

Excavation of Tani Pottery Kiln Site in Angkor Area : Report on the 4th excavation of pottery kiln sites (march 1999)

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# **1. Excavation of Tani Pottery Kiln Site in Angkor Area**

## **Report on the 4th excavation of pottery kiln sites (March 1999)**

Prof. Yoji AOYAGI, Prof. Tatsuo SASAKI

### **Discovery of Tani pottery kiln site**

In August 1995, the Sophia University Angkor Monuments International Survey Team discovered the remains of pottery kilns at the village of Run Ta Ek, about 20 km east-northeast of Angkor Wat.

Previous discoveries of pottery kiln relics in Cambodia had been made more than 100 years ago at the end of the 19th century. Cambodian pottery, called Khmer wares, has been appreciated and collected ever since. However, nothing was known of where and by what techniques it was made.

This discovery of the remains of pottery kilns has aroused the interest of the world's pottery connoisseurs, which is only natural considering their history and current status.

However, chance was the trigger that led to this discovery. The project got under way after some villagers who had discovered pottery fragments in the course of roadwork contacted the leader of the survey team, Professor Yoshiaki Ishizawa. Professor Ishizawa and his team confirmed pottery kiln relics at two places in the vicinity of Angkor Wat. One of these was the one that we are now calling the Tani pottery kiln site.

### **Beginning the 1st Survey**

In August 1996, the year following the discovery, Aoyagi and Sasaki confirmed the current status of the Tani pottery kiln site and visited the site in order to consider ways and means for their future preservation.

Although it was still only one year since the pottery kiln site had been discovered, they had already had many visitors and countless numbers of pottery fragments that were scattered over the surface had been picked up and taken away. Although we walked around the site, there were hardly any fragments to be found.

There was not a day to be lost in establishing some means of preservation. Therefore, in the very short space of four days, we tried putting a trench into a little mound in which we presumed a pottery kiln was buried.

Having confirmed the site, the trench would be refilled completely and left until the next occasion when preservation measures could be devised.

### **Tani pottery kiln site consists of many groups**

At the time of this first survey, we walked around the area. As a result, we found that there are four separate groups of pottery kiln ruins remaining in the Tani village. We decided to call the six kilns on the southern side group A, the seven to the north were called B, the two to the east were called C, and the one

to the north was called D. We drew up a simple distribution plan using a compass and 50-meter tape.

We were amazed that we had been able to infer that so many pottery kiln relics remain at this location, which we have simply called the Tani pottery kiln site. Afterwards, we were to find another group on the north side.

### **Trenching investigation**

The mound into which we put the trench is the first of the group of seven that we called B. Therefore remains of this pottery kiln is called pottery kiln site B1.

This B1, which is in the southernmost position, was selected for trenching because it is small and there was a large tree growing from the top of the mound. We thought it would a good subject for trenching because it seemed to be an independent pottery kiln site probably consisted of simple layers of sediment.

The trenching investigation was intended to unravel such questions as whether the mound contained the remains of a pottery kiln, had it been built up by discarding rejected articles or was it a garbage dump of household waste. Knowing the nature of the mound is the first step in considering the existence, restoration, application and so on of the entire group of pottery kiln relics.

As a result of the trenching investigation, we learned that the mound did contain the remains of a pottery kiln and consisted of deposits including crumbled kiln walls and rejected pots. Many pottery fragments were unearthed from within the trench. Many were unglazed jars and tiles. There were many ash-glazed small articles, ranging in abundance from lidded cups through bowls, tiles, bottles and plates. There was no dark-brown glaze. Up to now, these had been called Khmer pottery or Phnom Kulen kiln pottery. It had now become clear that this was the typical source area for Khmer ware of the 11th and 12th century.

However, with a short excavation period of only 4 days, the specific construction of the pottery kilns remained unclear and this became a matter for the second survey.

### **The 2nd Survey - investigating distribution**

The second survey was scheduled for July-August 1997 but immediately before then the survey was abandoned due to political instability in Cambodia. The second survey was implemented in March 1998 but for a number of reasons, the excavation investigation was deferred. On this occasion, the survey consisted of walking around and entering on a map where and how many pottery kiln relics remained. This time we were also able to walk over the area to the north, where we had previously been unable to walk because of land mines.

Apart from groups A, B, C and D that had been found before, we discovered another group E. The E group contained the remains of nine kilns. Two more were added to C group. It had become even clearer that the Tani pottery kiln site was a huge pottery production area.

Moreover, at the time of this survey, we made a collection of measurements and photographs of Khmer pottery held in storage by government organizations and temples. This will be useful for comparison with articles unearthed from the pottery kiln sites.

### **The 3rd Survey - getting to know the type of kiln**

We carried out a full-scale excavation of the remains of the B1 pottery kiln in September 1998. Our objective was to clarify the structure of this kiln and to obtain basic data for future research, preservation and public access to the Tani pottery kiln site.

The 1st survey of August 1996 identified the soil that constituted the mound as earth from which the kiln was constructed, rubble from the kiln and rejected pottery items. It became clear that the clay that constituted the foundations was heaped up in the center of the mound and there were stratified deposits of rubble from the kiln walls and pottery rejects in three trench sections. So the next problem was whether the kiln had an elliptical or rectangular floor plan.

Lumps of red-colored fired earth, presumably the floor of the kiln chamber, appeared at the ground surface in the top section of the mound. However nothing remained of the kiln wall. After sweeping the surface with a broom, we cut a small trench in one part and removed some of the lumps of red-colored fired earth a few centimeters thick. The bottom face was a layer of hard clay containing lumps of red sand and lumps of white sand. At this point, the probability of an elliptical shape for the remains of the kiln disappeared.

The rectangular shape of the kiln was retained in the sections between the trenches. This shape was general throughout Southeast Asia. Even though it was in pieces, the red-colored fired earth that had been the floor of the kiln remained. On close inspection by crawling over the ground, at last we were able to find some parts that had presumably been walls.

Lack of time again prevented us from excavating the bottom part of the remains of the kiln on this occasion. The combustion chamber became a matter for the next survey.

The articles that had been unearthed included glazed and unglazed pottery. We also found stands used as supports at the time of firing. There were thin elliptical items as well as tubular and rod-shaped items. This time we collected 16 containers full of fragments. Washing them, inscribing where they had come from, taking measurements to get an accurate knowledge of their shapes, and photographing them were tasks to be left for the next survey.

### **The 4th Survey - clarifying the overall shape of the kiln**

In March 1999 we investigated the part of the B1 pottery kiln site that had not yet been excavated, concentrating in particular on the lower combustion chamber. In this survey, we were able to clarify the complete structure of the ruined kiln. As we expected, it was very similar to kiln sites, which had produced Thai pottery. We can infer that the two were closely associated.

The kiln site whose overall appearance had been clarified, has been repaired a number of times. There are visible signs that the floor has been repaired several times. It also became clear that the walls of the combustion chamber had also been thickly replastered. It was necessary, therefore, to make further studies in order to obtain more detailed data. Once a point had become clear, this revealed further points that were not clear and more studies were needed. We expect that the overall structure of the B1 kiln site will have been explained by August 1999 and that the 5th Survey will complete the task.

## **Concerning the structure of the kiln site**

From the shape of its floor plan, the center section is a single chamber with a somewhat swollen, pear-like elongated elliptical shape. There are three sections, the flue, firing chamber and combustion chamber. The combustion chamber is low and the firing chamber slopes upwards. The floor of the firing chamber has basically the same slope but it has probably become stepped slightly as a result of repairs to the floor. There is a large step between the combustion chamber and the firing chamber, the combustion chamber being much lower than the firing chamber. There are many points of similarity with the kiln sites of northeastern Thailand.

The maximum width inside the chamber is three meters and the kiln is eight meters long. The B1 kiln has undergone major repair on at least once occasion. As a result, the main firing chamber has two floor surfaces and the combustion chamber also shows that there are two periods, before and after repair. We ascertained that there is a section at the bottom of the firing chamber that adjoins two surfaces of the back wall that has been replastered. We were able to infer that two stoking holes had been restored in the newly reconstructed combustion chamber. This sort of configuration is very unusual and it is something we would like to study again.

We shall refer to the remains of the B1 kiln after major repairs as the “new kiln” and before the repairs as the “old kiln”. The angle of slope in the firing chamber of the old kiln becomes steeper in the section near the combustion chamber. In the new kiln, clay has been applied to the floor to provide an almost uniform slope and it is only in this section that the back wall of the combustion chamber has become vertical.

### **Firing chamber**

Overlapping layers of red-colored hardened burnt surfaces indicate that the floor of the firing chamber has been replastered with clay several times. The upper floor is about 5 cm thick. The top is red, shading gradually to yellow, becoming white in some places. The upper floor overlies a red floor below. We have called the upper floor floor a and the floor below it is called b. However, beneath that we discovered another incomplete floor that we have called c.

Basically the continuous floors are the two floors a and b. Floor a belongs to the new kiln and b belongs to the old kiln. The slopes of the floors in the main part of the firing chamber are about the same, 18 to 22 degrees, but the slopes are steeper near the combustion chamber. Floor b is about 50 degrees and floor a is about 33 degrees.

In the section where the slope of the floor changes, the lines of the sidewalls are also bent. The walls seem to have been built to match the shape of the floor plan after the floor was laid. This is probably why the lines of the walls are not straight. At the boundary between the combustion chamber and the firing chamber, the sidewalls slant upwards towards the outside of the kiln.

Parts of the floor are buried under the sidewalls of the kiln. This shows that the sidewalls were built after the floor had been laid.

Although it is possible that there was access to the firing chamber, we were unable to discover any

sign of an entrance even though we investigated the floor and wall foundations. This point will need to be confirmed by excavating the remains of other kilns.

Long, thin kiln materials with a trapezoidal section are being unearthed from the two layers of ground inside the combustion chamber. Whether they were used to partition the interior of the firing chamber or to delineate the combustion chamber and firing chamber as a fireguard, it is probable that they were used for one or other of these purposes. This will probably be another matter to be investigated in the next survey.

### **Combustion chamber**

The plan of the combustion chamber is a semicircle. The bottom of the back wall of the new kiln rises vertically 90 to 110 cm from the flat floor. The bottom of the sidewalls is almost vertical and the upper parts are missing. The back wall of the old kiln has not yet been excavated but the floor is lower than the floor of the new kiln.

There are three combustion chambers floors a, b and c belonging to different periods. The height from the lowest floor c to the fire hole through the back wall is 110 cm. The height from the highest floor a to the fire hole through the back wall is 90 cm. The back wall is 250 cm wide. Floor a is topped with a thin layer of ash having a blackish tinge and has a hard black surface in some places. Below, it is filled with lumps of fired earth and the bottom is mixed with brown clay. There are charcoal deposits in floor b.

The combustion chamber has also undergone major repair. We can infer that the floor in the firing chamber was frequently subjected to partial replastering but there were probably few major repairs to the combustion chamber. It is highly probable that major repairs were carried out at the same time. The floor becomes blackened and hard but since the same red and white clay deposits that occur in the mound can be seen in the sections where it is broken, the combustion chamber is also built over an artificial mound.

It is conceivable that there was a partition wall over the steeply sloping floor at the junction of the combustion chamber and firing chamber but there are visible traces remaining on that steeply sloping floor as though a round clay column had been erected midway between the left and right side walls. A round clay column has broken and fallen on the fired earth deposit in the combustion chamber. The longest remnant is 70 cm long. The thinnest piece is 36 cm in diameter. We can infer that the distance from the floor of the combustion chamber to the top of the column was at least 170 cm. On looking from within the combustion chamber, this means there were two holes through which a person could pass. This column probably also serves as a fire-dividing column. However, since it is high over the floor of the combustion chamber, and very difficult to pass through, we cannot deny the possibility that there was an entrance to the firing chamber where the products were fired.

There are many finger marks remaining on the surface of the back wall of the combustion chamber of the new kiln. These are traces of mud having been pressed by hand sloping down to the left or sloping up to the left. The back wall is almost vertical. A small firing bed is attached to the part below the flame hole in the back wall, that is to say, in the corner of the back wall where it connects to the floor of the firing chamber. On the left side the corner part is only one row but on the right there are several rows towards the back. Since this is a place reached directly by the flames it is not suitable for the placement of pots.

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