A GIS Based Study on Craft Specialization of the Xinglongwa Culture

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Craft specialization is one of the crucial criteria for the evaluation of social complexity. Systematic research on intra-site distribution of artifacts and raw materials is an important method to interpret craft specialization in archaeological context. This paper is an experiment of the application of GIS in the study of craft specialization of the Xinglongwa Culture – a Neolithic archaeological culture dating to about cal. 6300 BCE to cal. 5000 BCE.

The data of three well-preserved and completely excavated settlements of the Xinglongwa Culture, the Nantaizi 南台子 and Baiyinchanghan 白音长汗 Sites in Inner Mongolia, were digitized and analyzed with the GIS software to find if there are spatial distribution of stone artifacts and raw materials indicating primary craft specialization.

I

The Nantaizi Site is located in the Hexigten Banner, Inner Mongolia (Inner Mongolia Institute 1994). The remaining area of the site is more than 1 ha. In a three-month excavation in the summer of 1991, archaeologists exposed an area of 3100sq m, within which 33 houses, 11 pits and abundant artifacts of the middle phase of the Xinglongwa Culture were discovered. According to the excavators, the area surrounding the houses and pits was clear – indicating that the 33 houses might represent a relatively independent residential zone (Figure 1). The 33 houses were arranged in three rows. The distance between the rows shows that the northern and middle rows might have a closer relationship and formed the northern house group. The southern row can be defined as the southern house group. The biggest house (F4) of the site is just in the middle of the northern row.

The Baiyinchanghan Site is located in Linxi County, Inner Mongolia (Inner Mongolia Institute 2004). In the excavations from 1988 to 1991, archaeologists dug about 7000sq m and found two settlements (A and B) of the late phase of the Xinglongwa Culture each surrounded by a ditch. The 29 houses in settlement A were arranged in four rows and can be divided into three house groups (Figure 2). The remaining 24 houses in settlement B were arranged in three rows indicating three house groups (Figure 3).

Two factors might affect my following analysis based on the statistics of floor assemblages.

First is the contemporaneity of houses. Obviously, it...
is difficult to prove archaeologically that all the houses in a settlement had co-existed during all of the habitation periods of the settlement. But intentional arrangement and similarity of artifacts, especially pottery, are important factors for the determination of contemporaneity of houses within a settlement. So based on the arrangement of the houses and the similar styles of artifacts on house floors, it is reasonable to say that most of the houses at Nantaizi and Baiyinchanghan might have co-existed for some time. Thus, though my following analysis based on the assumption that all the houses in a settlement had been coexisting is somewhat of an approximation, it can still provide reliable inferences on different aspects of the Xinglongwa societies.

Second, as Schiffer mentioned (1999), curation is an important depletion behavior that always affects house floor assemblages. The scarcity of artifacts in some houses might be caused by the taking away of useful artifacts when abandonment happened. Thus though the floor assemblages certainly, in certain degree, reflect types and quantity of artifacts in houses during the habitation period, one has to be cautious when making any inference about the habitation period from the floor assemblages.

For a systematic analysis of the data, I digitized the plan of the settlements and established a database of the houses with the GIS software application. The database includes the shape, size and floor assemblage of each house. With the help of GIS software, I was able to interrogate the database for different variables and immediately get images of the results. This allowed me to find some important characteristics of the distribution of the artifacts through houses, on which to base the social characteristics of the settlement. I divided the houses into three classes (high, middle and low) according to the number of total artifact, pottery, stone artifacts and bone tools in them. The software can auto-
II

Abnormal spatial distribution of stone artifacts can be recognized in all the three settlements.

Nantaizi

Abnormal distribution of stone artifacts at the Nantaizi settlement includes:

1) Seven of the eight high-rating houses for stone artifacts are in the northern group, while only one in the southern group.

2) F4, the most outstanding house in the settlement in the middle of the north house row, is not only the biggest in size (81.6 sq m), but also has abundant artifacts on its floor.

3) All the five smaller houses to the east of F4–F1, F2, F3, F5 and F32 – are high-rating houses for stone artifacts.

4) Stone raw material was found in five houses. Four of them – F2, F3, F5 and F6 – are just beside F4. F2 has 21 pieces of stone material at its eastern corner (Figure 4).

5) Four of the five houses with Microlithic blades are in the northern group. They are F1, F4, F14 and F32. House F14 is the richest house for Microlithic artifacts. Besides the 12 Microlithic blades on its floor, a large number (about 200) of Microlithic blades and cores were discovered in the pit H23 just to the south of this house.

Baiyinchanghan A

Abnormal distribution of stone artifacts can also be recognized at the Baiyinchanghan A settlement. Three of the four high-rating houses for stone artifacts are at the northern part of the eastern group. Among them, house AF32 has five grinding rollers and one stone pestle on the floor (Figure 5). AF25 has five stone axes, three stone chisels and one adze (Figure 6).

Baiyinchanghan B

Noticeable distribution of stone artifacts can be found at the Baiyinchanghan B settlement too. The only two high-rating houses for stone artifacts – BF73 and BF74 are just in the middle
Figure 6. The Plan of House AF25 in Baiyinchanghan Site
1, 2 and 10. cylindrical pottery jars of Subtype Bc 3. stone grinding roller of Type A 4. bone fishing harpoon 5. fragmentary stone spade 6-1. fork-shaped shell implement 6-2. shell ornament of Type A 7. shell ornament of Type A 8. stone adze of Type A 9. stone flake 11. cylindrical pottery jar of Subtype Da 12. pottery bowl of Type C 13. cylindrical pottery jar of Subtype Ba 14. cylindrical pottery jar of Type B 15. stone pestle of Type A 16. stone ax of Subtype Ba 17. stone ax of Subtype Ab 18. fragmentary stone ax 19 and 20. stone chisels of Type B 21. stone A-shaped implement of Subtype Ab 22. grinding stone of Type D 23. stone mortar of Type B. The rest are stone blocks.

Figure 7. Plan of House BF74 in Baiyinchanghan Site
1 and 2. stone spades of Subtype Bb 3. half-done stone spade 4. stone knife of Type D in Group A 5 and 18. stone grinding roller of Type C (two fragments of one item) 6. stone knife of Subtype Aa in Group A 7. stone knife of Subtype Eb in Group A 8. half-done stone ax 9. oval stone flake 10. small stone block 11. stone grinding roller of Type A 12. stone tube 13 and 14. cylindrical pottery jar of Subtype Bc 15. cylindrical pottery jar of Type B 16. pottery cup of Type B 17. grinding stone of Type D 19. grinding stone of Type B 20. grinding stone of Type C 21–24. animal bones 25. potsherd. The rest are stone blocks and flakes.
of the western house group. Interestingly, while three grinding stones and two grinding rollers were found on the floor of BF74 (Figure 7), the stone artifacts on the floor BF73 are four knives, six spades and some choppers.

III

According to Costin (1991), specialization is a relative state that can be defined as the ratio between producers and consumers. Systematic research on specialization should therefore address the production, distribution, and consumption of artifacts through the study of production sites, inter- and intra-site patterns of distribution, sources of raw materials and finished artifacts, and the parameters of the artifacts themselves. Due to the lack of reference studies, intra-site distribution of artifacts is the only evidence to support my discussion here.

Although as discussed above, one cannot draw a clear distinction between a floor assemblage formed in abandonment process and one accumulated during the habitation period, it is difficult to discount the above abnormal distribution of stone artifacts in the three Xinglongwa settlements as just accidents.

At the Nantaizi settlement, F4 is obviously the central house in the settlement, and seems especially important in economic practices pertaining to stone tools manufacture and probably also application.

Since few stone raw material and unfinished stone artifacts were found at Baiyinchanghan A and B settlements, we cannot provide a detailed interpretation on stone tools manufacture there. Yet the abnormal distribution of food processing tools (such as grinding stones and grinding rollers) and carpentry tools (such as axes, adzes, chisels) also indicate certain kind of specialization on some economic activities.

In conclusion, the abnormal distribution of stone artifacts at the three Xinglongwa settlements suggests that craft specialization might have begun in the Xinglongwa Period. Anyway, craft specialization in the Xinglongwa Period might be just in the stage of incipient specialization or ‘elementary specialization (Deal 1998)’. Thus specialization separates producers and users but remains small-scale and is likely to have been structurally linked to kin-related or other residence groups within individual villages. It is a part-time specialization, in which particular households regularly produce a relatively small output for local consumption. Significantly, households with high prestige (such as F4 at Nantaizi) in the kinship organization exhibited their importance in the craft specialization.

References


Note: The original paper, published in Kaogu 考古 (Archaeology) 2008.6: 58–68 with seven illustrations, was written by Li Xinwei 李新伟. This abridged version is prepared and translated by the original author.