturers' marks.

From late 2005 to May 2006, a roof-tile workshop that dates from the late Spring and Autumn to the Warring States period was excavated near the village of Doufu in northwest Yongcheng (Shaanxi Academy of Archaeology et al. 2013). This location, north of the area where major buildings such as palaces and ancestral shrines are found, is thought to be where the workshops were that supplied building materials, including roof tiles (Fig. 8.3: 1). Five flat kilns and many clay pits have been discovered (Fig. 8.3: 2). Around 2000 artifacts have been unearthed, including eave-end tiles, round tiles, flat tiles, bricks and terracotta figurines. Most of the eave-end tiles are round and bear animal decorations of deer, birds and tigers, as well as some cloud patterns. Many tools used for roof-tile production, such as ceramic antefix molds and anvils, have also been unearthed.

Round eave-end tiles with patterns of fauna have hardly ever been found in Yueyang, the capital from 383 BCE on, or Xianyang, built in 350 BCE: most of the roof tiles unearthed from the kiln remains are thought to be from the early Warring States period. We can thus conclude that workshops that specialized in roof-tile manufacture mainly existed at the Yongcheng site in the early Warring States period. These tiles were probably supplied to the palaces and ancestral shrines scattered within the site.

8.4.2. Tile production at the Wangcheng site in the Eastern Zhou Dynasty

In 771 BCE, the Western Zhou Dynasty fell and was replaced, the following year, with the Eastern Zhou, which had its capital at Luoyang. However, the Western Zhou tradition of roof-tile production was not passed on to the Eastern Zhou. Roof-tiled buildings had developed in Western Zhou centers like Zhouyuan, Fengjing and Haojing, with patterned half-round eave-end tiles decorating the eaves, whereas only undecorated half-round eave-end tiles have been reported in Luoyang, royal capital of Eastern Zhou, during the Spring and Autumn period, and cloud-patterned tiles using molds appeared only in the Warring States period (Institute of Archaeology, Academia Sinica 1959). Undecorated half-round eave-end tiles were used in the Warring States and Qin and Han periods as well as in the Spring and Autumn period; the latter were somewhat softer and gray-brown or black-gray in color, while the roof tiles of the Warring States period were hard and blue-gray. Additionally, roof tiles with cloth-mark impressions on their interiors appeared during the Warring States period.

Kiln-group remains from the mid to late Warring States period have been found at the Eastern Zhou Wangcheng site (Fig. 8.3: 3, 4) within the northwest outer wall of Luoyang, east of the Jian River (Institute of Archaeology CASS 1989). In addition to antefix molds, many ceramic anvils and tools used for burnishing have been unearthed, showing that the roof-tile and ceramic workshops were probably adjacent. To the southeast of the kilns, there was a bone workshop, and to the south of that, there were gem and stone workshops. Copper molds have also been found, indicating that the area was a center for artisan workshops.

Of the 15 kilns, 6 are unclear in structure and 5 are ordinary flat kilns, with a flat oval shape, a vent in the back wall of the flat firing chamber, and a firebox and stokehole dug deeply at the front. Some of the kiln walls are made from sun-dried bricks. The products of these kilns include everyday ceramics, construction materials such as roof tiles, and funerary objects to be buried with the dead. These three types of product have been unearthed mixed at many kilns, in ratios that vary by kiln. The artifacts found in the flat kiln H415 and its surrounding pits were mostly ceramics, with a few roof tiles as well. Around H437, likewise a flat kiln, both roof tiles and ceramics have emerged in quantity. In contrast to these, the round kiln H453 has a two-layer structure, with its fire lit under the bottom firebox layer and reaching the upper firing layer through multiple holes for flame passage. Reports indicate that while both roof tiles and ceramics have been unearthed from H453 and its surroundings, it is not clear whether all of them were fired in that kiln.

In 1974, near Jin'guyuan Road at the northeast outer wall, 22 kilns from the Eastern Zhou through the Han periods were found (Work Team of Luoyang City on Cultural Relics 1983). Of these, two were ceramic kilns, and one was a roof-tile kiln, all from the Eastern Zhou period. Ceramic

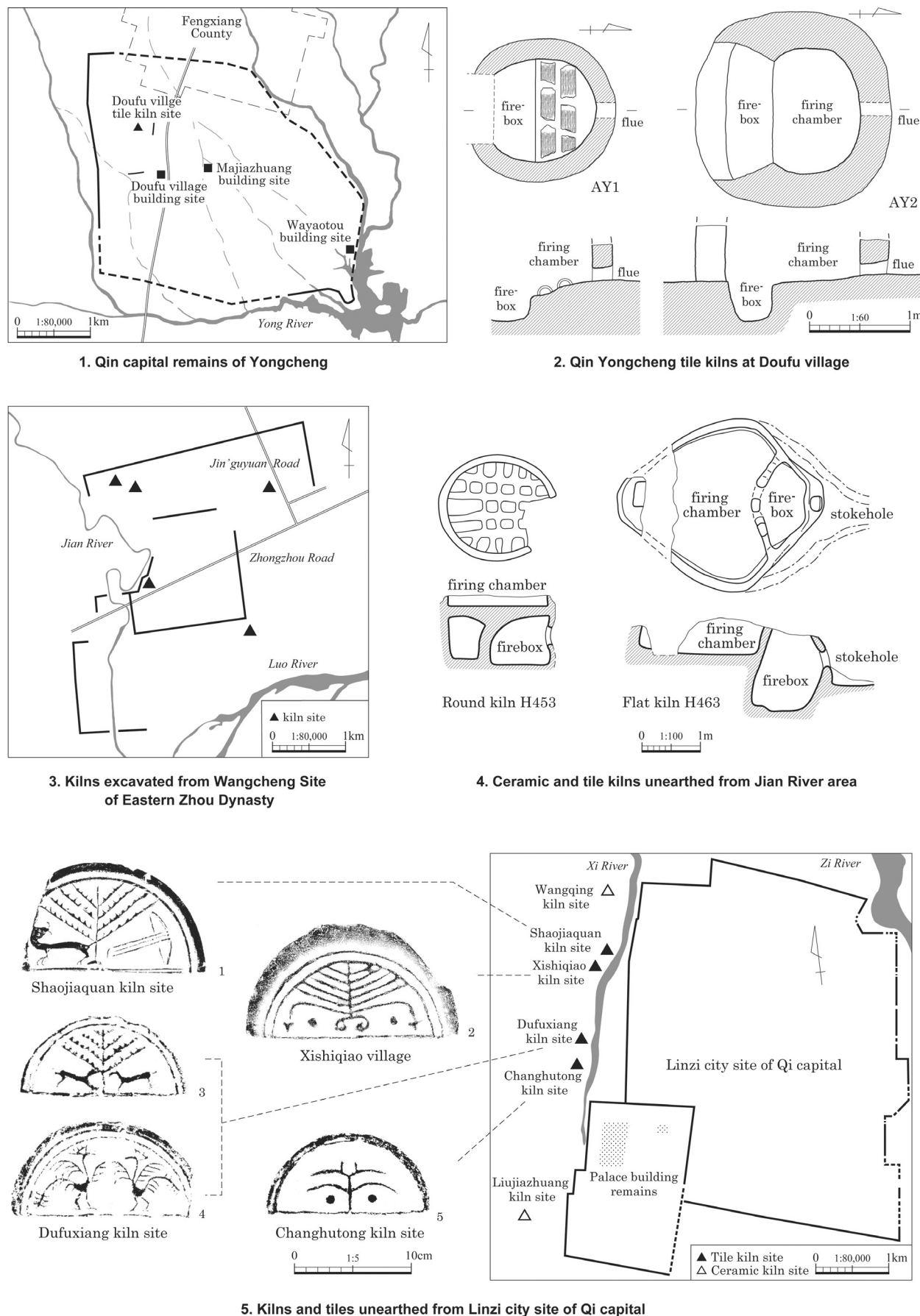


Figure 8.3. Kilns in the Warring States period (redrawn from Shaanxi Academy of Archaeology et al. 2013, Institute of Archaeology CASS 1989 and Zhang 2006).

kilns No. 5 and No. 4 had different structures, but both were two-layer kilns: the former may date back to the Spring and Autumn period. The No. 1 roof-tile kiln was a flat kiln with an almost rounded firing chamber. The kilns that are considered to be from the Qin and Han periods are all typical flat kilns, with the smaller ones used for ceramics and the larger ones for roof-tile or brick firing. Ceramics stamped with “He Ting” and “He Shi” marks have been found, indicating that during the Han period, these kilns were controlled by the market management organization. In all of these kilns from the Spring and Autumn through the Han periods, ceramic and roof-tile kilns were separate, with two-layer kilns firing only ceramics and flat kilns only roof tiles.

8.4.3. Roof-tile production at the Yan-Xiadu site

Many Yan roof tiles have been unearthed from the Yan-Xiadu site in Yi County, Hebei Province, the site of the capital during the late Warring States period (Hebei Provincial Institute of Cultural Relics 1996). This capital is generally thought to have been built in 311 BCE; while theories on the chronology of the Yan-Xiadu roof tiles vary, we assume here that half-round eave-end tiles with Taotie designs first appeared during the Warring States period and further developed during the later portion of the period (Tani 2006).

The city of Yan-Xiadu was divided into eastern and western halves, with the palace located in the north-northeast of the eastern city and some foundations spreading north of the wall. Artisans’ workshops were built close to the area of the palace in the northern part of the eastern city. While ceramics and roof tiles have been found in the workshops to the northwest of the palace, they largely produced bronze and iron objects, mainly weapons; by contrast, the workshops south of the palace were dominated by roof-tile and ceramic production, with traces of bone products and coins as well. Workshops for arms and those for other products were essentially separated.

Roof tiles and ceramics unearthed were carelessly mixed around the Yan-Xiadu workshops. While the kilns themselves have not been discovered, roof tiles and ceramics were certainly manufactured in close proximity. However, the characters stamped on the roof tiles and ceramics make it clear that the artisans for each were clearly distinct, and that they were managed and organized separately. Although no definitive statement can be made without evidence of the kilns, it is clear that in Yan-Xiadu, roof-tile and ceramic production were independent of one another and that the two types of products were probably mixed when defective items were disposed of from adjacent workshops or kilns.

8.4.4. Roof-tile production in Linzi, the capital of Qi State

Qi roof tiles have emerged in large quantities from the old capital at Linzi, in the city of Zibo, Shandong Province.

While theories of their chronology vary (Nakamura 2007), it is certain that a range of patterns, including tree patterns, developed in the late Warring States period. Tile kilns have been found and examined here and there outside the old capital walls (Fig. 8.3: 5), with ceramic-firing kilns also discovered (Zhang 2006). In particular, the Warring States kilns where eave-end tiles, round tiles and flat tiles have been unearthed were all dedicated workshops for roof-tile firing and supply. However, no photographs or diagrams of these kilns have been published; reports indicate that they existed from the Spring and Autumn period through the Han period. While it is difficult to confirm the beginning and end of their operating periods, the center of roof-tile production was almost certainly the late Warring States period.

Unlike the bone, bronze and iron workshops scattered within the old Qi capital, the roof-tile and ceramic kilns were located outside the walls. The failure to discover tile kilns within the walls suggests that the five found outside the walls were officially managed workshops. On the other hand, the characters stamped on ceramic products have led to the theory that the ceramic workshops were run by private citizens. Both types of kiln were outside the wall, but their distribution does not match, suggesting a difference in modes of operation.

8.4.5. Chu roof-tile production

The site of Ji’nancheng, Jiangling County, Hubei Province, which is believed to have been the Chu capital, has produced undecorated half-round eave-end tiles, round eave-end tiles, and round and flat roof tiles that are dated to the late Spring and Autumn period through the Warring States period (Hubei Provincial Museum 1982). The majority of building foundations appear in the Songbai area, southeast of the center, which is thought to have been the heart of the palace area. Kilns used to fire roof tiles and ceramics have also been found there, with many tile kilns found north of the central palace area and ceramic kilns scattered to its west.

A tile kiln was found in 1965 in Fanjiayuan, within the Songbai area, and two more (He River Kilns Nos. II-1 and III-1) were discovered elsewhere in 1975. Little is known of the III-1 kiln structure, and the Songbai Fanjiayuan and II-1 kilns are typical semi-sunken flat kilns, having oval shapes and one flue at the back wall. The firebox is a shallow dugout in front of the flat firing area that is connected to the stokehole.

From the artifacts found around these kilns, they are generally thought to date from the mid-Spring and Autumn period or later. Five undecorated round eave ends have been unearthed from the Songbai Fanjiayuan kiln, indicating that it dates from the time when these came into use, likely during the Warring States period; thus, the kiln was clearly in operation at some point during the Warring States period.

By contrast, four Warring States flat ceramic kilns have been found at the Xinqiao site in western Ji'nancheng (Hubei Provincial Institute of Cultural Relics and Archeology 1995). The ceramics found there imply a date from the late mid-Warring States period through the beginning of the late Warring States period. Thus, the ceramic and tile kilns at the Ji'nancheng site operated at different locations and featured clearly differentiated production.

8.4.6. Separation of tile and ceramic production

Tile kilns in the Western Zhou period made use of small-scale ceramic-firing kilns, with minimal structural differences between the tile and ceramic kilns, and likewise without separation between their workers (Owaki 2002). By contrast, through the Spring and Autumn and Warring States periods, the production of ceramics and of roof tiles became more and more distinct. By the Warring States period at the latest, the two were handled by different workers who rarely shared kilns. In response to this, roof-tile kilns in these periods became much larger than ceramic kilns, and structural differences appeared as well.

In the Warring States countries of Qin, Yan, Qi, Chu and others, roof-tile production was clearly separated from that of ceramics. At Qin Yongcheng and Chu Ji'nancheng, kilns dedicated to the firing of roof tiles were built near the interior palace areas in response to demand for the tiles. At the old Qi Linzi capital, however, iron, copper-casting and bone workshops were built within the outer walls, but dedicated roof-tile and ceramic-firing kilns were scattered outside the walls. Civilian-run ceramic kilns also existed. At Yan-Xiadu, workshops for arms, roof tiles and ceramics were concentrated near the palace area, suggesting that the national authorities were responsible for the management of these industries. Roof tiles were stamped with marks that represented control by central management, distinct from those marking ceramic artifacts. While roof tiles and ceramics have been unearthed together where they were disposed of, they were clearly separated at the production stage.

8.5. Tile and ceramic kilns in the Qin and Han periods

From the Warring States through the Qin and Han periods, major changes appeared in methods of roof-tile production. First, techniques of patterning on eave-end tiles using molds began to be used, and they spread across various regions during the Warring States period. In some areas, molds were used to produce clay cylinders, creating cloth marks on the round and flat tile interiors. Roof tiles with cloth marks date back as far as the Eastern Zhou Wangcheng site at Luoyang, and appeared widely during the mid to late Early Han period around Chang'an (Tani 1984). Roof tiles, which were first produced using ceramic-based methods, were by this point being manufactured with specially developed techniques and tools. These

differentiated techniques and tools further accelerated the separation of the production of ceramics and of roof tiles, and the two became distinct professions. Large numbers of tile kilns have been found from the Qin period onward, and during the Han period in particular, making it difficult to characterize all of them in one discussion. Here, let us concentrate on three groups of dedicated tile-firing kilns found from the Qin period (221 BCE to 206 BCE) through the beginning of the Early Han period (206 BCE to 8 BCE), to identify the specific characteristics of tile kilns during this time.

8.5.1. Tile kilns at the Mausoleum of the First Emperor

The Mausoleum of the First Qin Emperor is found in the eastern suburbs of Xi'an City, Shaanxi. It is recorded that its construction began in 246 BCE, and it became a massive mausoleum park construction project employing 700,000 workers after the unification of China in 221 BCE. The First Emperor died in 210 BCE and was buried there, but his palace and mausoleum were both destroyed after the Qin Empire fell in 206 BCE.

Investigations of this mausoleum have found multiple buildings in and around the mausoleum park, and many roof tiles have been unearthed from their remains. The kilns that produced this large quantity of roof tiles have been discovered in various places around the park (Qinyong Archeological Team 1985): in particular, three mainly tile-firing kilns have been found in the village of Zhaobeihu, west of the park, with three more near the village of Shangjiao, to the southeast (Fig. 8.4: 1). These kilns mainly produced roof tiles, together with a little ceramic. The Zhaobeihu kilns are triangular in shape and have three flues in the back wall, whereas the Shangjiao kilns are in the shape of a horseshoe or a round-cornered triangle; some have five flues in the back wall and show notable differences in shape.

During this period, the construction of the Qin palace and the Mausoleum of the First Emperor involved large numbers of civilians from all regions, together with workers from official workshops, as is made clear by the stamps engraved on the tiles and ceramics. In other words, the diverse shapes of the kilns found near the mausoleum, if they are dated correctly, most likely derive from the diverse origins of and techniques used by the kiln workers. By contrast, the tile kilns at the First Emperor's Jieshi Palace and at the Han Dynasty Northern Palace in Chang'an show a more uniform structure in their remains, suggesting that they were officially managed roof-tile workshops.

8.5.2. Tile kilns at the First Emperor's Jieshi Palace

The Qin Dynasty resort in Jiangnüshi, Suizhong County, Liaoning Province, resembles the Jieshi Palace built by the First Qin Emperor (Fig. 8.4: 2). Records indicate that after

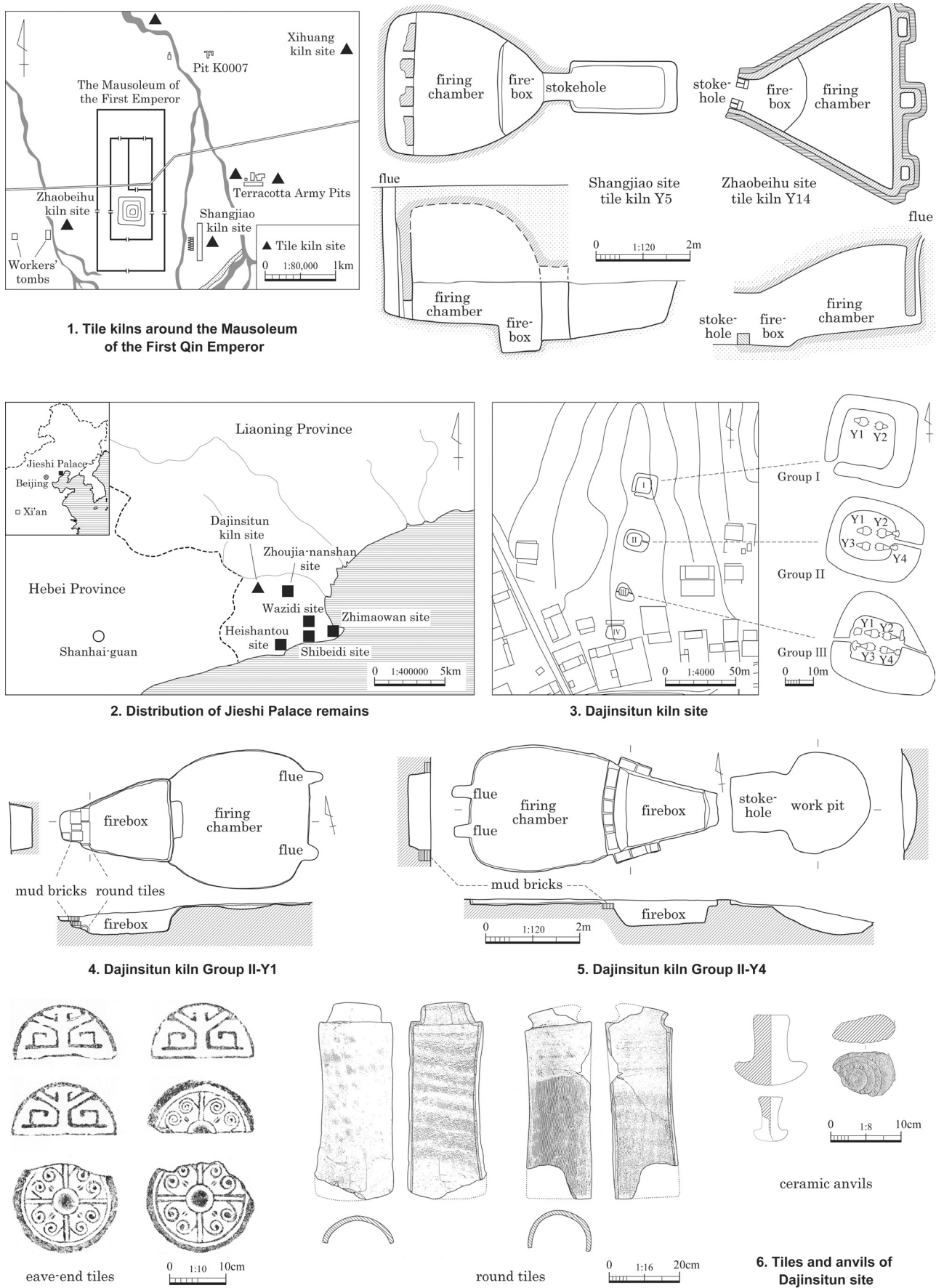


Figure 8.4. Kilns for the First Emperor of Qin Dynasty (redrawn from Qinyong Archeological Team 1985 and Liaoning Provincial Institute of Cultural Relics and Archaeology 2010).

unifying the country, the First Emperor took five imperial tours, visiting Jieshi to perform rites during his fourth tour in 215 BCE. The Shibeidi site is central to the Jieshi Palace, and features large tile-roofed building foundations with keystones at the Zhimaowan and Heishantou sites on its eastern and western capes. In the surrounding area, tile kilns have been found alongside buildings at the Wazidi and Dajinsitun sites, together with artifacts suggesting that these sites were related to the building of the Jieshi Palace (Liaoning Provincial Institute of Cultural Relics and Archaeology 2010).

At least four units (No. IV remains unexcavated) of two to four flat tile kilns, each encircled by ditches, have been discovered at the Dajinsitun site (Fig. 8.4: 3). The kilns are all similar in shape and structure and feature a trapezoidal firebox, oval firing area and two flues, the first depressed about 70 cm below the firing area (Fig. 8.4: 4, 5). They are semi-sunken kilns, built into the ground, plastered on the interior with mud mixed with fibers, and partially constructed of sun-dried bricks. The yard area outside the stokehole of the kilns includes a work pit. The work pit and outer ditch at No. II are linked, whereas the work pit at No. III is dug into a raised area within the ditch, suggesting that the ditch was used for wastewater and the disposal of defective products, rather than for work processes.

8.5.3. Tile kilns at the Chang'an Han Dynasty Northern Palace

The Northern Palace of early Han Chang'an is located in the north center. In a 1994 survey, 20 tile kilns were found outside its southern gate, of which 11 (Y31–Y41) have been excavated (Han Chang'an City Archaeological Team 1996). These are all flat oval kilns, standing in three rows of three to four kilns, each facing east (Fig. 8.5: 1).

The kilns are approximately 3 m long and up to 2.5 m wide, with fireboxes dug deeper than the firing chamber floors by 1 m or more. There are either one or three flues in the back walls, and rectangular work pits outside the stokeholes. These semi-sunken kilns are dug into the natural loess strata and have firing-chamber floors partially constructed of sun-dried bricks; their interior walls are plastered about 3 cm thick with mud mixed with fiber (Fig. 8.5: 2, 3, 4, 5).

The roof tiles and bricks unearthed in and around these kilns include undecorated and lattice-patterned, half-round eave-end tiles and cloud-patterned, round eave-end tiles (Fig. 8.5: 7); the accompanying flat tiles show cord marks on their exteriors and are either blank or anvil-marked inside. The stamp “dajiang” (great master), seen on round and flat tiles (Fig. 8.5: 6) in particular, is frequently found from the Qin through the very early Han periods, and uses characters close to those from the latter period. Therefore, these kilns are thought to have been in operation around the beginning of the Early Han period.

8.5.4. Changing tile-kiln shapes during the Qin and Han periods

In the early Warring States period, kilns were generally small and circular, with some still being two-layered, whereas in the mid to late Warring States period, flat oval kilns with a single flue became standard. Two-flue flat kilns appeared sometime later, and from the later Early Han period on, there was a rapid movement toward uniform, flat, horseshoe-shaped kilns with three flues (Li 2014; Wang 2011). The tile kilns of the First Qin Emperor's Jieshi Palace and the Han Dynasty Northern Palace at Chang'an exhibit this transition; however, the results of kiln excavations around the First Qin Emperor's Mausoleum also show that these changes were mainly seen in officially managed Qin and Han workshops, while contemporaneous civilian-run kilns continued to have diverse shapes.

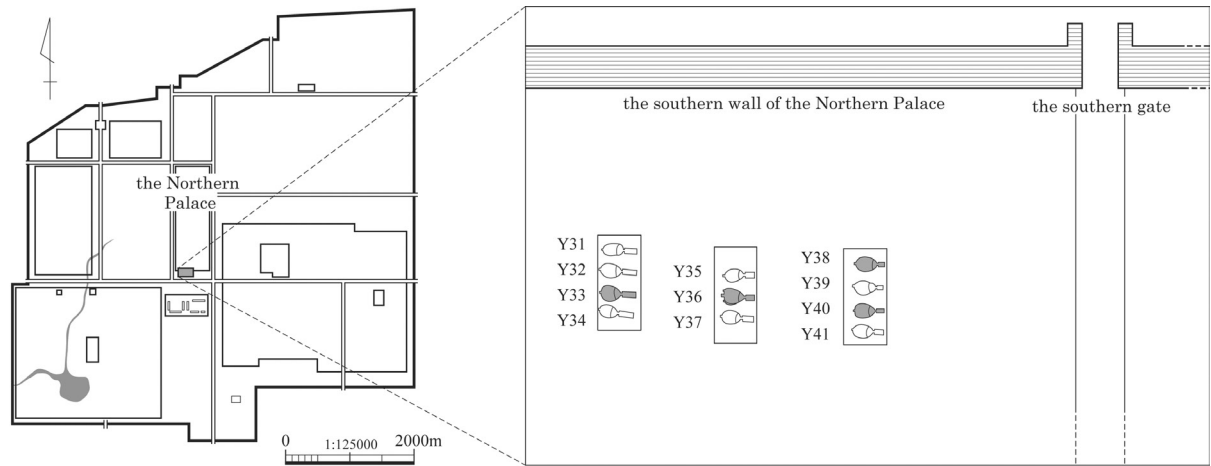
Structurally, tile kilns kept roughly the same structure from the Warring States through the Qin and Han periods. However, they steadily grew larger throughout this time, and the back-firing chambers in particular expanded. This enlargement enabled larger-scale production and the firing of larger products. The steadily increasing number of flues at the back wall of the firing chamber also supported larger tile kilns; the straight back wall with three flues at its base represented a means of retaining firing-chamber space while ensuring that products at the back were fully fired.

8.6. Conclusion

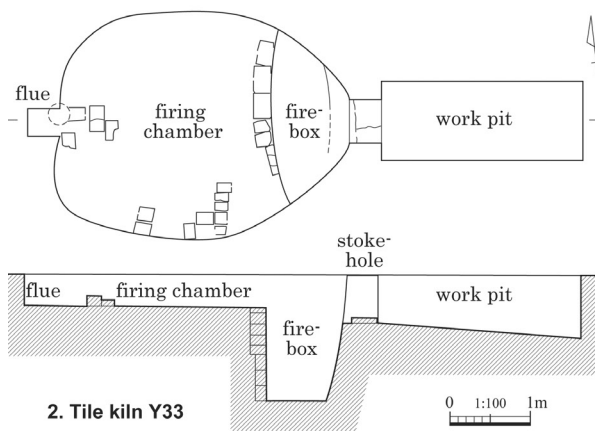
We have discussed the shape of and structural changes in tile kilns and roof-tile production from the Western Zhou through the early Han periods, together with their relationships to ceramic production. The conclusions of this paper are given below.

1) Tile kilns during the Western Zhou period and earlier used a two-layer structure, with ceramics and roof tiles being unearthed together in sites such as the village of Luoshui at Haojing. Examples of separate firing have also been discovered, such as at the two kilns found in the village of Liulongzui, Qishan County. However, in both cases, roof tiles and ceramics were produced and fired in extremely close proximity. This suggests that roof-tile and ceramic workers were not yet separated, and the same workers may have engaged in production of both forms.

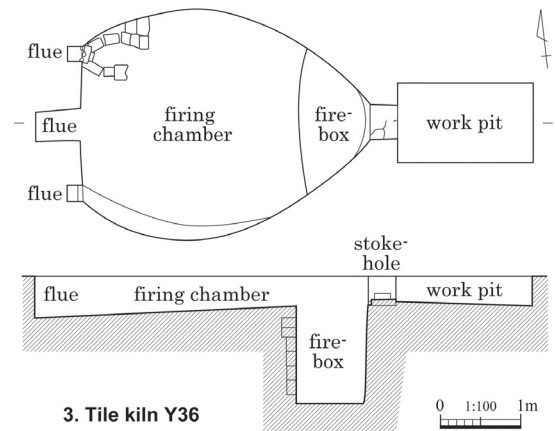
2) Much about roof-tile production in the Spring and Autumn period remains unclear, but it is clear that in Qin, Qi, Yan and Chu during the Warring States period, roof tiles and ceramics were produced separately by different workers. Unique roof-tile molds arose for use in antefix production, and as roof-tile consumption increased, the production of ceramics and roof tiles appear to have become separate. Large flat kilns for roof-tile firing came into widespread use, whereas ceramic-firing kilns remained small and two-layered until relatively late.



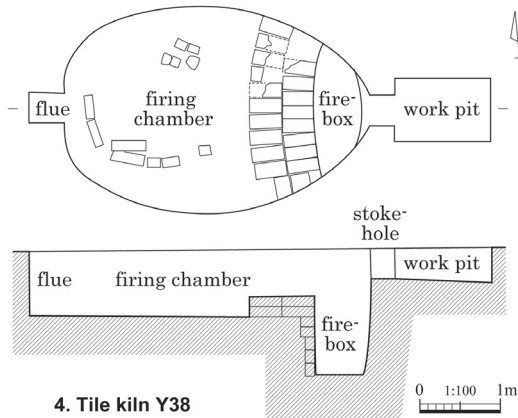
1. Tile kilns to the south of the Northern Palace in Chang'an city during the Western Han dynasty



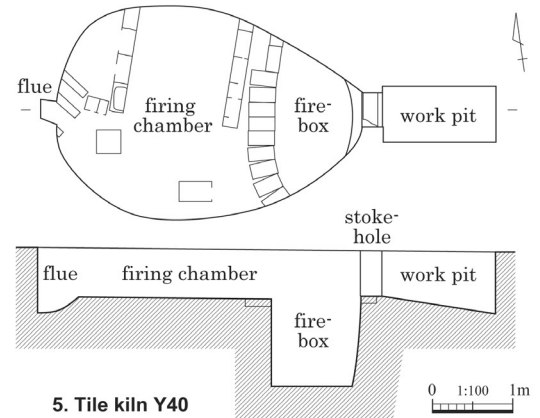
2. Tile kiln Y33



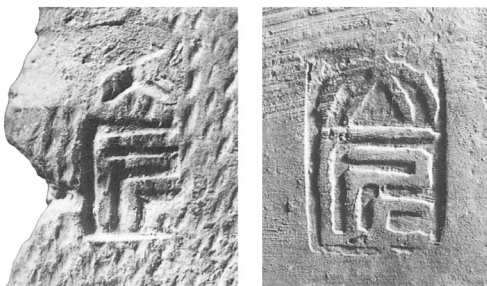
3. Tile kiln Y36



4. Tile kiln Y38



5. Tile kiln Y40



6. "Dajiang" stamp on tiles (Y41:3, Y31:8)



7. Eave-end tiles (Y36:2, 5)

Figure 8.5. Tile kilns in Chang'an City during the Western Han Dynasty (redrawn from Han Chang'an City Archaeological Team, 1A, CASS 1996).

3) This division of labor progressed further during the Han period, with roof tiles and ceramics being produced intensively in different workshops. This is clear from the large numbers of tile kilns that have been found lined up south of the Han Dynasty Northern Palace in Chang'an. Han period kilns all used the same flat structure for roof tiles, ceramics and terracotta figurines, but each kiln fired a specific model, indicating a division of functions.

The kiln shape and structure that were perfected during the Han period continued to be used for centuries without major changes, mainly in northern China. During this process, the influence of roof-tile production technology and kiln structure was felt throughout East Asia.

References

- Archaeological Team of Yongcheng, Shaanxi, 1985. Excavation of the Architectural Remains No. 1 at Majiazhuang, Fengxiang. *Cultural Relics*. 2: 1–29. [陕西省雍城考古队 《凤翔马家庄一号建筑群遗址发掘简报》《文物》]
- Baoji Municipal Institute of Archaeology, 2011. Architectural Materials of Longshan Period unearthed from Baoji. *Cultural Relics*. 3: 44–45. [宝鸡市考古研究所《宝鸡发现龙山文化时期建筑构件》《文物》]
- Feng Hao Archaeological Team, IOA, Academia Sinica, 1963. Trial Diggings along the East Bank of the Feng River, Chang'an, Shaanxi (1961–1962). *Archaeology*. 8: 403–412. [中国科学院考古研究所丰镐考古队《1961–62年陕西长安沣东试掘简报》《考古》]
- Han Chang'an City Archaeological Team, IA, CASS, 1996. Prospecting for the Beigong Palace in Chang'an City of the Han Period and Excavation of Brickkilns to the South of It. *Archaeology*. 10: 15–22. [中国社会科学院考古研究所汉城工作队《汉长安城北宫的勘探及其南面砖瓦窑的发掘》《考古》]
- Hebei Provincial Institute of Cultural Relics, 1996. *The Lower Capital of the Yan State*, Cultural Relics Publishing House. [河北省文物研究所《燕下都》]
- Henan Provincial Institute of Cultural Relics and Archaeology, 2007. A Brief Account of the Flat Tiles from the Palace area of the Zhengzhou Shang City. *Huaxia archaeology*. 3: 31–42. [河南省文物考古研究所《郑州商城宫殿区商代板瓦发掘简报》《华夏考古》]
- Hubei Provincial Institute of Cultural Relics and Archeology, 1995. Xinqiao Site at Jinan City. *Acta Archaeological Sinica*. 4: 413–451. [湖北省文物考古研究所《纪南城新桥遗址》《考古学报》]
- Hubei Provincial Museum, 1982. Exploration and Excavation of the Ancient Chu Capital, Jinan City (Part Two). *Acta Archaeological Sinica*. 4: 477–506. [湖北省博物馆《楚都纪南城的勘查与发掘(下)》《考古学报》]
- Institute of Archaeology, Academia Sinica, 1959. *Luoyang Zhongzhou Lu (Western Part)*. Science Press. [中国科学院考古研究所《洛阳中州路(西工段)》]
- Institute of Archaeology, CASS, 1989. *Archaeological Report of Luoyang: Archaeological Resources unearthed at Jian River and Bing River Area, in 1955–1960*. Beijing Yanshan Press. [中国社会科学院考古研究所《洛阳发掘报告 1955–1960 年洛阳涧滨考古发掘资料》]
- JU Wangcang, 1989. Finding of Ceramic Kiln Site at Liulongzui village in Qishan County. *Relics and Museology*. 2: 85–87. [巨万仓《岐山流龙咀村发现西周陶窑遗址》《文博》]
- LI Qinglin, 2014. Study of Ceramic Kilns during the Qin and Han Dynasties. *Archaeology and Cultural Relics*. 2: 59–81. [李清临《秦汉时期砖瓦窑研究》《考古与文物》]
- Liaoning Provincial Institute of Cultural Relics and Archaeology, 2010. *Jiannüshi: Excavation of Qin Imperial Palace Remains*. Cultural Relics Publishing House. [辽宁省文物考古研究所《姜女石: 秦行宫遗址发掘报告》].
- LUO Xizhang, 1987. Ceramic Architectural Materials unearthed from Zhouyuan. *Archaeology and Cultural Relics*. 2: 9–17. [罗西章《周原出土的陶制建筑材料》《考古与文物》]
- MUKAI Yusuke, 2012. Origin and Development of Roofing Tiles in China. *Kodai*, 129–130: 177–214. [向井佑介「中国における瓦の出現と伝播」《古代》].
- NAKAMURA Akiko, 2007. A Study of Roof Tiles from the Capital of Qi State. *Chinese Archaeology*, 7: 97–119 [中村亜希子「臨淄齊故城出土瓦の検討」《中国考古学》].
- OZAWA Masahito, 1993. A Study on the Technology of Firing between Neolithic Age and Xi-Zhou Period in Middle and Down Valley of the Yellow River. *Shikan: The Historical Review*, 128: 49–63. [小澤正人「黄河中下流域における新石器時代から西周時代の土器焼成」《史観》].
- OWAKI Kiyoshi, 2002. Roof Tiles from the Western Zhou Period to the Spring and Autumn Period. *Collected papers Honoring 90th birthday of FUJISAWA Kazuo*. 100–126. Shinyōsha. [大脇潔「西周と春秋の瓦」藤澤一夫先生卒寿記念論文集].
- Qinyong Archeological Team, 1985. Report on the Findings and Sorting-out of Ceramic Kilns of the Qin Dynasty. *Archaeology and Cultural Relics*. 5: 35–39. [秦俑考古队《秦代陶窑遗址调查清理简报》《考古与文物》]
- Sanmenxia Municipal Archaeological Team, 1993. Excavation at the Lijiayao Site in Sanmenxia City. *Huaxia Archaeology*. 4: 1–7. [三门峡市文物工作队《三门峡市李家窑遗址发掘简报》《华夏考古》]
- Shaanxi Academy of Archaeology et al., 2013. *Workshop Ruins for Pottery Building Materials of Qin Capital*

- Yongcheng in Doufu Village*. Science Press. [陕西省考古研究院等《秦雍城豆腐村战国制陶作坊遗址》].
- Shaanxi Academy of Archaeology et al., 2019. The Lushanmao Site of the Neolithic Age in Yan'an City, Shaanxi. *Kaogu: Archaeology*. 7: 29–45. [陕西省考古研究院等《陕西延安市芦山峁新石器时代遗址》《考古》]
- Shanxi Archaeological Teams of the Institute of Archaeology, CASS et al., 2005. Excavation on the City-site at Taosi, Xiangfen, Shanxi, in 2002. *Acta Archaeologica Sinica*. 3: 307–346. [中国社会科学院考古研究所山西队等《山西襄汾陶寺城址 2002 年发掘报告》《考古学报》].
- TANI Toyonobu, 1984. Manufacturing Techniques of Roof Tiles in China Before Western Jin Dynasty. *Journal of the Archaeological Society of Nippon*. 69(3): 334–361. [谷豊信「西晋以前の中国の造瓦技法について」『考古学雑誌』].
- TANI Toyonobu, 2006. Round Eave-end Tile with Tao-tie Design. *MUSEUM: The Bimonthly Magazine of the Tokyo National Museum*. 603: 57–67. [谷豊信「新収品紹介: 饕餮文軒丸瓦」『東京国立博物館研究誌』].
- WANG Chunbin, 2011. A Preliminary Study on Kilns dating to the Warring States and the Transitional Period Between the Qin and Han Dynasties. *Archaeology and Cultural Relics*. 5: 50–59. [王春斌《战国及秦汉之际陶窑初步研究》《考古与文物》].
- Work Team of Luoyang City on Cultural Relics, 1983. The Ancient Kiln-sites within the Royal City of the Eastern Zhou Dynasty in Luoyang. *Archaeology and Cultural Relics*. 3: 12–19. [洛阳市文物工作队《洛阳东周王城内的古窑址》《考古与文物》].
- ZHANG Longhai, 2006. Exploration of Ceramic Kilns at Linzi City Site of Qi Capital, Shandong. *Archaeology*. 5: 91–94. [张龙海《山东省临淄齐国故城陶窑遗址的调查》《考古》].
- Zhouyuan Archaeological Team in Shaanxi Province, 1979. Excavation at Earlier Zhou Palace Remains at Fengchu Village in Qishan County, Shaanxi Province. *Cultural Relics*. 10: 27–37. [陕西周原考古队《陕西岐山凤雏村西周建筑基址发掘简报》《文物》].
- Zhouyuan Archaeological Team in Shaanxi Province, 1981. Excavation of the Site of the Western Zhou Dynasty Buildings at Shaochen Village in Fufeng County, Shaanxi Province. *Cultural Relics*. 3: 10–22. [陕西周原考古队《陕西召陈西周建筑群基址发掘简报》《文物》].
- Zhouyuan Archaeological Team, 2002. Excavation of Western Zhou Building Foundations at Yuntang and Qizhen in Fufeng County, Shaanxi, in 1999–2000. *Archaeology*. 9: 3–26. [周原考古队《陕西扶风县云塘、齐镇西周建筑基址 1999~2000 年度发掘简报》《考古》]

Pottery and Long-Distance Trade in East Asia: Coastal Areas Around the East China Sea and Yellow Sea During the Han Dynasty

Daisuke Nakamura

Abstract: Kiln-fired pottery was widely used for long-distance trade around the Yellow Sea and the East China Sea from the third century BC to the third century AD. This essay discusses a possible value change in that type of pottery. The first widespread distribution was of large containers for transport, produced in the Liaodong and Shandong peninsulas. However, after the development of proto-celadon in the Jiangnan region, medium-sized long-necked jars were exported to other regions from the Han Dynasty onwards. In short, the wide distribution of pottery changed from pottery for transport to high-quality ceramics. In addition to the rising value of ceramic itself, it seems to have been appreciated as a tool for drinking and spread to the higher strata of societies.

Keywords: Long-distance trade, Lelang commandery, Liaodong peninsula, Shandong peninsula, proto-porcelain

9.1. Introduction

The long-distance movement of pottery is occasionally seen in the Japanese archipelago starting in the Jomon period, which was a hunter-gatherer society. Although there are some cases of movement of more than 1000 km, such as Ōbora-type pottery in the Final Jomon period, the movement was mostly contained within the Japanese archipelago, except for the southern end of the Korean peninsula. However, from the Middle Yayoi period onwards, the pottery produced in the northern part of the Korean peninsula or farther away, such as Lelang pottery and Liaodong style pottery, was brought to the Japanese archipelago. These were the types of pottery produced with the flat kiln (see Chapter 8) that developed in northern China.

Regarding the acceptance of kilns, in the south of the Korean peninsula, people adopted not only the flat kiln but also the tunnel kiln that originated from the Jiangnan region (see Chapter 6). In the Japanese archipelago, people also adopted the technology of the tunnel kiln, which formed the basis for later pottery production. In both regions, however, solid kiln-fired pottery had been introduced by trade before the production of kiln-fired pottery began. In this chapter, the author will discuss the expansion of the trade network of the East China Sea and the Yellow Sea during the Han Dynasty that accompanied the use of kiln-fired pottery.

9.2. Current issues

Lelang commandery, which is the source of Lelang pottery, was established in 108 BC after the Emperor

Wuhan defeated Wiman Joseon (Fig. 9.1, Table 9.1). The Lelang Fortress, located in present-day Pyongyang, as a capital almost dominated the Northern part of the Korean peninsula. In the Treatise on Geography of the “Hanshu,” there is a description as follows:

There were *Wa* people in the sea of Lelang, divided into more than a hundred countries. They came and contribute (to Lelang) in time. (Bangu, *Hanshu*, Treatise on Geography, 103 of last volume)

This text suggests that there was a close relationship between Lelang commandery and Japan (which was known as “Wa” in ancient texts), and archeological research conducted in the early twentieth century shows that diplomatic activities were carried out from this period, accompanied by bronze mirrors and gilt bronze products.

It has also been confirmed in the 1950s that Lelang pottery was brought to the Japanese archipelago (Mizuno and Okazaki 1954). However, it was not until Tani Toyonobu (1984–86) sorted out the pottery of the Lelang Fortress and clarified its composition that the study of Lelang pottery began to progress in earnest, which led to the identification and distribution of Lelang pottery mainly in the northern part of Kyūshū (Takesue 1991a, 1991b).

In parallel with the aforementioned studies, Korean researcher Shin Yongmin (1991: 47–50) sought the origin of Lelang tombs and mentioned the change of some types of pottery in his examination of a burial with wooden compartments and burial goods. Later, Takaku Kenji (1995) examined almost all the burial goods in Lelang tombs and

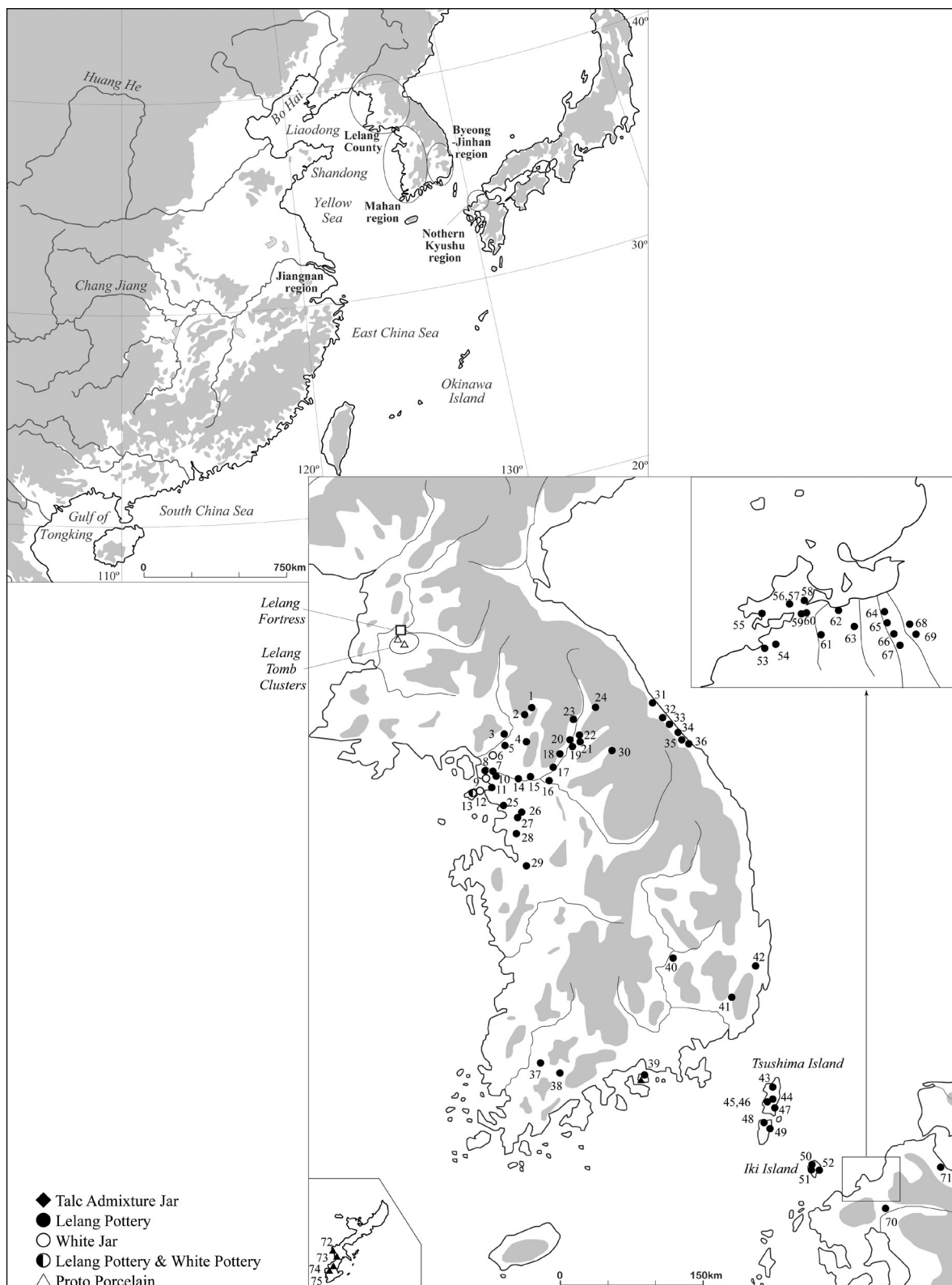


Figure 9.1. Distribution of long-distance trade pottery to the south of the Liaodong region (modified from Nagatomo 2010). 1. Wasuri, 2. Jeongokri, 3. Hakgokri, 4. Guemjuri, 5. Dangdongri, 6. Galhyeongri, 7. Unyangdong, 8. Yanggok, 9. Yanchon, 10. Bullodong, 11. Yeonhuidong, 12. Neundeul, 13. Unbukdong, 14. Pungnap Fortress, 15. Misari, 16. Yansuri, 17. Daeseongdong, 18. Daljeonri, 19. Geunhwa, 20. Shinmeri, 21. Ududong, 22. Yulmunri, 23. Georyeri, 24. Godaeri, 25. Oido, 26. Kianri, 27. Danghari, 28. Seodundong, 29. Galmeri, 30. Cheoljeiongri, 31. Gapyeongri, 32. Gyohangri, 33. Chodangdong, 34. Aninri, 35. Geumjinri, 36. Songjeongdong, 37. Shinchangdong, 38. Daegokri, 39. Nuekdo, 40. Pyeongchonri, 41. Pyeongsanri, 42. Dalcheon, 43. Kyōnokuma, 44. Kine/Yamabe, 45. Ōtobaru Yamoto, 46. Senosae, 47. Kannonbana, 48. Koshikizaki, 49. Shire'eura, 50. Karakami, 51. Toda, 52. Harunotsuji, 53. Fukae Imuta, 54. Magarita, 55. Mitoko Matsubara, 56. Ichinomachi, 57. Usui, 58. Motooka, 59. Urashi Ijiri, 60. Uruuji Tōkyū, 61. Mikumo, 62. Imajuku Gorōe, 63. Konori, 64. Hakata, 65. Hie, 66. Naka, 67. Takahata, 68. Sasai, 69. Shimotsukiguma C, 70. Hebonogi, 71. Jussō, 72. Ōkubo, 73. Nakagawa shell-mound, 74. Arachibaru, 75. Kajoū shell-mound, 76. Kasihima offshore, 77. Zannochi, 78. Aoki, 79. Monzen Ike.

Table 9.1. Chronological division in East Asia from third century BC to third century AD

	China	Korean Peninsula	Japanese Archipelago	Historical Events
220 AD	Three Kingdoms	Korean Three Kingdoms	Early Kofun period	239 AD Tribute from Himiko to Wei 202 AD Establishment of Daifang County Growth of Korean Han states and population outflow of Lelang County (Latter half of 2nd century)
		Final Proto-Three Kingdoms	Final Yayoi period	
89 AD	Middle and Late Eastern Han (M/LEH)	Late Proto-Three Kingdoms	Latter half of Late Yayoi period	
41 AD	Early Eastern Han (EEH)	Middle Proto-Three Kingdoms	First half of Late Yayoi period	57 AD Emperor Guangwu granted the Golden Seal to Wa
8 AD	Xin/Initial Eastern Han (X/IEH)			
48 BC	Late Western Han (LWH)	Early Proto-Three Kingdoms	Late stage of Middle Yayoi period	108 BC Establishment of Lelang County 111 BC Establishment of Nanhai County 119 BC State monopolies on salt and iron
118 BC	Middle Western Han (MWH)	Initial Proto-Three Kingdoms	Middle stage of Middle Yayoi period	
180 BC	Early Western Han (EWH)	Early Iron Age	Early stage of Middle Yayoi period	
221 BC	Qin/Initial Western Han (Q/IWH)		End of Early Yayoi/Initial stage of middle Yayoi period	195 BC Foundation of Wiman Joseon 222 BC Ruin of Yan state
	Late Warring States			

clarified their transitions. In northern Kyūshū, gray-colored pottery similar to Lelang pottery was also brought from Byeong-Jinhan in the southern part of the Korean peninsula, but the fragments are sometimes difficult to distinguish from each other. However, a study by Jeong Inseong (2004: 88–89) revealed differences between Lelang pottery and Wajil pottery in the inner pattern of pottery made by the anvils in paddling.¹ Furthermore, including this point, Terai Makoto (2007: 88) suggested three elements of difference between Lelang pottery and Wajil pottery.

As a result, the actual distribution of Lelang pottery is now understood in considerable detail. After the 1990s, the number of excavations in Korea began to increase rapidly, and Lelang pottery was unearthed in many places. At that time, the studies by Tani, Takaku and Jeong made a significant contribution to identification and chronology.

While the movement of Lelang pottery was taking place, White pottery from the Shandong peninsula was also exported to the Liaodong peninsula and Lelang commandery (Tani 2008). Particular White pottery has been produced since the Neolithic period in the Shandong peninsula, but it became widely distributed in the Han Dynasty. Those pieces unearthed in the Liaodong peninsula and Lelang commandery are basically large jars. In addition, proto-porcelain produced in the Jiangnan region has been excavated from the Shandong peninsula

and Lelang commandery. It is obvious from these findings that the Han Dynasty was a time when coastal trade in the East China Sea and Yellow Sea increased significantly (Nakamura 2015, 2017; Miyamoto 2020).

On the other hand, in recent years, research on the northeastern part of China has progressed and the development of the Warring States and Han dynasties in the Liaodong region has become clearer (Onuki ed. 2007). It is now evident that some pottery was moved long distances before the establishment of Lelang commandery (Jeong 2008; Nagatomo 2010). Talc was mixed into the clay in large amounts (hereinafter, this is called “talc admixture pottery”). Since this type of pottery was transported to the main island of Okinawa, it was also found that trade across multiple polities had begun before the establishment of Lelang commandery (Jeong 2008; Nakamura 2012).

All this long-distance transported pottery from the Han Dynasty period shares one characteristic: it was all fired in kilns, as mentioned in the introduction. This means that the solid and tough pottery moved further compared with the pottery in local areas of the Korean peninsula and the Japanese archipelago at that time. Furthermore, the pottery included large storage containers, which were not found in earlier long-distance transported pottery.

9.3. Pottery of long-distance movement

The pottery that moved long distances in the Korean peninsula and the Japanese archipelago was brought from a plurality of regions. In the following, the differences in

¹ Wajil pottery appeared in the southeastern part of Korea. Some of this was fired by open firing at first, but almost all of the vessels became to be fired by kilns, including gray-colored reduction-fired ones.

the characteristics of each will be discussed, with reference to the pottery that moved long distances across the East China Sea and the Yellow Sea during the Han Dynasty.

9.3.1. Talc admixture jar

In the Japanese archipelago, a talc admixture jar was the first long-distance trade pottery brought from further to the north than the middle part of the Korean peninsula. Pottery containing large amounts of talc is often found in the area from the Liaodong region to the Daedong River basin, and these were transported to the middle and southern part of the Korean peninsula as flowerpot-shaped pottery just before and after the establishment of Lelang commandery. Prior to this type of pottery, large neckless jars suitable for storage were produced (Fig. 9.2: 1–6).

Talc admixture jars have been found in Muyangcheng site, located at the tip of the Liaodong peninsula (Fig. 9.2: 1, 2), Neukdo site, located at the southern end of the Korean peninsula (Fig. 9.2: 3), and some sites in Okinawa (Fig. 9.2: 4–6). Since all sites are located in coastal areas, they are deeply related with ocean-based trade networks. Unfortunately, as only the mouth rims of these jars have been found, the shape of the jar is not clear. However, judging from these parts, it is likely they were nearly spherical in shape. The fact that they were fired in a kiln proves that they were not produced in the Korean peninsula, where kilns had not yet been introduced. Muyangcheng site in Liaodong peninsula was built as a fortress of Yan state in the late Warring States period and continued until the early Western Han Dynasty (from the third to the second century BC). Talc admixture jars were not found in the assemblage of Yan State pottery. Although there were various types of jars made from the Qin to the early Western Han periods, the production of large jars, almost as wide as they were tall, increased. Focusing only on the shape of the mouth rim, a similar jar was found in the Dajinsitun site (Fig. 9.2: 7), which related to the Qin temporary palace, but it does not contain talc. If a talc admixture jar has a flat bottom, it dates from the Qin period; if it has a round bottom, it dates from the early Western Han period, but there are no extant remains of jar bottoms. Therefore, it is reasonable to conclude that the talc admixture jar was created in the Liaodong region and influenced by jars from the Qin to the early Western Han period.

The Neukdo site at the southern end of the Korean peninsula contains a cemetery, a shell mound, and a dwelling. Not only a talc admixture jar was found there, but also Lelang pottery, which will be discussed below (Seo 2004; GARI 2003, 2006). A large amount of Yayoi pottery from the northern Kyūshū area was also found, as well as examples from the Setouchi and Sanin areas of Japan. For this reason, the nature of the Neukdo site as a trade center is evident (Shirai 2001). A talc admixture jar was excavated from the Na-No.136 pit accompanied by local pottery and Yayoi pottery from the first century BC to the first half of the first century AD (Li 2004). As a

large amount of pottery from the second century BC has been excavated across the entire Neukdo site, including the Yayoi pottery of that time, the talc admixture jar seems to have been used for a long time, until it broke.

In Okinawa, examples have been unearthed at the Ōkubobaru site, Kajou shell mound, Nakakawabaru shell mound, and the Arechibaru site. Bronze articles such as a knife-shaped coin (*Mingdaoqian*) and a trilobate arrowhead have also been found. Talc admixture jars from the Kajou and Nakakawabaru shell mounds accompanied such Yayoi pottery as Takahashi type, Iriki type and Yamanokuchi type, which date from the third to first century BC in southern Kyūshū. In the Ōkubobaru site, this type of jar was found with Yayoi pottery such as Takahashi II type and Iriki II type, which date to between the end of the third and the second century (Shimada 1999: 22). Miyamoto Kazuo (2014: 81–82) suggested that the talc admixture jar and bronze artifacts were brought by refugees from the Liaodong region during the time from the fall of the Yan to the Qin in 222 BC to the establishment of Wiman Joseon in 195 BC. However, the talc admixture jar does not date from the fall of Yan. Even if there were refugees, it is unlikely that they would have arrived at a completely unknown place by accident. It is noteworthy that the relay type trade of artifacts was seen in such areas: from the western part to the southern end of the Korean peninsula; from the southern end of the Korean peninsula to northern Kyūshū; and from northern Kyūshū to the Okinawa Islands via southern Kyūshū. It should be assumed that Chinese artifacts were brought based on a trade network. What was in the talc admixture jar remains a mystery, but it is still informative as the first pottery used as a transport container in long-distance trade around the East China and Yellow Seas.

9.3.2. Lelang pottery

A large amount of Lelang pottery was brought to the Korean peninsula and Japanese archipelago after the establishment of Lelang commandery in 108 BC. As mentioned above, studies on pottery from the Lelang Fortress (Tani 1984–86) advanced the identification and understanding of Lelang pottery. Jeong Inseong (2003, 2008) and Kim Mujung (2004, 2007) have conducted extensive research on these discoveries in Korea.

Lelang pottery has been unearthed in large amounts from the fortress and tombs of Lelang, and consists of a wide variety of assemblages (Fig. 9.2: 8–30). Some of them are found all over the Han Dynasty, such as vats (*Pan*, Fig. 9.2: 22) for temporary water storage and eared cups (*Erbei*) for drinking, but some types of necked jars (*Hu*, Fig. 9.2: 19) and pots are unique, for example, the flowerpot-shaped talc-admixture pottery (*Fu*, Fig. 9.2: 9–10), which is distinctive of the region of Lelang commandery. It originated from the Yan-style pot (*Yan fu*), and was typologically changed in the Liaodong region; it took on its final form as it spread to the northern part of the Korean peninsula (Miyamoto

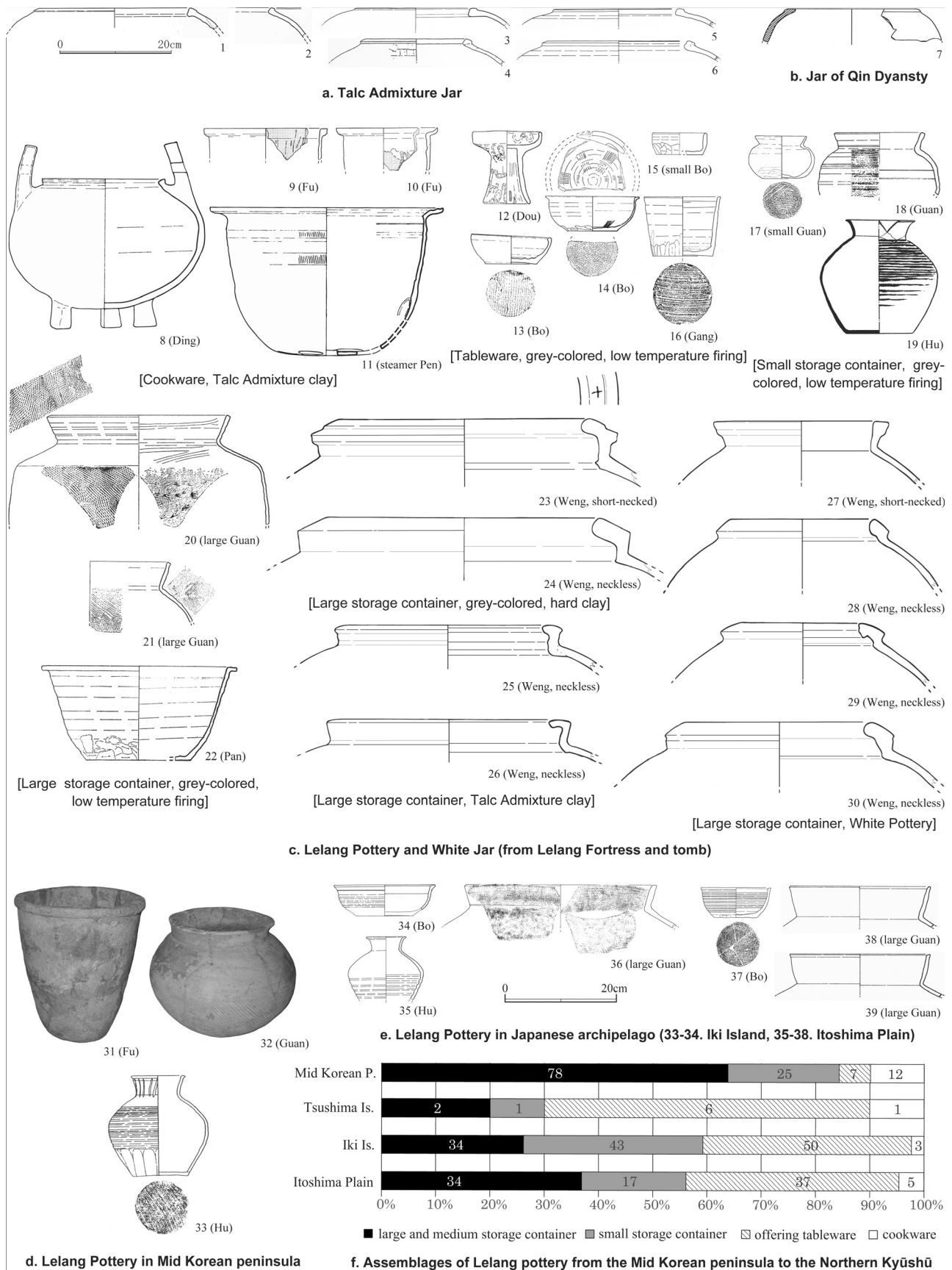


Figure 9.2. Talc pottery and Lelang pottery (a: Ōnuki eds. 2007; Lee 2004; Nagatomo 2010, b: Tani 1984-86; Harada and Tagawa 1930, c: picture courtesy of Nagatomo Tomoko; Kim 2004, d: Nagatomo 2010, Takesue 2014, e: based on Nagatomo 2010; FCBE 2011; Furusawa 2016). 1–2. Muyangcheng, 3. Neukdo, 4. Kajō shell-mound, 5–6. Ōkubo shell-mound, 7. Dajinsitun, 8–18, 20–30. Lelang Fortress, 19. Seokamri tomb No. 205, 31–32. Daljeonri burial No. 2, 33. Songjeongdong, 34–35. Karakami, 36. Harunotsuji, 37. Fukai Imuta, 38–39. Mikumo (Banjo).

2012). Specifically, the Lelang pottery includes a certain number of types that originated from Yan state and were transformed in the Liaodong region and in the Wiman Joseon. In Lelang commandery, a talc admixture jar (Weng, Fig. 9.2: 25–26) was also found, which had transformed from that of the Early Western Han period. Cups with a long leg (Dou, Fig. 9.2: 12)² and cylindrical cups (Gang, Fig. 9.2: 16) were found in the Lelang Fortress, and similar types of pottery were seen in Han tombs in the Liaodong peninsula but have not been unearthed in the Lelang tombs. Incidentally, judging from the Lelang pottery found from the midwestern to the southern part of the Korean peninsula and the White pottery (Fig. 9.2: 27–30) that is easy to assign to the period, the pottery from the Lelang Fortress is mainly from the late Western Han (the latter half of the first century BC) to the early Eastern Han (first century AD) periods. Pottery from the first half of the first century BC is not seen in the Lelang Fortress.

Reflecting the variety of the Lelang pottery, several kinds were distributed in the Korean peninsula and the Japanese archipelago. However, there is a deviation among the regions in their composition (Takesue 1991; Nagatomo 2010). Fig. 9.2f shows the variety of types of Lelang pottery in the midwestern part of the Korean peninsula located to the south of Lelang commandery, the trade centers of Tsushima and Iki islands, and the Itoshima plain, where many Chinese artifacts have been unearthed.

First, many storage tools have been excavated in the central part of the Korean peninsula. Among the medium and large storage tools, there were 42 vats and 36 short-necked jars. Seven of the short-necked jars were more than 30 cm in length, and the rest were medium-sized, less than 26 cm. At Gapyeong Daljeonri cemetery and Incheon Unbukdong site, the latter of which was a relay point for trading, Lelang pottery from the first century BC was excavated as early examples. The former site contained a set of flowerpot-shaped pottery and a short-necked jar (Fig. 9.2: 31–32), which influenced the burial goods of Mahan countries in the Midwest. This set came to be used as a standard of grave goods there. These grave goods include a large number of vats and some White pottery (Fig. 9.3: 12–15), which will be discussed below. Cooking steamers (Fig. 9.3: 18) are also included, and they suggest that the site was a base for a temporary stay. It is common to find a few medium and small jars (Fig. 9.2: 33) at other sites in the middle of the Korean peninsula dating from the first to the second century BC. Small jars to be used for storage are presumed to have been brought from Lelang commandery with some contents. This type of jar seems to have been regarded as significant, and was often imitated in the middle part of Korea (Nagatomo 2010: 18–20).

A large amount of Lelang pottery tableware (Fig. 9.2: 34, 37) has also been found on Tsushima Island, Iki Island and the Itoshima plain (Nagatomo 2010). Much Lelang

pottery has been excavated at the Haranotsuji site on Iki Island, and the proportion of small storage jars (Fig. 9.2: 35) is high. These jars are believed to have held some kind of liquid and been used locally as convenient containers. If they were used for a feast, it may have been a set of tableware. From Tsushima Island to the Itoshima plain, there are presumed fragments of large jars, but basically medium and large storage containers were short-necked jars (Fig. 9.2: 36, 38–39), of which there are only a few large ones. Some large jars with (over 40 cm) are found in Lelang commandery, and there were jars of White pottery of the same size. However, except for the White jars brought to Incheon Unbukdong site, as mentioned above, no other jars have been found to date in the Korean peninsula and the Japanese archipelago. Although the talc admixture jars from the early Western Han period spread without other kinds of pottery, the movement of Lelang pottery was different.

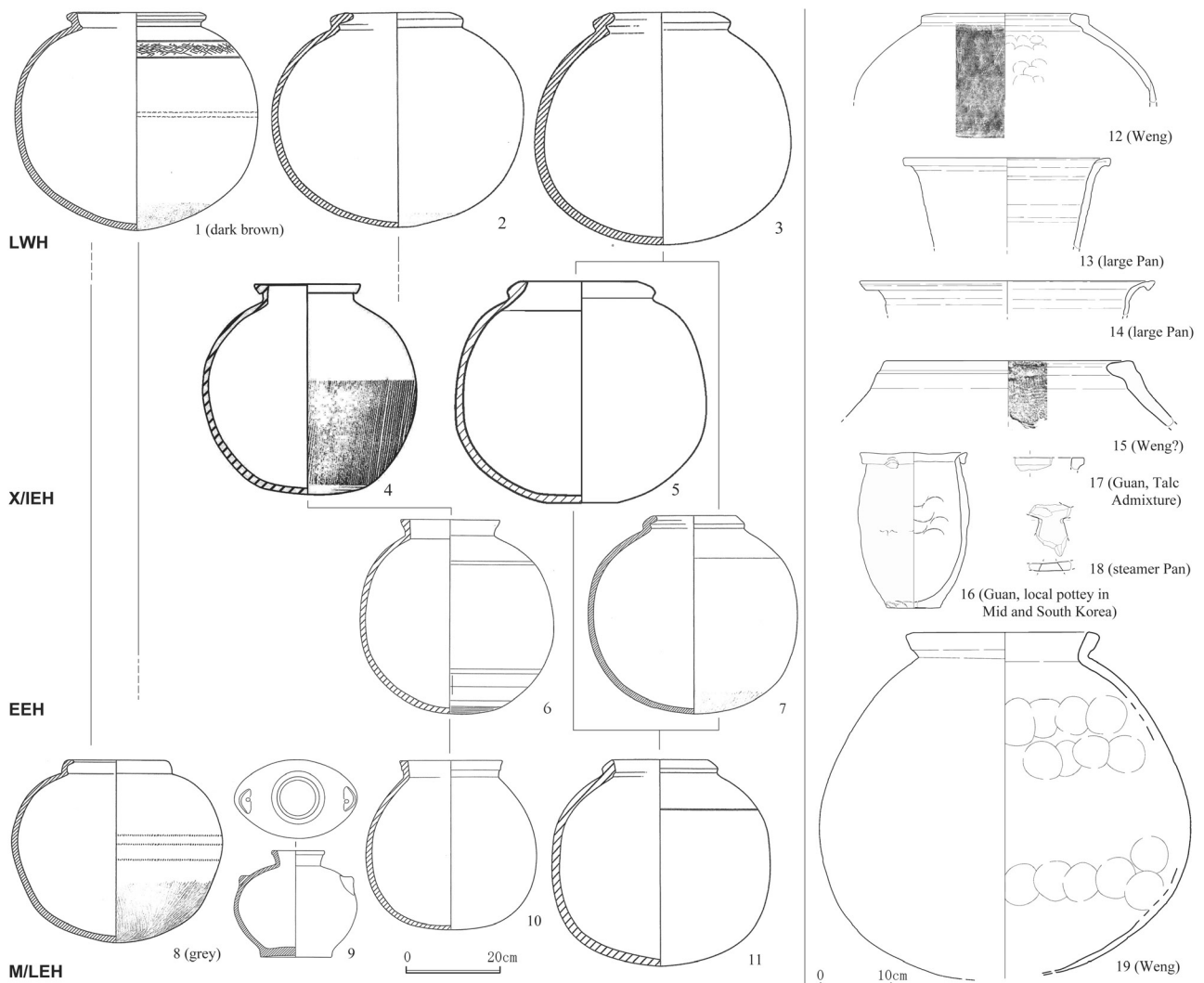
9.3.3. White pottery

Although White pottery jars used to be identified as a type of Lelang pottery, Tani Toyonobu (2008) demonstrated that these were produced in Shandong peninsula. White pottery was found in the Fuxia Wangjia kilns along with Wu Zhu coins, and therefore, they were made in the Han Dynasty (Hou Jiangye 2006), but a more detailed dating has not been attempted. However, the examples of the Jiangtun cemetery in the Liaodong peninsula showed that this kind of pottery appeared starting the late Western Han period (Xu and Zhang 2016). At present, it is believed that jars of White pottery were distributed around the Yellow Sea and that many of these were brought to burials in the Liaodong peninsula and the fortress and tombs in Lelang commandery.

White pottery at the Lelang Fortress includes two types: A) a neckless jar (Fig. 9.2: 28–30) and B) a short-necked jar (Fig. 9.2: 27), and there are sherds of reduction-fired gray pottery among Type A (Fig. 9.2: 23–24). Regarding the Lelang tombs, the earliest Type B jar was found in Jeongbekdong tomb No. 88 and dates from the late Western Han period (Takaku 1995: 57). Type A jars were found in Seokamri tomb No. 257 from the late Western Han period (Nakamura 2017) and Seokamri No. 9 from the Xin period (Takaku 1995: 57). Both types were imported to the Lelang commandery from the late Western Han Dynasty. Considering the cases of Jiangtun burial No. 41 (Fig. 9.3: 2–3) and Yingchengzi burial No. 2003–76 (Fig. 9.3: 5) on the Liaodong peninsula (Nakamura 2020), Type A jars in the Lelang commandery correspond to the late Western Han to Xin-Initial Eastern Han period. Additionally, according to the study by Xu Zheng and Zhang Miao (2016), Type B jars in Lelang commandery are presumed to date from the early Eastern Han period.

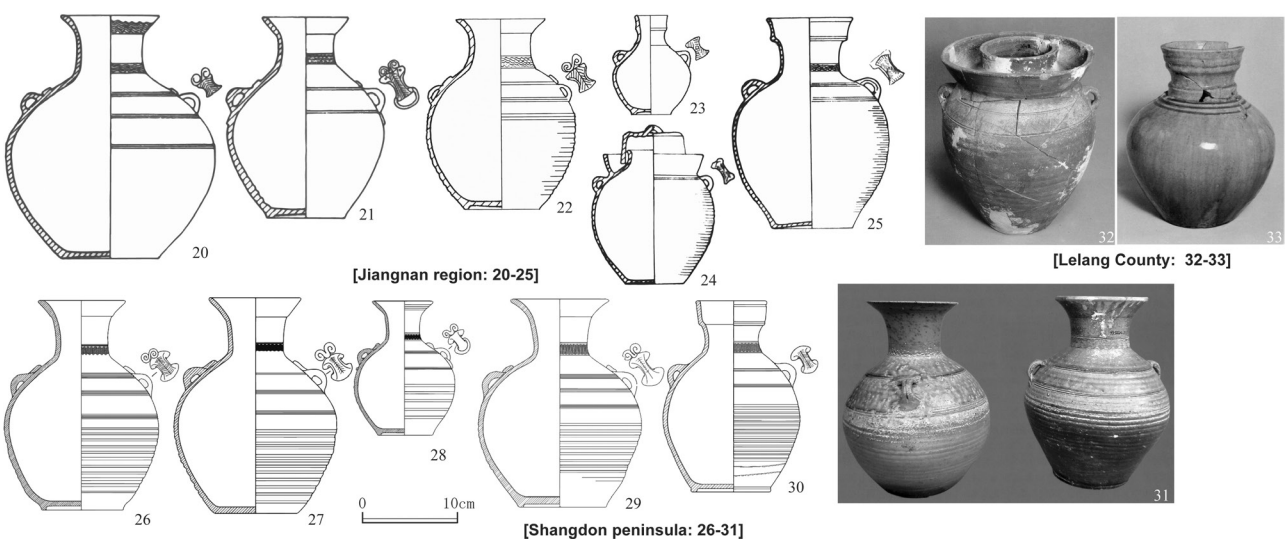
In the southern area of the Korean peninsula, several white jars have been found in the lower Han River basin. Several Type A jars of White pottery have been unearthed from pit No. 1 in section 5 of Incheon Unbukdong (Fig. 9.3:

² It is classified as a ‘Deng’ in the Han tombs of the Liaodong region, and it functions as a lamp.



a. White Jar and Liaodong Style Pottery in Liaodong peninsula: 1. Jiangtun burial (JT) No. 153 (Liaodong Style Pottery), 2-3. JT No. 41, 4. JT No. 19, 5. Yinchengzi burial No. 2003-76, 6. JT No. 10, 7. JT No.106, 8. JT No. 27 (Liaodong Style Pottery), 9. JT No. 73, 10. JT No.22, 11. JT No.21

b. White Jar and Lelang pottery in Midwest Korean Peninsula: 11-17. Unbukudong pit No.5-1, 18. Yangchon 3-Na, moat of tomb No.1



c. Proto-porcelain from Jiangnan region to Lelang County: 20-21. Laoheshan burial No. 98 (LWH), 22-23. No. 128 (EEH), 24-25. No. 129 (EEH), 26-28. Tushantun mound No. 4 burial No. 148 (LWH), 29-30. mound No. 4 burial No. 147 (LWH), 31. Jiuding Meihualing (EEH), 32. Toseongdong tomb No. 45 (M/LEH), 33. Namsari tomb No. 29 (M/LEH) *LWH: Late Western Han, EEH: Early Eastern Han, MEH: Middle Eastern Han, Late Eastern Han

Figure 9.3. White jar and proto-porcelain (a: LPICRA 2014; DMICRA et al. 2019, b: HICH 2012, c: Wang 2005, QMICHC et al. 2019, Yan 2006, ECIBRRK 1989).

12), accompanying local pottery (Fig. 9.3: 16) and many Lelang vats (Fig. 9.3: 13–14). Wu Zhu coins were also found from other archaeological features. The typological characteristics of the jars and coins show that they definitely date to the late Western Han period. At Gimpo Yanchon tomb No. 1 of section Na-3, a Type B jar was excavated from an outer moat of the mound, which is dated to the second half of the second century.

A large number of large jars were offered in the Jiangtun cemetery in the Liaodong peninsula (Fig. 9.3a). White jars of Type A and black-brown short-necked jars were found from the late early Han period (Fig. 9.3: 1–3). Different from those in Lelang tombs, White jars of Type B appeared between the Xin and the initial Eastern Han period (Fig. 9.3: 4). Then, in the Middle and Late Han Dynasty, the edge of the mouth rim of Type A rose and became close to a right angle (Fig. 9.3: 11). Type B jars came to have a thickened mouth rim (Fig. 9.3: 10). In addition, the variety of large jars has increased, to include black-brown pottery, gray pottery (Fig. 9.3: 8) and White pottery during this period, and the oligopoly of White pottery among large jars seems to have been lost.

Since the White pottery in widespread use consisted of large jars and necked jars, Tani Toyonobu (2008) suggests that the pottery was associated with some kind of contents. The White jars in Lelang tombs were also mentioned by Harada Yoshito and Tazawa Kingo (1930: 48–49) as possible food and drink containers. It is reasonable to assume that they were used as both transport and storage containers. The distribution of white pottery is limited to the lower Han River basin in the Midwest of Korean peninsula, and short-necked jars made in Lelang commandery were exported to the southern end of the Korean peninsula and the West of the Japanese archipelago, which suggests that White pottery was not just a tool for transportation but was considered a commodity along with its contents.

9.3.4. Liaodong style pottery

The Liaodong style pottery has a pattern of anywhere from one to several lines of cord on the body (Jeong 2003). Vessel types include large jars (Fig. 9.3: 1, 8), wide-mouth jars, long-necked jars and small vats, which were produced from the early Western Han period to the middle and late Eastern Han period. Since a certain amount has been found in the Shandong peninsula (Terai 2007), it is also called Shandong-Liaodong style pottery (Miyamoto 2020). However, the pottery form of the two areas is not the same.

Several Liaodong style pottery pieces have been found from the Harunotsuji site, and a wide-mouth jar among them attracted attention as being typical of the pottery before the establishment of Lelang commandery (Jeong 2008; Takesue 2016). However, as noted by Furusawa Yoshihisa (2016: 87–89), it is difficult to determine the date due to the lack of a mouth rim. As this type of wide-mouth jars appears in the middle Western Han period, which

begins from 118 BC as defined by Chinese archeology, the dating can hardly be traced back before the establishment of Lelang commandery. Regarding the Liaodong style pottery at Harunotsuji site, it is proper to consider that they were brought in during the late Western Han period when the number of such pottery increased. The small vat with a pattern of cord lines in the Harunotsuji site seems to hail from the Liaodong peninsula rather than the Shandong peninsula, taking into account the type of form. Rather, what is important for the Liaodong style pottery is the fact that the pottery from the Liaodong region had moved even after the movement of the jars of talc admixture. It shows that the trade at that time was not limited to the Lelang commandery, Korean Three Han (Mahan, Jinhan, Byeonhan) and Wa.

9.3.5. Proto-porcelain

Proto-porcelain is known to have been produced since the Shang Dynasty and to have developed in the Yangtze River basin (Yuba 1999). This kind of pottery is considered porcelain in Chinese archeology, but a kind of ash-glazed ceramic in Japanese archeology. This gap in recognition comes from the difference in the definition of porcelain between Japan and China. In China, porcelain is considered to be glazed and fired at a high temperature, while in Japan, some Chinese porcelain is categorized as glazed ceramic, as the quality of the clay body is emphasized.

Even in China, there was a controversy over whether to use glazed ceramics or porcelain, but Guo Moruo suggested proto-porcelain as a compromise term in 1971, and the name became widely used (Wang et al. 2014: 87). In addition, Li Zhiyan (1973) used the term “proto-celadon” as satisfying the elements of porcelain, and Sekiguchi Koji (2002) also uses this term. In recent years, Wang Chang-Hu et al. (2014) have also argued that ash-glazed ceramics in China are the same as proto-porcelain and cannot be scientifically distinguished from celadon. Although the term “proto-celadon” is now used again for long-necked jars from the Western Han period (QMICHU et al., 2019), the term of “proto” seems to be used to distinguish it from later celadon with typical coloration. Also, Lin Shimin (1986) determined that proto-porcelains unearthed from kilns from the Middle and Late Han period of Ningbo in the Jiangnan region were made by the immersion glazing method and improved clay body. He regarded them as an early form of celadon. However, the ceramics excavated from kilns in Ningbo are a type of long-necked jar that kept being made from the Western Han period, and there was no large difference in the appearance and chemical composition of those of the Western Han and the Eastern Han. Furthermore, according to the work of Yin Min et al. (2015), differences in clay and glaze can be seen from the Warring States period. For these reasons, and also considering the difference from later celadon, this paper will use the term “proto-porcelain,” which is still in common use.

Proto-porcelain spread from the middle Yangtze River in the early stage and then did from the lower (Okamura

1995). It was also produced in the Guanzhong region during the Han Dynasty and buried as ceramics with unique forms in the graves. In the lower Yangtze River basin, the Jiangnan region, many mound tombs were constructed in the Han Dynasty in which many long-necked jars with twin ears are found (Fig. 9.3: 20–23, 25). A type of wide-mouthed jar for fermentation was also widely produced in this region which could be sealed by filling it with water between the cover and the mouth (Fig. 9.3: 24).

In Toseongdong tomb No. 45, a wide-mouth jar for fermentation was found dating from the Middle and Late Han Dynasty of the Lelang commandery (Fig. 9.3: 32), and a long-necked jar with twin ears was found in Namsari tomb No. 29 (Fig. 9.3: 33). They were certainly produced in the Jiangnan region. According to Wu Xiaoping and Jiang Lu (2016), long-necked jars with mouth rims that open outwards were also found in tombs in the middle Yangtze River basin. However, in the period from the middle Western Han Dynasty to the early Eastern Han Dynasty, this pottery was closely related to the Jiangdong area, that is, the lower Yangtze River basin. In light of this point, it may be considered the case that the proto-porcelain in the Lelang commandery came from the coastal area of the Jiangnan region.

On the other hand, the proto-porcelain was not brought directly from the Jiangnan region to the Lelang commandery, but passed through several transit points. Among them, the closest area to the Lelang commandery is the Shandong peninsula. Now, let us take a look at some examples.

In Qingdao Tushantun tomb No. 4, proto-porcelains were found in graves No. 147 and No. 148 (Fig. 9.3: 26–30). Originally, grave No. 148 had its own small mound, then it was enlarged and the new main part of the tomb was constructed (grave No. 147). A wooden tablet with the inscription ‘Yuanshou 2 year (1 BC)’ was found in grave No. 147, and according to the chronological study of Okamura Hidenori (1984), a Han mirror of around 30–20 BC was found in grave No. 148. However, there is no difference in type between the proto-porcelains of the two graves.

In Rizhao Haiqu tomb No. 2, which has many graves in a mound, Shandong-Liaodong style pottery was unearthed dating to the middle Western Han period. Starting in the late Western Han period, long-necked jars of proto-porcelain with twin ears came to be placed in the graves. Long-necked jars with twin ears were also excavated from Susia Guanlicun grave No. 1 and Haiyang Jiuding Meihualing dating to the Eastern Han period (Yan 2006, Fig. 9.3: 31).

Traditionally, exchange between the Shandong region and Jiangnan region began in the Warring States period. The crystal ornaments and ivory in the Linzi Fanjia cemetery in the fifth century BC (Wang and Li 2016) shows that the trade passed through the Jiangnan

region. In addition, as regards the style of burials, Qingdao Tushantun tomb No. 4 and Rizhao Haiqu tomb No. 2 were influenced by Tutunmu, which was the characteristic type of mound grave mainly distributed in the Jiangnan region.

9.4. Long-distance trade pottery and kilns

As mentioned in the introduction, all of the long-distance mobile pottery examined above was fired in kilns. The following discussion of the characteristics of each type of pottery will focus on the differences in kiln types.

First of all, as talc admixture pottery appeared from the eastern end of Yan State territory, the technology of the kilns used for firing surely originated from Yan State. Several kilns in which Yan-style pots were fired have been discovered at Fangshan Nanzheng in Beijing (Fig. 9.4: 1). A large-scale kiln site consisting of eleven kilns dating from the Qin period has been excavated at the Dajinsitun site (Fig. 9.4: 7) in the Liaoxi region, and the nearby Shibeide site had a kiln in the early Western Han period. These kilns are all of the same “flat kiln” type, despite differences in whether the firing chamber is rectangular or oval. Since the flat kiln style replaced the updraft kiln during the Warring States period and spread mainly in North China (Fukasawa 2011), these continued to be used without any fundamental change in the northern and northeastern parts of China even during the dynasty change from Yan to Qin and Qin to Han.

In regards to Lelang pottery, its vessel assemblage contains the talc admixture jars and the flowerpot-shaped pottery, which also descended from the lineage of the Yan State. It is highly possible that the Lelang pottery was fired in a similar flat kiln. Since even the firing temperature of the reduction-fired Lelang pottery is about 800–1000°C (Kanegae and Fukuda 2006), it is difficult to argue that the kilns in the Lelang commandery were acquiring new technology from other regions.

A kiln for White pottery has been reported, although only photographs are available (Hou 2006, Fig. 9.4: 8). It is a flat kiln almost the same as the Fangshan Nanzheng kiln. Therefore, the White pottery established its uniqueness not by the improvement of the kiln structure but rather by the use of kaolin-rich clay. In the Middle and Late Han Dynasty, not only large White jars but also the flattened jars and other types of White pottery were distributed (Fig. 9.3: 9). It can be seen that the production of new products began at a certain stage in the Eastern Han period. Unfortunately, White pottery continued to be produced until the beginning of the Three Kingdoms period, but when the trade of proto-porcelain began to reach as far north as the East China Sea, its production seems to have shrunk.

On the other hand, after the Warring States period, flat kilns came to dominate in North China, but in contrast to this, the dominant type in coastal areas of Central and

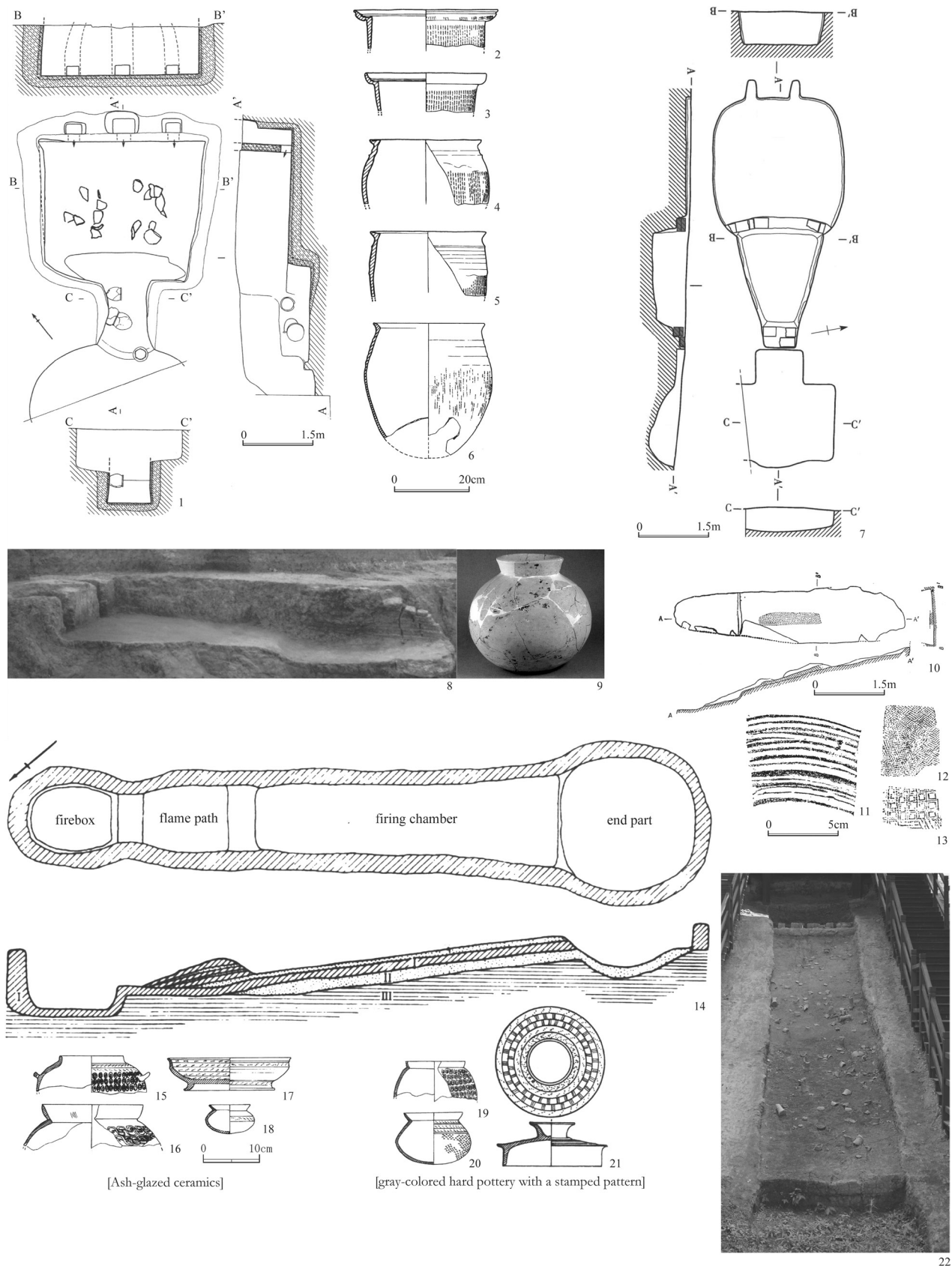


Figure 9.4. Flat kiln and tunnel kiln from North to South China (CRIB 2008; LPICRA 2010; Hou 2010; Hu 1987; GPICRA et al. 1998; photo by author): 1–6. Fangshan Nangzheng kiln No. 6 (Beijin), 7. Dajinsitun kiln No. III-4, 8–9. Buxia Wangjia kiln No. 1 (Yantai, Shandong), 10–13. Shangyu kiln of Shang period (Shangyu, Jiangnan), 14–21. Meihuadun (Boluo, Lingnan), 22. Jinshan kiln of Eastern Han period (Shangyu, Jiangnan).

South China is the tunnel kiln (Fukasawa 2011); it is called the “dragon kiln” in China. This type of kiln appeared in the late Shang period (late second millennium BC), and a long kiln has been excavated which has a 16-degree slope and boasts about 4 m of firing chamber, and was found at Shangyu in the Jiangnan region (Hu 1987; Fig. 9.4: 10). Gray-colored hard pottery with a stamped pattern was mainly unearthed from this kiln, and there was no proto-porcelain. It is still unclear what kind of kiln the early stage of proto-porcelains was fired in. However, it is known that these were found with gray-colored hard pottery in the Meifadun kiln, which dates from the late Spring and Autumn to the early Warring States period (GPICRA et al. 1998). This proto-porcelain is reported to have been fired at 1270°C and to have a clay composition similar to that of celadon. The proto-porcelains of the Han Dynasty period were fired by excellent tunnel kilns (Fig. 9.4: 22), and are furthermore both elegant and much more rigid than other pottery at that time. Solid and refined proto-porcelains have been found up to the Shandong Peninsula from the Western Han Dynasty and eventually came to be distributed to the Korean Peninsula during the Eastern Han Dynasty. The proto-porcelain had always been valued for its quality in the Yellow River basin. It can be said that this value was extended to the east.

9.5. Structure of the trade network and its expansion

The movement of pottery in the Yellow Sea and the East China Sea is a result of trade at that time. However, the Han Dynasty was quite different in terms of the developmental stages of polity and economic structure than the countries in the Korean peninsula and Japanese archipelago. It is well known that commerce and manufacture developed in China from the Warring States period to the Han Dynasty period, and merchants rose to prominence. According to Sahara Yasuo (1985), markets were held in cities and villages, and coins and cloth were the basic means of exchange. In the Korean Three Han and Wa, although coins have been excavated, they were not used as a means of exchange; the exchange was based on barter. The History of the Three Kingdoms describes how Jinhan countries produced iron and the Korean Three Han, Hui and Wa countries came to collect it. It also refers to iron used as currency (Chenshou, *Sangoushi*, Weishu Volume 30, Treatise on Han). Actually, at the Ulsan Dalcheonri site, where iron ore was produced in the first century BC, Lelang and Yayoi pottery has been unearthed. It is suggested that a market was held with iron as its focus (Nakamura 2015). Wa people are presumed to have exchanged cloth and local specialties for iron, but this will be discussed below.

Since Wa lacked iron-smelting technology until the latter half of the fifth century and copper-smelting technology until the seventh century, obtaining iron and bronze was crucial to producing not only tools and weaponry but also prestige goods. Before the establishment of Lelang

commandery, cast-iron tools and their fragments were brought from Liaodong commandery (Nakamura 2015), which seems to have been done by merchants of the Yan State and Han Dynasty. After the establishment of Lelang commandery, iron began to come in from Byeon-Jinhan in the southeastern part of the Korean peninsula to Wa, as described in the *Sanguozhi*. On the other hand, as a result of the establishment of diplomatic relations between Wa and Lelang commandery (Okamura 1999; Nakamura 2015), large and superior Han mirrors were brought and buried in the graves of the Japanese chiefs. Previously examined pottery such as the talc admixture jars, Lelang pottery and Wajil ware of the southeastern part of the Korean peninsula were not used as burial goods or ritual offerings on and beside burials. The fact that only prestige goods and weapons served as burial goods shows the value of long-distance mobile pottery as hard containers.

Takesue Junichi (2009, 2016) describes how a settlement located on the coast and relying heavily on maritime trade activities has been united with a regional capital as a social and economic unit.³ Based on the unearthed artifacts of the Han Dynasty including the Lelang pottery and coins, the Northern Kyūshū countries undoubtedly connected with the Lelang commandery via such relaying bases as the coastal settlements in Japan, island counties of Iki and Tsushima, and Neukdo, which is a coastal settlement of Byeon-Jin Han. The relay trade along the coastline would be the concrete image of the trade network at that time.

Incidentally, in the period from the first century BC to the first century AD, Indo-Pacific Beads (IPBs) were distributed to such regions as the Nanhai commandery, the Lelang commandery, the Liaodong peninsula, the southern part of the Korean peninsula and the Japanese archipelago (Oga and Tamura 2013, Nakamura 2015). At the Khao Sam Kaeo site located on the Malay peninsula, archeologists found not only IPBs but also indigenous hard pottery which was produced from the Jiangnan region to the areas around the Gulf of Tongking, in addition to Brahmi script from India (Higham and Thosarat 2012: 184–85). These artifacts mean that the Jiangnan region was connected to India. The so-called Sea Silk Road had been in use since this period. It should be noted that IPBs are almost never unearthed in the Jiangnan region and Shandong peninsula, located between the Huanan region and Lelang commandery. However, as examined above, the proto-porcelains were distributed from the Jiangnan region to the Shandong peninsula, and a great deal of White pottery was distributed from the Shandong to the Liaodong peninsula and Lelang commandery. These pottery movements show

³ Miyazaki Takao (2001) and Anraku Tsutomu (2013) used the term ‘Tsukushi Union’ to explain the social structure of this period. In addition, in the Fukuoka plain, Kusumi Takeo (2008) assumed that the Naka site functioned as a ‘trade center’ and the Sugu Okamoto site functioned as a ‘royal city’.

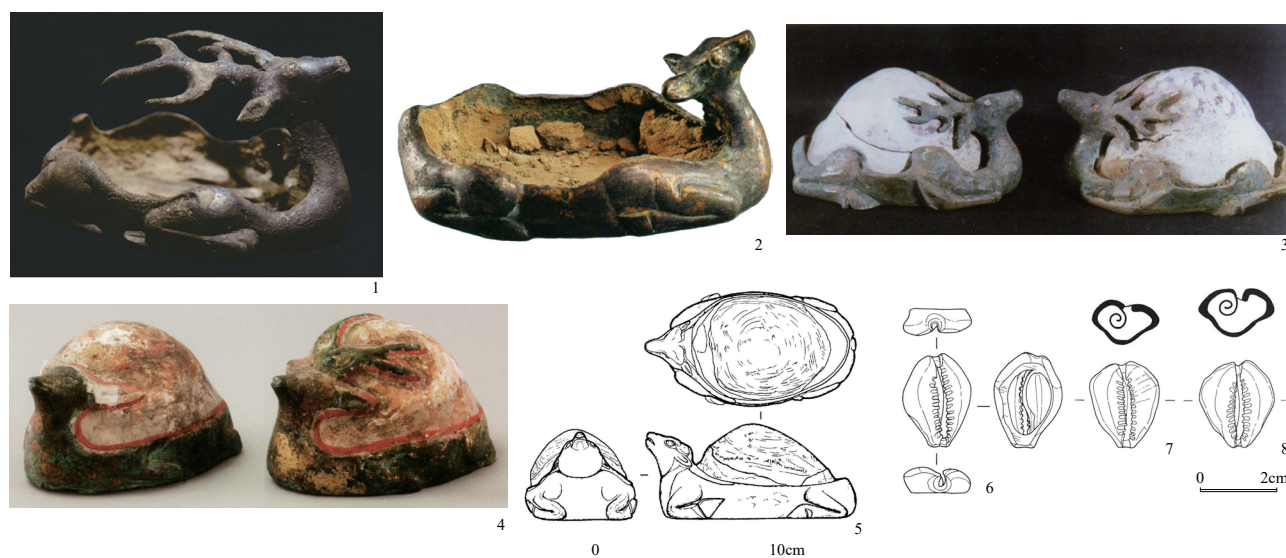


Figure 9.5. Copper deer weights with a large shell and cowries in China and South Korea (Cheng 2017; APICRA et al 2007; Wei eds. 1998; Guo and Zhao 2010; LPICRA 2013; GARI 2006). 1. Haihunhou Liuhe tomb (length: ca. 11 cm, Nanchang, Jiangxi), 2. Fangwanggang grav No. 1 (length: 10.2 cm, Chaohu, Anhui), 3. Babai grave No. 3 (length: both 10.4 cm, Hohhot, Inner Mongolia), 4. Huaershan grave No. 7 (length: 10.5 and 10.7 cm, Pulandian, Liaodong peninsula), 5. Jiangtun grave No. 41 (Pulandian, Liaodong peninsula), 6. Neukdo shell mound (Sacheon, Gyeongsang-namdo), 7. Neukdo grave No. Ka-95 (Sacheon, Gyeongsang-namdo), 8. Neukdo grave No. Ka-122 (Sacheon, Gyeongsang-namdo).

that the area from the Jiangnan region to the Shandong peninsula had a significant role as the site of relay bases.

There is good evidence in the Liaodong peninsula for when the trade of the East China and Yellow Seas connected to the Sea Silk Road. Copper deer weights with a large shell were found in Jiangtun grave No. 41, which is the shell filling grave in the Liaodong peninsula (Fig. 9.5: 5). The shell is *Cypraea tigris*, a species that lives in the South China Sea. Additionally, the shell filling grave is the local style of burial around the Yellow Sea, and IPBs have often been unearthed from these graves in the Liaodong peninsula (Nakamura 2020). Because of their date and materials, it is estimated that the copper deer weights with a large shell spread after the establishment of the Nanhai nine counties (111 BC, Cheng 2017) around the Gulf of Tongking, which may have led to a permanent connection with the Sea Silk Road from this time.

Meanwhile, although the shell filling graves had rich burial goods, they lack lacquerware, long swords and long knives; thus, they differ from those of the aristocracy of the Lelang commandery. Shell filling graves are estimated to have belonged to an affluent merchant class (DMICRA et al. 2019; Nakamura 2020). Furthermore, the shell filling graves and the Lelang tomb had gold belt fittings of the type that were sent to influential people in the periphery of the Han Dynasty. This demonstrates that the Liaodong peninsula and the Lelang commandery were not only closely related but also amassed a great deal of financial power. In particular, the aristocracy in Lelang commandery has long been noted for its wealth (Sekino 1968).

In ordinary trade, cloth and other specialties may have been exchanged for bronze and iron before and after

the establishment of the Lelang commandery. Japanese comma-shaped beads have been found in a Lelang tomb and Japanese bronze pikes in burials on the Korean peninsula, but not in large numbers. The distribution of Yayoi pottery is limited to the middle and southern parts of the Korean peninsula. It is controversial whether Wa people exchanged for much metalware and materials; among them, rice has often been mentioned (Choi 2006, Miyamoto 2020). However, unlike in Okinawa and the steppe areas where agriculture is not possible, it is easy to grow grain in both the Korean peninsula and areas in the Han Dynasty. More valuable goods that are difficult to find were shellfish and pearls. In China, cowries have been valuable since the Shang Dynasty, and the *Cypraea tigris* shells mentioned above were distributed as luxury goods from the South China Sea from the middle Western Han period. There is a strong possibility that the distribution of shellfish from the Nanhai commandery stimulated the demand for shellfish of Okinawa in the Lelang commandery and the Korean peninsula. In fact, cowries (Fig. 9.5: 6–8) have been unearthed at the Neukdo site, including shell mounds.

9.6. Concluding remarks

From the Qin and early Western Han period onwards, since large jars began to be distributed widely but these vessels were large in size and heavy when filled, trade by ship was a necessity. Firing in kilns was essential to harden the large pottery used as transport tools. White pottery was brought from the Shandong peninsula to the Liaodong peninsula and the Lelang commandery and was also offered in burials. The quantity of this pottery increased, especially from the late Western Han period to the initial Eastern Han period, and the number of IPBs in distribution

increased rapidly. The White jars and a large number of vats were found in Incheon Unbukdong, located on an island in the Midwest of the Korean peninsula. In addition, this was accompanied by a simple dwelling and pottery for cooking. This situation reminds us of the merchants from the Lelang commandery who were heading south via their coastal base.

Pottery fired in kilns, which was a novelty in the middle and late Western Han Dynasty, was brought to the Korean peninsula. Kilns were only introduced in the southeastern region, Byeon-Jinhan. However, the Wajil ware of Byeong-Jinhan was initially fired in a kiln as medium short-necked jars and small padlock-shaped jars. The emergence of large kiln-fired pottery was delayed. The kilns were introduced for reasons other than the need for rigid containers. As mentioned above, the Lelang pottery and Wajil ware was also brought to the Japanese archipelago, but it was not used as burial goods or for rituals. The main aim was transportation of their contents.

In the middle and late Eastern Han period, the number of IPBs decreased in the Lelang commandery and the Japanese archipelago and increased in the southern part of the Korean peninsula (Nakamura 2105: 44). It is evident that the distribution situation changed during this period. At the same time, proto-porcelains from the Jiangnan region were newly brought to the Lelang commandery. This indicates that the vast changes in coastal trade extended to the distribution of pottery. In addition, it is significant that the aristocrats of Lelang commandery, who had collected precious artifacts from all over the Han Dynasty, began to appreciate the value of porcelain. In Baekje on the Korean peninsula, porcelains from the Jiangnan region were imported from the early Eastern Jin Dynasty after the collapse of the Lelang commandery. Along with large ceramic jars, necked jars with a spout in the shape of a chicken head and small cups were also brought and became burial goods. These were valuable on their own as drinking vessels. The use of pottery from other states as burial goods has not been seen anywhere else except on the border of the Lelang commandery. In Baekje, it was treated as quite valuable. It can be considered that the sense of the value of the aristocracy in the Lelang commandery diffused around the time of its collapse. In this regard, the distribution of proto-porcelain of the Jiangnan region constituted the most significant innovation in the value of pottery in long-distance trade. It is also interesting to note that from this period on, the Japanese began to offer pottery in their burials from Gaya and found value in pottery from other countries.

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References

- Anhui Provincial Institute of Cultural Relics and Archaeology (APICRA) and Chaohu Administration Office of Cultural Relics (CAOCR), 2007. *Han Burials in Chaohu*. Cultural Relics Press, Beijing. [安徽省文物考古研究所, 巢湖文物管理所《巢湖汉墓》]
- ANRAKU Tustomu, 2013. Tsushima country and Iki country in the period of Gishi wajin-den, *A long way of Gishi wajin-den II*, Nagasaki Prefectural Board of Education, 22–25. [安楽勉「魏志倭人伝の時代の対馬国・一支国」『はるかなる魏志倭人伝の道 II』]
- CHENG Xiaowei, 2017. Deer-shaped weight inlaid a large shell, *Spring and Autumn Annals of Cultural Relics*, 2017-1: 56–60. [程晓伟《汉代嵌贝鹿形席镇》《文物春秋》]
- CHOI Jonggyu, 2006. The structure of Neukdo site. *Nukudo Shell Mound V*. 101–122. Gyeongnam Archaeological Research Institute (GARI). Jinju. [崔鍾圭「勒島遺蹟의 構造」『勒島貝塚 V』]
- Dalian Municipal Institute of Cultural Relics; Archaeology (DMICRA) & Archaeological Team of the Yingchengzi Cemetery of the Han Dynasty Dalian (ATYCHDD), 2019. Excavation of Yingchengzi Cemetery of the Han Dynasty 2003M76 in Dalian City, Liaoning. *Archaeology*. 2019(10): 52–62. [大连市文物考古研究所, 大连营城子汉代墓地考古工作队《辽宁大连市营城子汉墓群2003M76的发掘》《考古》]
- Editing Committee of the illustrated book of ruins and relics of Korea (ECIBRRK) 1989. The illustrated book of ruins and relics of Korea. vol. 2. Pyeongyang. [조선유적유물도감편찬위원회『조선유적유물도감』2]
- Fukuoka City Board of Education (FCBE), 2012. *Imajuku Gorōe Site II*. [福岡市教育委員会『今宿五郎江遺跡 II』]
- FURUSAWA Yoshihisa, 2016. Character of Harunotsuji site and relationship of other areas. *Aspects of Exchange in East Asia through Neukdo and Harunotsuji sites*. 59–114. Jinju National Museum, Jinju. [古澤義久「原の辻遺跡の性格と他地域との関係」『늑도와 하루노쓰지를 통해 본 동아시아 교류의 양상』].
- Guangdong Provincial Institute of Cultural Relics and Archaeology (GPICRA) & Boluo Museum (BM), 1998. Excavation of the Yuenzhou Meihuadun Kiln Site in Boluo Prefecture, Guangdong. *Archaeology*. 1998(7): 28–44. [广东省文物考古研究所, 博罗县博物馆《广东博罗县园洲梅花墩窑址的发掘》《考古》]

- GUO Fuchun and ZHAO Xijin, 2010. *Illustration of Dalian Ancient Civilization*. Jilin Wenshi Press, Jilin. [郭富纯, 赵锡金《大连古代文明图说》]
- Gyeongnam Archaeological Research Institute (GARI). 2003. *Nukudo Shell Mound*. [慶南考古學研究所『勒島貝塚』]
- Gyeongnam Archaeological Research Institute (GARI). 2006. *Nukudo Shell Mound II–V*. [慶南考古學研究所『勒島貝塚 II–V』]
- Hangang Institute of Cultural Heritage (HICH), 2012. *Unbuk-dong site, Incheon*. [한강문화재연구원『인천 운북동 유적』]
- HARADA Yoshito & TAZAWA Kingo, 1930. *Lo-Lang : a report on the excavation of Wang Hsu's tomb in the 'Lo-Lang' province, an ancient Chinese colony in Korea*, Tōkō Shoin, Tokyo. [原田淑人, 田澤金吾『樂浪: 五官掾王野の墳墓』]
- HIGUCHI Takayasu, 1975. The origin of Lelang culture. History and Person. 49(9): 249–265. [樋口隆康「樂浪文化の源流」『歴史と人物』]
- HONG Juhui, 2015. Lelang type pottery in the middle part of Korean peninsula. Introduction of Lelang Archaeology. 272–307. Zininzin, Seoul. [홍주희「중부지역 낙랑(계) 토기」『樂浪考古學概論』]
- HOU Jianye, 2006. First kiln specialized for White Pottery. *Archaeology of Yantai*, 212–215. Yantai city museum. [侯建业《专烧白陶第一窑》《考古烟台》]
- HU Jigen, 1987. Brief report on excavation of kiln sites for pottery with a stamped pattern in Shangyu of Shang Dynasty, Zhejiang Province. *Archaeology*, 1987(11): 984–987. [胡继根《浙江上虞县商代印纹陶窑址发掘简报》《考古》]
- Itosima City Board of Education (ICBE), 2013. *Mikumo-Ihara site VIII: compilation* [糸島市教育委員会『三雲・井原遺跡VIII: 総集編』].
- JEONG Inseung, 2003. External negotiation of Byeonhan-Gaya: focusing on relationship with Lelang commandery, *New Lights on Gaya archaeology*. 535–602. Hyeon, Seoul. [鄭仁盛「弁韓·加耶의 對外交渉: 樂浪郡과의 교섭關係를 중심으로」『가야고고학의 새로운 조명』]
- JEONG Inseung, 2004. A pottery from Nakrang earthen castle, *The Journal of Korean Ancient History*. 34: 71–123. [鄭仁盛「樂浪土城의 土器」『韓國古代史研究』]
- JEONG Inseung, 2008. Review on the theory of Wajil pottery and Lelang commandery, *Yongnam Archaeological Review*. 47: 5–44. [鄭仁盛「瓦質土器樂浪影響說의 검토」『嶺南考古學』]
- JEONG Inseung, 2013. Chinese artifacts in Unbuk-dong site, *Unbuk-dong site, Incheon*. 485–501. HICH. [鄭仁盛「雲北洞遺蹟의 中國系 遺物」『인천 운북동 유적』]
- KANEGAE Kenji & FUKUDA Masaaki, 2006. Basic Study on Coloring Techniques of Korean style pottery and Lelang type pottery, *Archaeology and natural science*, 52: 51–65 [鐘ヶ江賢二・福田匡朗「韓半島系土器・樂浪系土器の発色技術についての基礎的研究」『考古學と自然科学』]
- Liaoning Provincial Institute of Cultural Relics and Archaeology (LPICRA), 2014. *Han Dynasty Cemetery in Jiangtun*. Cultural Relics Press, Beijing. [辽宁省文物考古研究所《姜屯汉墓》]
- LIN Shimin, 1986. Investigation of Han dynasty kiln sites in Ningbo, Zhejiang. *Archaeology*. 1986(9): 800–809. [林士民《浙江宁波汉代窑址的勘察》《考古》]
- OGA Katsuhiko & TAMURA Tomomi, 2013. Ancient Japan and the Indian Ocean Interaction Sphere: Chemical Compositions, Chronologies, Provenances and Trade Routes of Imported Glass Beads in Yayoi-Kofun Period (3rd Century BCE–7th Century CE). *Journal of Indian Ocean Archaeology*, 9: 35–65.
- OKAMURA Hidenori, 1984. The Chronology and Style of Earlyer Han's Mirrors. *The Shirin*. 67(5): 661–702. [岡村秀典「前漢鏡の編年と様式」『史林』]
- OKAMURA Hidenori, 1995. Theory on the origin of ash-glazed ceramics (proto-porcelain), *Cultural Study of Japan and China*, No. 7: 91–98. [岡村秀典「灰釉陶(原始瓷)器起源論」『日中文化研究』]
- OKAMURA Hidenori, 1999. Global strategy and weapon export of the Han Empire. The Evolution of Battles and the Formation of States. 186–206. Toyoshonin, Tokyo. [岡村秀典「漢帝国の世界戦略と武器輸出」『戦いの進化と国家の生成』]
- ŌNUKI Shizuo eds. 2007. Reexamination of the ancient history in North East Asia: mainly Liaoning province of China. The Department of Archaeology, Tokyo University, Tokyo. [大貫静夫編『遼寧を中心とする東北アジア古代史の再構成』]
- Korean Institute of Heritage (KIH), 2013. *The archaeological Report of Yangchon*. [高麗文化財研究院『金浦 陽村 遺蹟』]
- KIM Mujung, 2004. Regarding Lelang type pottery in the iron manufacture site of Hwaseong Kianri, *The Journal of Paekche Research Institute*, 40: 79–103. [金武重「華城 旗安里製鐵遺蹟 出土 樂浪系土器에 대하여」『百濟研究』]
- KIM Mujung, 2007. Spread of Lelang type artifacts in Mahan area, *Study of Lelang culture*, 279–306, Northeast Asian History Foundation. [김무중「마한 지역 낙랑계 유물의 전개 양상」『낙랑 문화 연구』]
- KUSUMI Takeo, 2008. Hie and Naka sites in Fukuoka plain: the oldest city in the Japanese archipelago, *Archaeology in Yayoi period*, vol. 8, 240–263, Dousheisha, Tokyo. [久住猛雄「福岡平野 比恵・那珂遺跡群: 列島における最古の都市」『弥生時代の考古学』8]

- LI Zhiyan, 1973. A Preliminary Investigation of Proto Celadon. *Cultural Relics*. 1973(2): 38–45. [李知宴《关于原始青瓷的初步探索》《文物》]
- MIYAZAKI Takao, 2001. Regarding Historical Opportunities in Harunotsuji Site, *Saikai Archaeology*. 4: 53–79. [宮崎貴夫「原の辻遺跡における歴史的契機について」『西海考古』]
- MIYAMOTO Kazuo, 2014. International relationship in the Eastern China Sea viewed from the pottery contained with talc grains in Okinawa Island. *The Shien*, 151: 63–84. [宮本一夫「沖縄出土滑石混入系土器からみた東シナ海の対外交流」『史淵』]
- MIYAMOTO Kazuo, 2014. International relationship in the Eastern China Sea viewed from the pottery contained with talc grains in Okinawa Island. *The Shien*, 151: 63–84. [宮本一夫「沖縄出土滑石混入系土器からみた東シナ海の対外交流」『史淵』]
- MIYAMOTO Kazuo, 2020. International Trading in the latter half of the Yayoi period viewed from the Liaodong-Shandong pottery and Lelang pottery, *The Shien*, 157: 31–55. [宮本一夫「遼東・山東系土器と楽浪系土器からみた弥生時代後半期の国際関係」『史淵』]
- NAGATOMO Tomoko, 2010. Interactions in terms of Lelang Pottery. *Machikaneyam Archeological Essays II*. 13–34. Osaka University Department of Archaeology, Osaka [長友朋子「楽浪土器からみた交流関係」『待兼山考古学論集 2』]
- NAKAMURA Daisuke, 2012. Ironware Diffusion in the east of Yan, *Saitama University review. Faculty of Liberal Arts*, 48(1): 169–190. [中村大介「燕鉄器の東方展開」『埼玉大学紀要（教養学部）』]
- NAKAMURA Daisuke, 2015. Technological Transfer of the Iron and Glass Beads to the South of Lelang Commandery, *Material Culture*. 95: 33–48. [中村大介「楽浪郡以南における鉄とガラスの流通と技術移転」『物質文化』]
- NAKAMURA Daisuke, 2017. Pottery of long-distance trade around East China and Yellow Seas. *Comparative archaeology for progress of pottery-production system and political development in the introduction period of kiln*. 25–36. Result report of 2013–2015 JSPS Grants-in-Aid for Scientific Research (C) 25370896. [中村大介「環東シナ海及び黄海における長距離交易土器」『窯導入前後の土器生産体制の進展と政体の成長に関する日韓の比較研究』]
- NAKAMURA Daisuke, 2020. Liaodong commandery and trade in Han dynasty period. *Saitama University review. Faculty of Liberal Arts*, 55(2): 129–147. [中村大介「漢代における遼東郡と交易」『埼玉大学紀要（教養学部）』]
- Qingdao Municipal Institute of Cultural Heritage Conservation and Archaeology (QMICHCA) and Huangdao District Museum (HDM), 2019. The excavation of mound No. 4 and burials of the Tushantun cemetery in Qingdao, Shandong. *Acta archaeologia sinica*, 2019(3): 405–438. [青岛市文物保护考古研究所, 黄岛区博物馆《山东青岛土山屯墓群四号封土与墓葬的发掘》《考古学报》]
- SAHARA Yasuo, 1985. The market in Han period, *The Shrin*, 68(5): 705–743. [佐原康夫「漢代の市について」『史林』]
- SEKIGUCHI Kōji, 2002. Proto celadon and celadon. *History of the Oriental Ceramic Tradition*. 26–34. Japan Society of Oriental Ceramic Studies, Tokyo. [関口広次 2001「原始青磁と青磁」『東洋陶磁史:その研究の現在』]
- SEKINO Tadashi, 1968. Wealth of the Wang Clan in the Lelang Province, Korea. *Journal of Hōsei Historical Society*. 20: 10–35. [関野雄「楽浪王氏の富」『法政史学』]
- SEO Yeongnam, 2004. *The shell mound and graves on the Neuk-do site*. Pusan National University Museum. [徐始男『勒島貝塚 斗 墳墓群』]
- SIMOJI Yasuhiro, 1999. Unidentified type of pottery found from the Kajō shell mound. *Bulletin of the Urasoe City Library*. 10: 34–42. [下地安広「嘉門貝塚出土の型式不明の土器」『浦添市立図書館紀要』]
- SHIRAI Katsuya, 2001. Neukgo Trade and Harunotsuji Trade. Trade in Yayoi period: the movement of materials and its carriers. 157–176. Society for buried cultural properties, Fukuoka. [白井克也「勒島貿易と原の辻貿易」『弥生時代の交易: モノの動きとその担い手』]
- TAKAKU Kenji, 1995. *A study on the culture of Lelang tombs*. Hakyeon Munhwasa, Seoul. [高久健二『楽浪古墳文化研究』]
- TAKESUE Junichi, 1991. Lelang type pottery and Three-Han type pottery in Western Japan: with a focus on Wajil pottery, *Study of Local History*. 41(5): 9–20. [武末純一「西日本の楽浪系土器と三韓系土器: 瓦質土器を中心に」『地方史研究』]
- TAKESUE Junichi, 2009. Interaction between the Three Han States and Wa: From the Perspective of Settlements Based on Marine Resources. *Bulletin of the National Museum of Japanese History*. 151: 285–306. [武末純一「三韓と倭の交流: 海村の視点から」『国立歴史民俗博物館研究報告』]
- TAKESUE Junichi, 2016. Overview of Lelang type pottery in the Japanese archipelago, Harunotsuji Site compilation II. 153–168. Nagasaki Prefectural Archaeological Center, Nagasaki. [武末純一「日本列島の楽浪系土器概観」『原の辻遺跡 総集編 II』]
- TANI Toyonobu, 1984. Pottery from the Site of the Lelang Provincial Office in Pyongyang, North Korea, the Eastern Outpost of the Chinese Empire from the First Century B. C. to the Fourth Century A. D. (I). *Bulletin of the Department of Archaeology, Tokyo University*. 3: 41–58. [谷豊信「楽浪土城出土の土器（上）」『東京大学考古学研究室研究紀要』].

- TANI Toyonobu, 1985. Pottery from the Site of the Lelang Provincial Office in Pyongyang, North Korea, the Eastern Outpost of the Chinese Empire from the First Century B. C. to the Fourth Century A. D. (II). *Bulletin of the Department of Archaeology, Tokyo University*. 4: 159–188. [谷豊信「楽浪土城出土の土器（中）」『東京大学考古学研究室研究紀要』].
- TANI Toyonobu, 1986. Pottery from the Site of the Lelang Provincial Office in Pyongyang, North Korea, the Eastern Outpost of the Chinese Empire from the First Century B. C. to the Fourth Century A. D. (III). *Bulletin of the Department of Archaeology, Tokyo University*. 5: 73–124. [谷豊信「楽浪土城出土の土器（下）」『東京大学考古学研究室研究紀要』].
- TANI Toyonobu, 2008. Research Note on ceramics manufacture in the Han dynasty. *Chinese Archaeology*. 8: 61–75. [谷豊信「漢代製陶業に関する研究ノート」『中国考古学』]
- TERAI Makoto, 2007. Basic study on the Lelang type pottery unearthed in the Japanese archipelago. *Journal of the Society of Kyushu Prehistoric and Ancient Cultural studies*. 56: 85–108. [寺井誠「日本列島出土楽浪系土器についての基礎的研究」『古文化談叢』]
- WANG Changsui, LI Wenjing & CHEN Yue, 2014. The Re-exploration of the Concept of “Proto-porcelain” and the Origin of the Celadon. *Archaeology*. 2014(9): 86–92. [王昌燧, 李文静, 陈岳《“原始瓷器”概念与青瓷起源再探讨》,《考古》]
- WANG Haiming, 2005. Excavation report of Laoheshan Han tomb in Hangzhou, Zhejiang Province. *Journal of the Zhejiang provincial institute of cultural relics and archaeology*, vol. 7: 311–413. Hangzhou Press, Hangzhou. [王海明《浙江省杭州市老和山汉墓发掘报告》《浙江省文物考古研究所学刊》]
- WANG Huitian & LI Min, 2016. Fanjia Warring States cemetery in Linzi District, Zibo City of Shandong. *Archaeology*. 2016(2): 25–63. [王会田, 李民《山东淄博市临淄区范家墓地战国墓》《考古》]
- WU Xiaoping & JIANG Lu, 2016. The archaeological studies on the porcelain wares unearthed from the burials of the Han dynasty in the middle reach of the Yangtze. *Acta archaeologica sinica*. 2016(1): 25–48. [吴小平, 蒋璐《长江中游汉墓出土瓷器研究》《考古学报》]
- YAN Yong, 2006. White Pottery and Celadon from Jiaodong peninsula, *Archaeology of Yantai*. 204–211. Yantai city museum. [阎勇《白陶青瓷出胶东》《考古烟台》]
- YIN Min, THILO Rehren & ZHENG Jianming, 2015. The earliest high-temperature glazed porcelain in China: composition analysis of proto porcelain in Zhejiang during the Shang and Zhou dynasties. *Collection of Research Essays on the Origin of Proto Porcelain*. 47–67. Cultural Relics Press, Beijing. [殷敏, Thilo Rehren, 郑建明《中国最早的高温釉瓷: 商周时期浙江原始瓷器成分分析》《原始瓷器起源研究论文集》]
- YUBA Tadanori, 1999. *Chinese Ceramics 1: Ancient Pottery*, Heibonsha, Tokyo. [弓場紀知『中国の陶磁器 1: 古代の土器』]
- XU Zheng & ZHANG Meizi, 2016. A preliminary study of white pottery in the Liaoning area of Western and Eastern Han dynasty. *Northern cultural relics*. 2016(3): 37–43. [徐政, 张美子《辽宁地区两汉时期白陶器初步研究》,《北方文物》]
- HIGHAM Charles & THOSARAT Rachanie, 2012. *Early Thailand: from Prehistory to Sukhothai*, River books, Bangkok.
- NAGATOMO T., NAKAMURA D. & KIM G. 2016 Comparative Study of Pottery Production on the Japanese Archipelago and Korean peninsula during the Early Period of Kiln Use, *abstract of Seventh Worldwide Conference of the Society for East Asia Archaeology (SEAA)*.

Part III

Spread to the North and the Northeast