

The excavation of the pottery workshop site at Liujiazhuang Locus North of Yinxu in Anyang City, Henan

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Abstract

In 2008 and 2010, the Anyang Archaeological Team of the Institute of Archaeology, Chinese Academy of Social Sciences recovered 24 pottery kilns of the Shang Dynasty on the sidewalks of Angang Boulevard and Fanglin Street. The structures of these pottery kilns were basically the same. They were all composed of an upper part and a lower part; the upper part consisted of the roof, stacking chamber and flue; the lower part consisted of the fuel entrance, firebox, fire tunnels, kiln columns, firebox roof and fire holes. Some kilns had operation pits in their front. Pottery-making tools such as pottery paddles and anvils were unearthed from this workshop site; the products were mainly fine clay gray pottery wares, most of which were food containers, including *dou*-stemmed bowls, *gui*-tureens, *yu*-basins, *bu*-vessels, bowls, basins, lids, etc., as well as some cooking vessels also made of fine clay, such as small *li*-cauldrons and *zeng*-steamers. The styles of the pottery products showed that this pottery workshop started to operate in Yinxu Phase I and its operation lasted at least to Yinxu Phase III or later.

Keywords: Liujiazhuang Locus North; Pottery craft—history—China—to 771 BC; Yinxu Site (Anyang City, Henan)

Brief introduction to the site

In 1988, our team recovered fragments of discarded waste pottery products in the vicinity of Liujiazhuang Locus North. This led to work in 2008 and 2010 when we exposed 24 Shang Dynasty kilns in this area and recovered large amounts of discarded waste pottery products and some pottery-making tools. In 2011, ten more Shang kilns were cleared out at the North Tangle Garden in Liujiazhuang Locus North (Figure 1). Here we present a basic overview of the structure of the 24 kilns excavated in 2008 and 2010 as

well as the pottery-making tools and the kilns' products. For convenience, in this article the artifact numbers are shortened such that the year, for example 1988 is changed to 88 and the site section is removed. Artifact 2008AGDDIIY1, therefore, would be identified as 08Y1, and 2010AGDDIIH229, as 10H229.

The shape and structure of the pottery kilns

1. All of the kilns have been damaged to different degrees. Those best preserved still have intact elements such as the fuel entrance, the firebox, the fire tunnels, the kiln columns, kiln walls, the firebox roof (pierced floor of stacking chamber), the fire holes and the stacking chamber. Most of the kilns have the same structure. Most are in ladle-shaped plan, with one exception that is in boot-shaped plan. All of them have upper and lower sections. The upper section comprises the flue, stacking chamber and roof, whereas the bottom section is made up of the fuel entrance, the firebox, the fire tunnels, the kiln

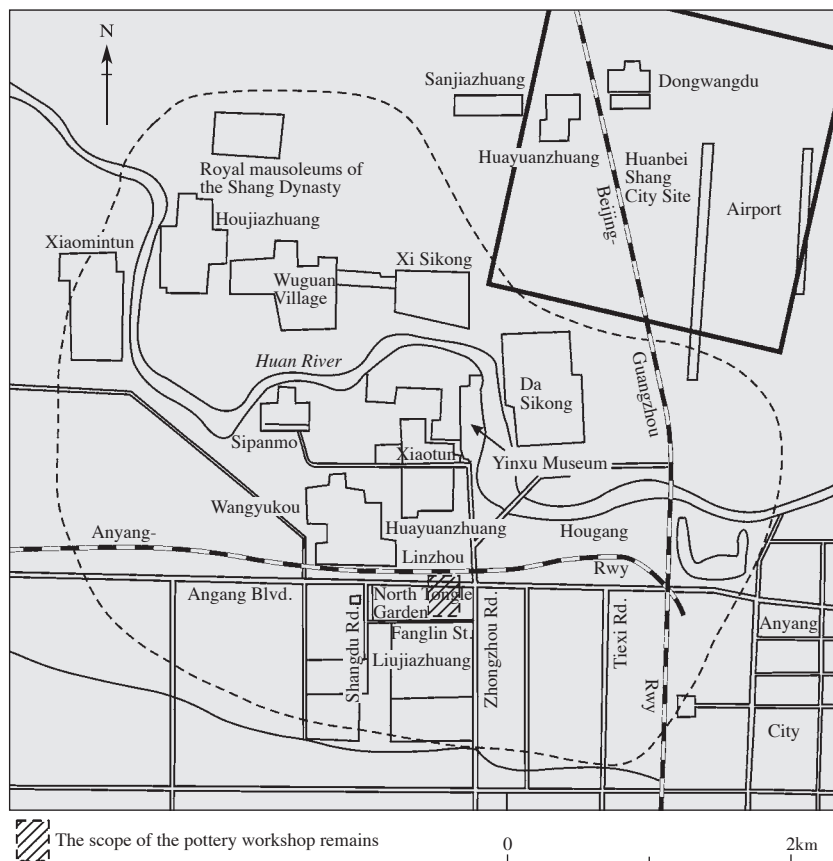


Figure 1 Location and scope of the pottery workshop in Liujiazhuang Locus North.

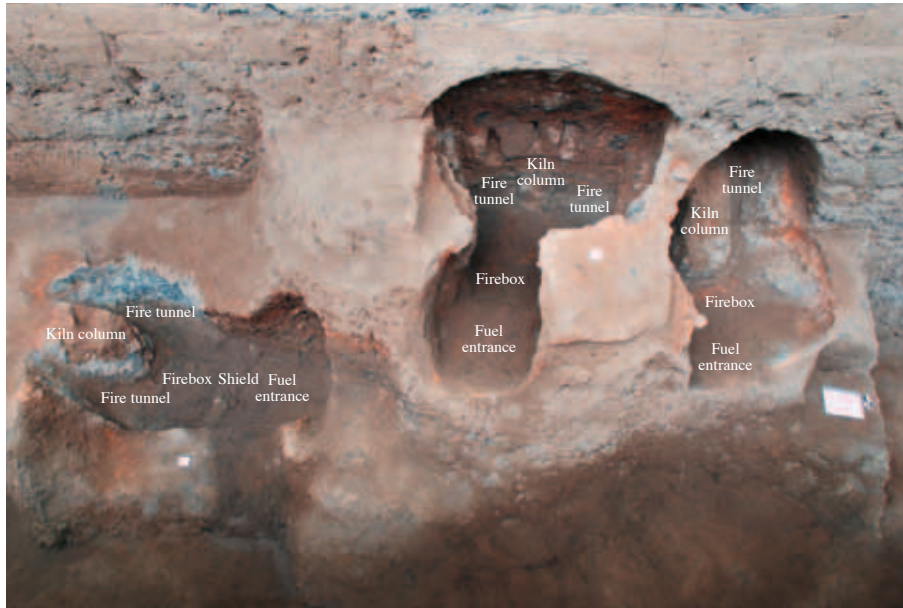


Figure 2 The kilns 10Y7, Y5 and Y6 (N–S).

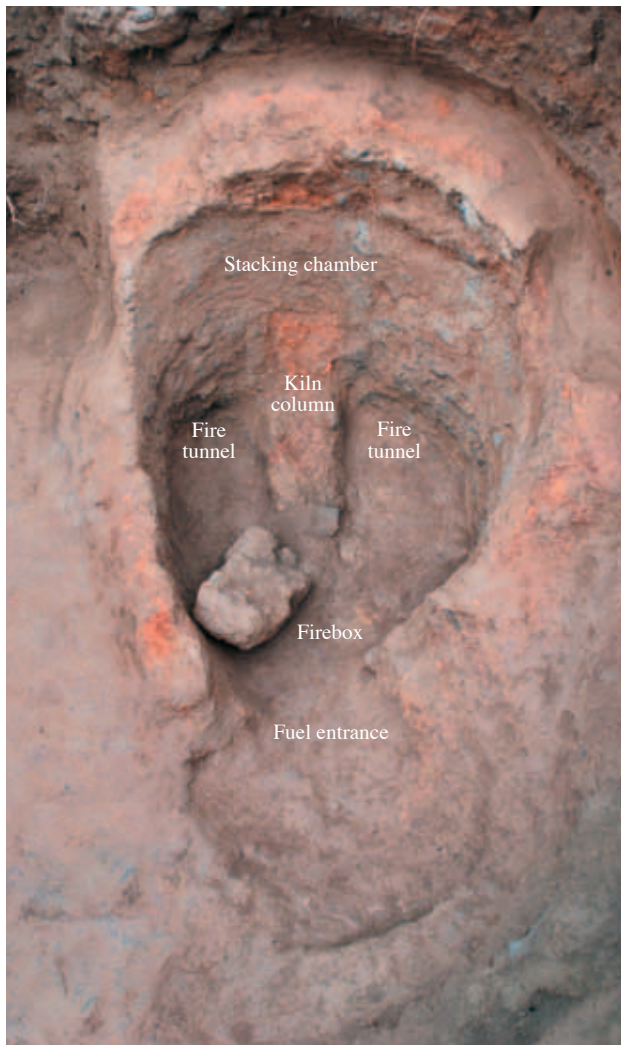


Figure 3 The kiln 08Y8 (SE–NW).

column, the firebox roof and the fire holes. The lower section was constructed by digging out an area with tools and there are very clear tool marks that have been left behind in some places. In front of some of the kilns there is also an operating pit (Figures 2 and 3). The fuel entrance is located in the front area and is either round or oval in cross section, but its central vault has usually collapsed. Typically the fuel entrance is higher than the operating pit outside the main body of the kiln and lower than the firebox.

The firebox is located inside the fuel entrance and outside the kiln columns. Most are in oval plan with round bottom and lower than other sections

of the kiln body. Typically white ash residue left on the firebox floor.

The kiln column is located behind the firebox between the two fire tunnels. It is in rectangular plan, while in vertical cross section most are trapezoidal and some are rectangular. The rear of the kiln column is connected to the kiln walls. The surfaces of the column are greenish gray, while the interior is reddish brown. Its primary purpose is to prop up the firebox roof (pierced floor of stacking chamber).

The fire tunnels of the kilns are located behind the firebox on either side of the kiln column, which separate the heat flow into two separate tunnels. Most of the fire tunnels are in oval plan, although some are semicircular. They extend from the rear of the firebox, usually on an upward slope, and at the tail end go upward and narrow to two fire holes. Some have flat bottoms. The surfaces of the fire tunnels are the part of the kiln body that was heated to the highest temperature, and consequently most are greenish gray, glossy and vitrified.

The firebox roof sits on top of the firebox, fire tunnels and kiln column. There are two types of firebox roofs. One is dug out and thus combined with the kiln walls and column. This type is more common. The other kind is a movable grate placed on top of the kiln columns, but this kind is rarer. Most of the firebox roofs have been damaged or destroyed. From those that remain preserved we can tell that they are typically in oval plan, although some are round and a small number are square. Most have a greenish gray surface color. The upper surface tends to be flat and has been slathered with sandy mud. The bottom is not flat, and tool marks are preserved on those firebox roofs that were dug out. Four to eight fire holes are usually evenly distributed around the edges of the firebox roof where it meets the kiln wall.

Fire holes tend to be in round or oval plan. In most

cases, the rear two fire holes are associated with the tail ends of the fire tunnels where they become restricted and angle upward. In cross section, these are slanted and appear tubular in overall shape. The surfaces of the fire holes are greenish gray in color, and some are vitrified.

All of the stacking chambers are poorly preserved. Based on those that are more complete, when the firebox roof is of the type that was dug out, then a segment of kiln wall extending 20cm above the bottom of the stacking chamber is constructed together with the firebox roof, and the middle and upper parts of the kiln wall are made of either rammed-earth or built of adobes made of mud tempered with straw. In those cases where there is a removable firebox roof, the sides of the kiln are usually dug out. The inner wall of the stacking chamber is greenish gray, the walls are rather flat and smooth, and they have been covered with a layer of sandy clay slurry.

None of the kiln roofs remain intact. Consequently, the roof shape, structure, and the position, number and shape of the flues, are all impossible to know. Below we discuss one example that is preserved relatively well.

2. Kiln 08Y5 is located in excavation grid T16 and has an orientation of 260° (Figures 4 and 5). The upper part of the kiln was buried 1.35m below the ground surface beneath a Shang Dynasty house feature (F2) and was intruded into by a Shang period ash pit (H38) and a burial (M38). The kiln was built into the primary soil. The portions of this kiln that remain intact include the fuel entrance, firebox, kiln column, fire tunnels, firebox roof, fire holes and a small part of the stacking chamber. The kiln was in a ladle-shaped plan and includes both upper and lower sections. The lower section includes a fuel entrance, firebox, fire tunnels, kiln column, firebox roof and fire holes, and was constructed by digging into the surrounding sediment. The fuel entrance is located on the west side, the surface of which is reddish brown in color and has an arched roof damaged by burial M38. The width of the fuel entrance area at the base is 35cm and the remains were 50cm high. Immediately adjacent to the fuel entrance is the firebox with a round bottom where large amounts of white ash was found, and the fill contained many fragments of kiln wall and burned earth. Excavations recovered three pottery *dou*-stemmed bowls and one pottery basin. Within the firebox was a rectangular kiln column that was also rectangular in cross-section: 75cm long × 30cm wide × 60cm tall. The rear portion of the kiln column is connected to the kiln wall

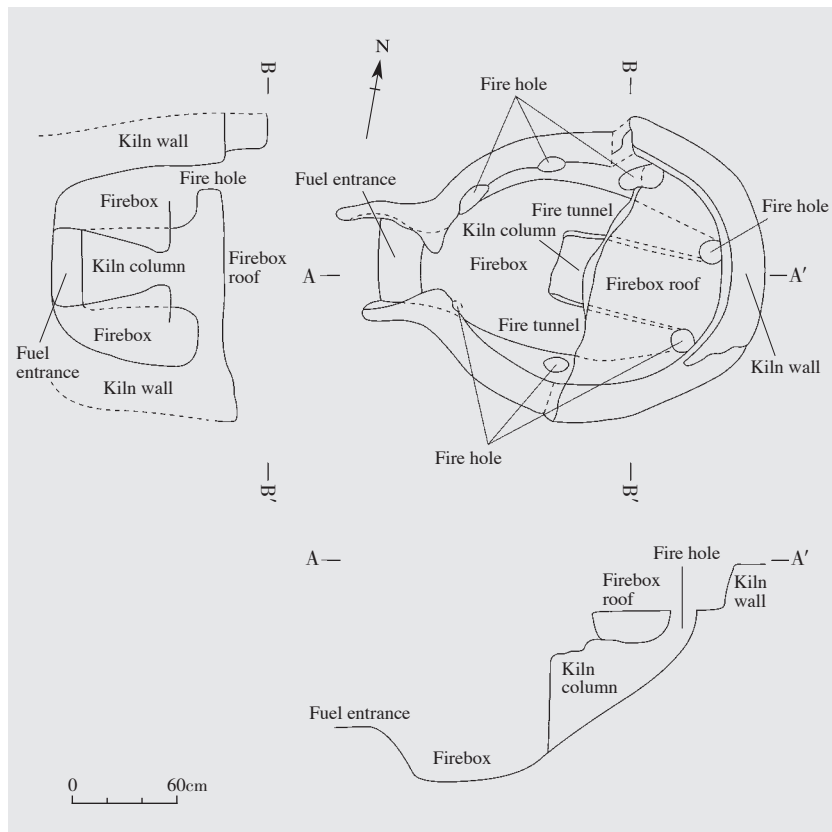


Figure 4 The plan and sections of the kiln 08Y5.

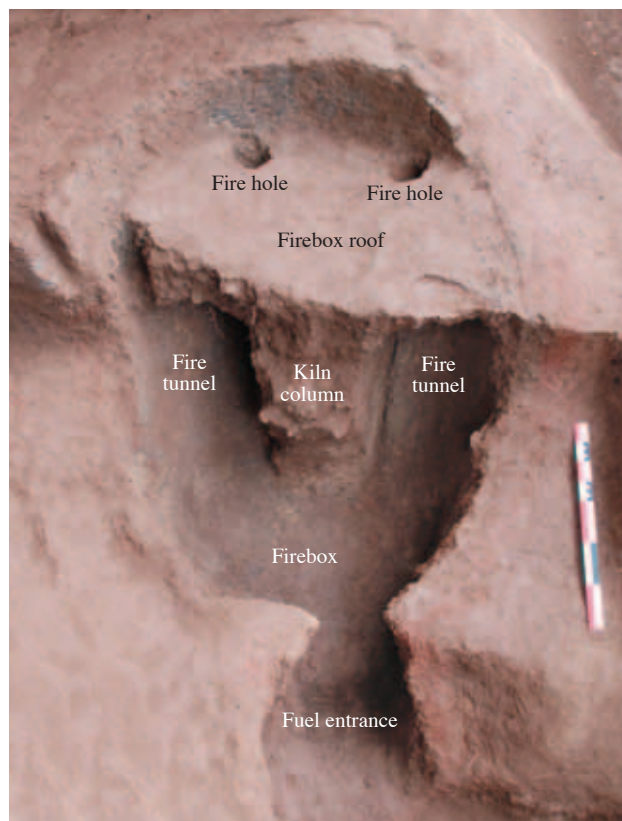


Figure 5 The kiln 08Y5 (W-E).

and the surface is greenish gray in color while the interior is brownish red. On either side of the kiln column are the two fire tunnels, which slope upward from the front to the back. The firebox and inner wall of the fire tunnels seem to have been covered with a thin layer of greenish gray mud. The firebox roof covers the firebox, fire channels, and kiln column, and was supported by the kiln column. It is in oval plan. Its front part has been damaged by burial M38. It is green in color with a flat front while the back is uneven. The roof, which is about 15cm thick, is covered with a 1cm thick layer of sandy mud. Around the edge of this firebox roof the excavators found seven fire holes where the roof meets the kiln wall. These fire holes are round and about 10cm in diameter. In the rear part of the firebox roof, two of the fire holes are almost completely preserved. They are associated with the rear

end of the fire channels and are therefore slanted in cross section. The rest fire holes are fragmentary, but from the remains present they seem to be cylindrical in shape. The stacking chamber is on top of the firebox roof and in oval plan. Only a part of the lower portion remains up to a height of 20cm but this is enough to show that it was constructed by digging out. The inner wall of the stacking chamber is greenish gray. It is 4cm thick with about 0.5cm layer of sandy mud applied to the surface. Outside the kiln wall there is a 15cm thick area of red-burned earth, which becomes muted in color gradually as distance from the wall increases. The upper portion of the stacking chamber, the kiln roof and the flues are all destroyed.

According to the evaluation of the shapes of the pottery *dou*-stemmed bowls and basins found in the stacking chamber, this kiln should date to Yin Xu Phase I at Anyang.

Discarded waste pottery products found in pits nearby are mostly from *dou*-stemmed bowls suggesting this kiln was primarily used for their manufacture.

Pottery-making tools

To date, the objects that can be confirmed as pottery-making tools include pottery paddles and pouch-shaped pottery anvils.

1. Pottery paddles. A total of 32 have been discovered, 12 of which are fragmentary. Their sizes are varying. Most are made of fine paste, with a small number being sandy pottery. They are fairly similar in shape – generally in the form of mushrooms with a cap on the end of a handle. The handles tend to be round shafts, mostly with hollow centers, although a few have indentations or are solid. Most of the cap sections are undecorated with fragments of gravel or sand on their surface. A few have cord marks or bowstring pattern on the surface. It is noteworthy that 13 of the pottery paddles have carved or incised marks like characters or symbols on the handles (Figure 6).

Artifact 08T25 gathered (not archaeologically unearthed):02: Fine paste, fragmentary cap with gravel inclusions. Thick hollow handle. Three sets of the symbols “𠂇” and “𠂈” are incised on the handle and a single “𠂉” character. The “𠂇” symbols may relate to the character “𠂇” (pictograph of snake) as it is similar to the oracle bone character

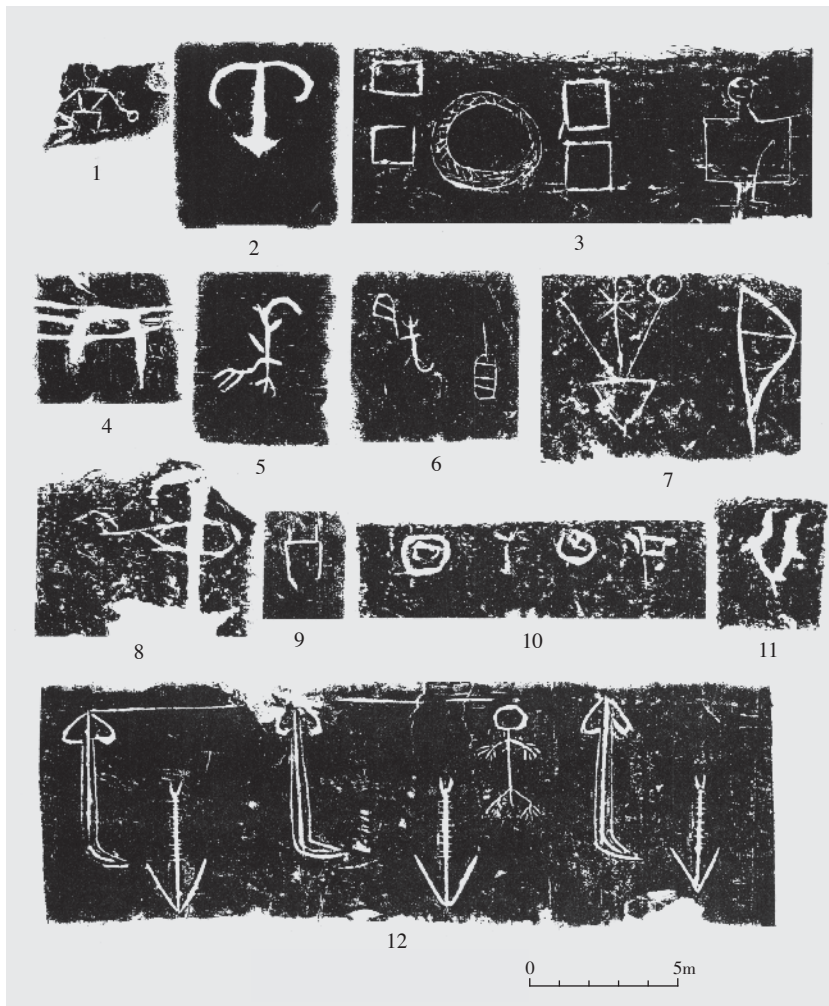


Figure 6 Rubbings of the marks on the pottery-making tools.

1. Pottery anvil (10H41:12); 2, 3, 5-8 and 12. Pottery paddles of Type A (10M77:01, 10H41:9, 10F21:9, 08T16gathered:02, 08H40:9, 10H188:1 and 08T25gathered:02); 9 and 10. Pottery paddles of Type C (10H137:1 and 08T19gathered 01); 4 and 11. Pottery paddles of Type B (08H2:4 and 08H12:5).

“𠂔”. The symbol “↓” is thought to be associated with “脊” (spine) as in the case of the Shang bronze inscription use of the symbol “𠂔” (cf. Institute of Archaeology 1984–94: no. 12.6897) and the early Western Zhou bronze inscription character “𠂔” (cf. Institute of Archaeology 1984–94: no. 12.6794). The symbol “𠂔” is similar to the oracle bone inscription character “𠂔” (cf. Guo 1978-82: items 721-front and 722-front), which some scholars believe is the character “垂” (to hang or bequeath), and it is also similar to the oracle bone character “𠂔” (cf. Guo 1978-82: no. 28180), which is interpreted as “舞” (to dance / to wield). The diameter of the head is 9cm and it is 10.6cm high (Figures 6:12 and 7:4).

Artifact 08H2:4: Fine paste, cap portion has fine gravel inclusions. The base of the handle has an impression and the middle is a little thinner. The surface has three rings of sunken bowstring patterns and a single incised symbol, which is not recognizable. The cap is 7.4cm in diameter and the full height of the item is 7.9cm (Figures 6:4 and 7:3).

Artifact 10H146:1: Fine, grayish-black ware with a little brown. Solid handle that is slightly narrower and narrower from the cap to the end. Cap section has cord mark and is 5.2cm in diameter and the full height is 4.9cm (Figure 7:2).

2. Pottery anvils. A total of three specimens have been recovered all of which are similar in shape – roughly in the form of the pouched legs of *li*-cauldron and *yan*-steamer. They have flat tops, hollow centers and plain surface, and are relatively smooth. They are tools used as internal supports during the manufacture of pouched legs. In two cases a round hole that was interlinked with the pouched leg on one side so that when they were being used a finger could be inserted into the hole to firmly hold it.

Artifact 10H41:12: Fine gray ware, slightly damaged. The lateral side is relatively bulging and the lower side has a round through hole. A single “𠂔” symbol is incised above the round hole but it is incomplete and undecipherable. The object is 5.7-7.7cm in diameter and 8.7cm tall (Figure 7:1).

Pottery wares

Pottery vessels are mostly gray fine ware and include specimens of *dou*-stemmed bowls, *gui*-tureens, *yu*-basins, *bu*-vessels, *bo*-bowls, basins, *zeng*-steamers, vessel lids and small *li*-tripod cauldrons. *Dou* are the most common, followed by *gui*.

1. *Dou*-stemmed bowls. A total of 202 specimens classified into four types.

Type I: four specimens. Their rims have external

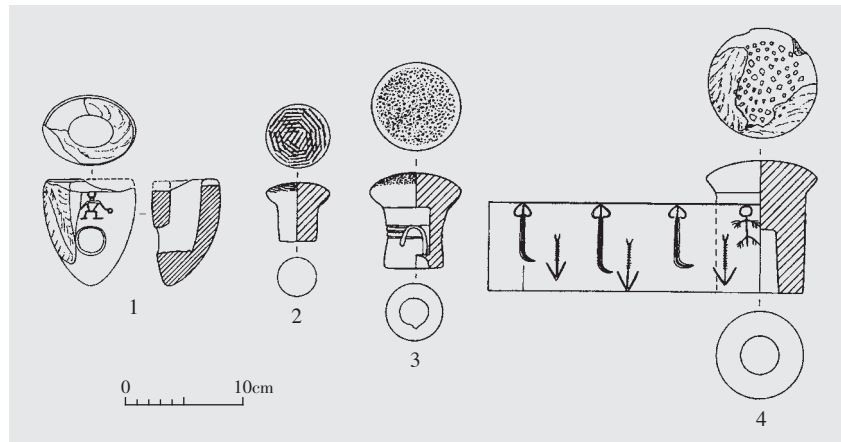


Figure 7 Pottery-making tools.

1. Pottery anvil (10H41:12); 2-4. Pottery paddles (10H146:1, 08H2:4 and 08T25gathered:02).

slanting on the lip, shallow bodies, flat bottoms and squat ring feet. On the upper part of the ring feet are several lines of bowstring marks. Sample 08Y1:3 is somewhat deformed and has a relatively straight ring foot. The diameter at the mouth is 13.3cm and it is 7.2cm tall (Figure 8:6).

Type II: these have thick rims, relatively deep bodies, nearly flat round bottoms and tall ring feet. Specimen 10H229:11 has a plain surface, a mouth diameter of 13.7cm and is 8.5cm tall (Figure 8:7).

Type III: the lip is flat and the bowl-body is relatively straight, with a round bottom and tall, thin ring-foot. Specimen 10H229:9 has a mouth diameter of 13.3cm and is 8.6cm tall (Figure 8:8).

Type IV: has a contracted mouth, a pointed lip, deep bowl, curved belly, round bottom and a tall, thin ring foot. The lower part flares outward. The body and upper part of the ring foot have several lines of bowstring marks. Specimen 88Huayuanzhuang Locus South gathered:05 has a mouth diameter of 14.1cm and is 12.7cm tall (Figure 8:9).

2. *Gui*-tureens. A total of 25 specimens classified into two types.

Type A: this type has a flared mouth, deep body, round bottom, and short ring foot. Their neck and/or body have several lines of bowstring marks. There are three subtypes.

Subtype AI: sample 10H229:4 has a thick, round rim, a mouth diameter of 22.5cm and is 15.5cm tall (Figure 8:1).

Subtype AII: this form is very similar to subtype I and represented by artifact 10Y1:1, which is severely deformed, with a mouth diameter of 19.3-26.1cm and is 16.5cm tall (Figure 8:2).

Subtype AIII: this form has a thick square lip and a wide, flat rim. Sample 10H229:6 has a band of sunken bowstring mark on the inner lip. It is 28.3cm in diameter at the mouth and 17.2cm tall (Figure 8:3).

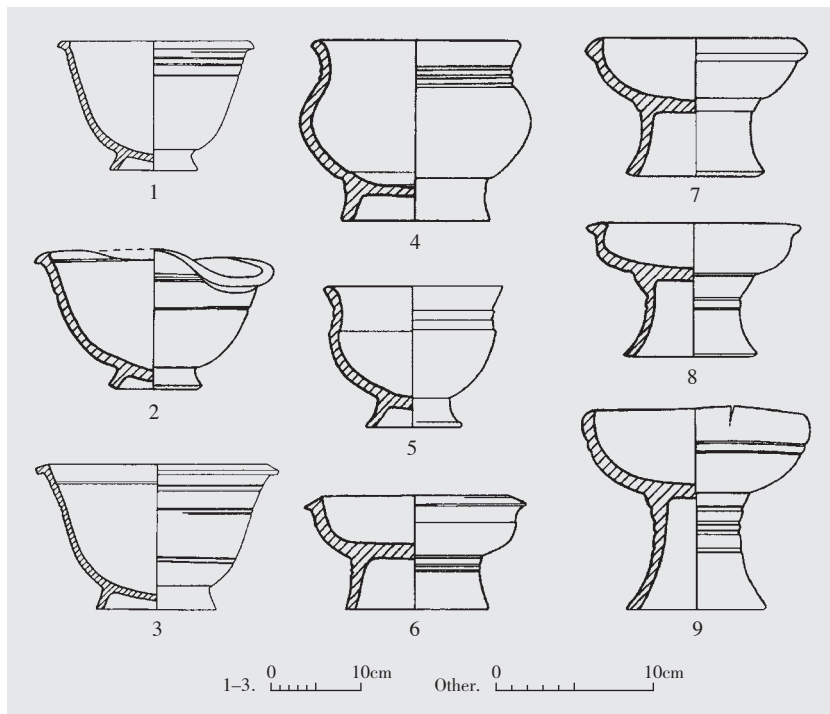


Figure 8 Pottery vessels.

1. *Gui-tureen* of Subtype AI (10H229:4); 2. *Gui-tureen* of Subtype AII (10Y1:1); 3. *Gui-tureen* of Subtype AIII (10H229:6); 4. *Gui-tureen* of Subtype BI (10H229:15); 5. *Gui-tureen* of Subtype BII (88Huayuanzhuang Locus South gathered:02); 6. *Dou-stemmed bowl* of Type I (08Y1:3); 7. *Dou-stemmed bowl* of Type II (10H229:11); 8. *Dou-stemmed bowl* of Type III (10H229:9); 9. *Dou-stemmed bowl* of Type IV (88Huayuanzhuang Locus South gathered:05).

Type B: this type has a flared mouth, a constricted neck and several bands of bowstring marks on the neck area. It has two subtypes.

Subtype BI: they have round rims, a relatively short neck, a bulging belly, and a relatively short and thick ring foot. Sample 10H229:15 has a rim diameter of 13.4cm and is 11.3cm tall (Figure 8:4).

Subtype BII: This form has a pointed round lip, a long neck, slightly bulging body, and thin, tall ring foot. Sample 88Huayuanzhuang Locus South gathered:02 is 11.2cm in diameter at the mouth and 8.8cm tall (Figure 8:5).

The context, chronology and nature of the Site

1. The site context.

Based on coring and excavation, together with the results from previous excavations at the Yinxu Site, we can be fairly certain of the position and scope of this workshop site in the broader community at the site. It extends more than 300m south to Fanglin St. and north to the southern side of the Anyang-Linzhou Railway. To the east it extends 100m to Zhongzhou Rd. and west about 200m. Based on this distribution, the locus covers about 6ha, and is the largest and most important pottery

manufacturing locus known from Yinxu.

2. The site chronology.

Based on the form of the pottery vessels recovered from the site the chronology can be determined. *Dou-stemmed bowl* of Type I and *gui-tureen* of Subtype AI can be attributed to Yinxu Phase I. *Dou* of Types II and III, and *gui* of subtypes AII, AIII, and BI, are all associated with Yinxu Phase II. *Dou* of Type IV and *gui* of Subtype BII are artifacts from Yinxu Phase III. Based on these results we can suggest that the locus was used for a relatively long period of time, starting in Phase I of the Yinxu chronology and continuing until Yinxu Phase III.

3. The site character.

The pottery wares produced in this workshop were primarily fine wares with food containers being dominant and cooking vessels absent. Based on previous research, the material used to produce food containers at Yinxu derives from the Aeolian sediment present locally in the loess, whereas cooking vessels made with sandy paste such as *li*-cauldron and *yan*-steamer comes from the alluvial sediments (black sediment) found to the east of Yinxu. According to this previous knowledge, the site

discussed here was involved in the manufacture of pottery using local loess primarily to make containers.

This locus is in close proximity to the palace and temple area of the Yinxu Site and its position is extremely important so it is clear that the royal family of the Shang placed extraordinary significance on the activities there. The locus neighbors a Shang period metallurgical locale (Miaopu Locus North) to the east. In 2006, our team discovered a large quantity of refuse left by bone-manufacturing craft dating to the Shang Dynasty at this locale and we believe that it represents an immense bone tool and artifact workshop. These three production areas are closely connected to one another and comprise the central craft manufacturing district of the Shang capital at Yinxu. Based on these recent excavations of pottery kilns we have gained a basic understanding of the structure of pottery kilns in the late Shang Dynasty and have improved our understanding of early Chinese pyrotechnology.

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Postscript

The original article was published in *Kaogu* 考古 (Archaeology) 2012.12: 43–58 with 16 tables and six figures. The authors are Zhanwei Yue 岳占伟, Hongbin Yue 岳洪彬, and Yuling He 何毓灵. The abridged version was written by Zhanwei Yue and translated into English by Rowan Flad 傅罗文.