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Excavation report of the Lingjing Paleolithic Site in 2006

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Abstract

The excavation to Lingjing Site in 2006 revealed an area of 218sq m, and brought to light 5,690 stone artifacts, several hundred identifiable animal fossil specimens and over 100 bone implements. The stone artifacts are products of white vein quartz pebbles and various quartzite blocks, which came from the boulder bed of the ancient river running through about 7km northwest of the site. The vein quartz implements are largely small in size, while the quartzite ones are mainly large-and medium-sized. Flaking was chiefly by hammering, and the block-on-block technique was used to produce a few vein quartz flakes. The unearthed disc-shaped stone cores are great in number and typical in form, which constitutes a distinct feature. The finds belong mainly to the stone industry of North China, but the occurrence of large-sized pebble implements reflects certain kinship with southern stone tool making. The bone articles fall into scrapers, points, pointed and edged tools, and burins, with the first type coming first in number. Both the bone artifacts with traces of working and those with traces of using occurred quite frequently. A comparison in fauna indicates the date of the Lingjing site to be the earlier late Pleistocene, the absolute age of which can be inferred to about 100 ka BP.

Keywords: Lingjing Site (Xuchang Shi, Henan); lithics; microliths; Paleolithic Age.

Introduction

In 2006, archaeologists from the Henan Provincial Institute of Cultural Relics and Archaeology undertook the second field session, excavating the Lingjing Paleolithic Site. The excavation exposed 218sq m in area, yielding 5690 lithic artifacts, a few hundreds of identifiable faunal remains, over a hundred pieces of bone tools, plus over 10, 000 pieces of animal bone fragments.

The site is located in the west of the Lingjing Township, about 15km northeast of Xuchang City seat in Henan Province. The site is at an altitude of 117m above the sea level (Figure 1).

Prior to the excavations, the site had been inundated by a water pond over a long time. In April 2005, a malfunction of local coal-mining caused an underwater flood, resulting the draining of the springs including the "Lingjing (Mystical Well)". The underground water level dropped dramatically, pond waters disappeared, exposing the site to surface again since 1950s when the site was originally identified.

The excavation areas of the second session continue the west side of the 2005 excavation trench, consisting of four excavation squares each 6 x 7m (numbered as T3 to T6). Additional two excavation squares were laid out near the spring source (T7 and T8). This session excavation focused on Layers 10 and 11.

Stratigraphy and fossil fauna

The deposit layers are identified into three parts. The Upper Part is about 2.9m thick deposits of Layers 1 to 4, yielding cultural materials representing Neolithic to Shang-Zhou Bronze Age. The Middle Part consisted the Layer 5 only of 0.62–0.7m thick yellowish sandy

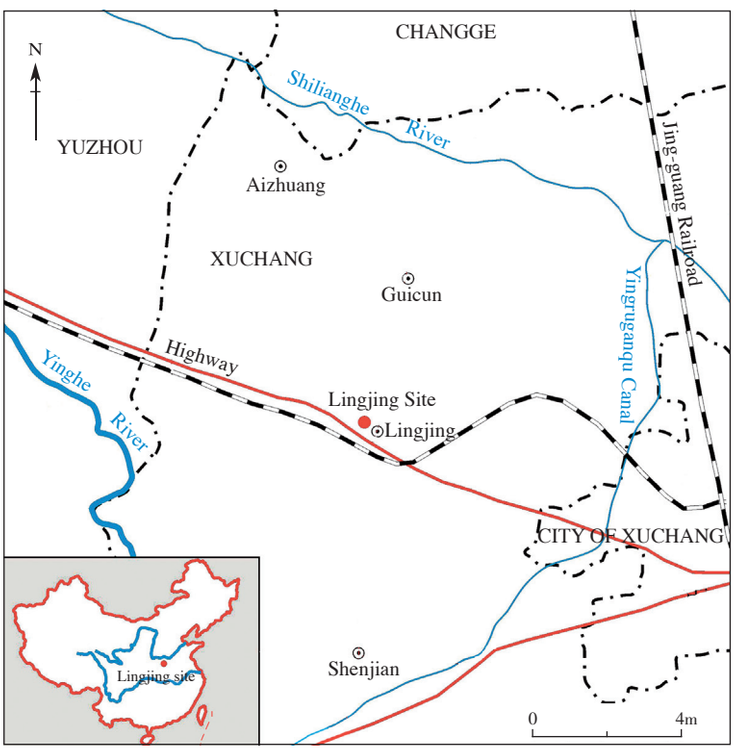

Figure 1 The location of Lingjing Site.

sediments, yielding cultural materials of carved bone, microliths, and perforated ostrich eggshells, hematite, and animal remains. The Lower Part consists of Layers 6 to 11, 5.5m thick and 9m deep from modern ground surface, was a combination of silt, travertine plates, and grayish-green lacustrine deposits, yielding a large quantity of lithic artifacts, bone tools, and animal remains from Layers 10 and 11. Especially a *Homo* human skull was recovered *in situ* from the Layer 11, which is about 9m below the surface. The stratigraphic investigation suggested that there might be unexcavated cultural deposit below the Layer 11 (Figure 2).

The identified mammal remains from the site include: *Viverra* cf. *zibetha*, *Ursus* sp., *Pachycrocuta* cf. *sinensis*, *Palaeoloxodon* sp., *Coelodonta antiquitatis*, *Dicerorhinus mercki*, *Equus caballus*, *Equus hemionus*, *Sus lydekkeri*, *Hydropotes pleistocenica*, *Megaloceros ordosianus*, *Cervus elaphus*, *Procapra przewalskii*, and *Bos primigenius*. In addition, there are two new species of Cervidae family: *Axis lingjingensis* sp. nov. and *rifurcatoceros xuchangensis* gen. et sp. nov. Including two species of rodents, there is a total of 18 species recognized from the site.

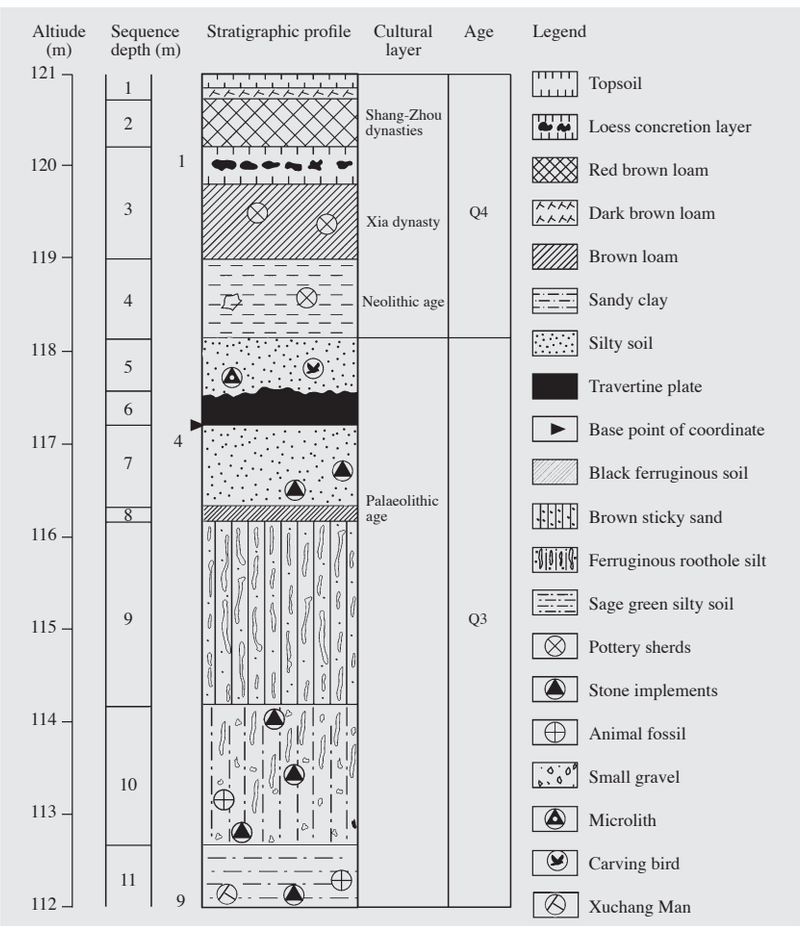

Figure 2 The stratigraphy of Lingjing Site.

Faunal assemblages and paleoenvironment

Cervus elaphus appearing in the Lingjing faunal assemblage was adaptable to forest-grassland environment, as their fossils were frequently discovered from sites within either forest or grassland settings. Ecologically, both *Viverra* cf. *zibetha* and *Ursus* sp. are more towards forest environment, whereas *Pachycrocuta* cf. *sinensis* are a type of grassland animal. The group of *Coelodonta antiquitatis*, *Dicerorhinus mercki*, *Palaeoloxodon* sp., *Sus lydekkeri* and *Megaloceros ordosianus* lived in semi-open forests, whereas *Equus caballus*, *Equus hemionus*, *Procapra przewalskii* and *Bos primigenius* also pointed to grassland environment. *Ursus* sp., *Equus hemionus* and *Cervus elaphus* are specimens popular in cold temperate zone while *Megaloceros ordosianus* and *Coelodonta antiquitatis* are that of cold zone. Therefore, faunal assemblages are indicative of open grassland plain mixed with spotty forests. It belongs to north temperate continental monsoon zone with semi-humid and semidry condition; the annual precipitation is similar to that today.

According to the faunal assemblage, it is assumed that the period of Lingjing occupations were likely warm and moist. Lake waters in the grassland and nearby forests on hilly setting provide idea environment for animal living; especially local springs provide water sources for both human and animals. In addition, the site yielded a few samples of marine animals, suggesting that Lingjing humans relied on not only hunting animals, but also possible fishing.

Stone and bone artifacts

1. Stone artifacts. 5690 pieces in total, characterized as follows (Figures 3–20).

1) Stone tools were primarily made of small cream-white vein quartz pebbles and relative large quartzite nodules. Quartz materials were accounted for 97%, while quartzite was taken up only 3% in raw material types. Finely-made tools were made of quartz. Only choppers were found on quartzite, but the quantity is very low. The sources of the raw materials probably came from ancient riverbed about 7km away northwest of the site.

2) The types of stone tools include hammer-stone, anvil-stone, cores, flakes, chunks, and debris. Tools made of vein quartz are small in size, while

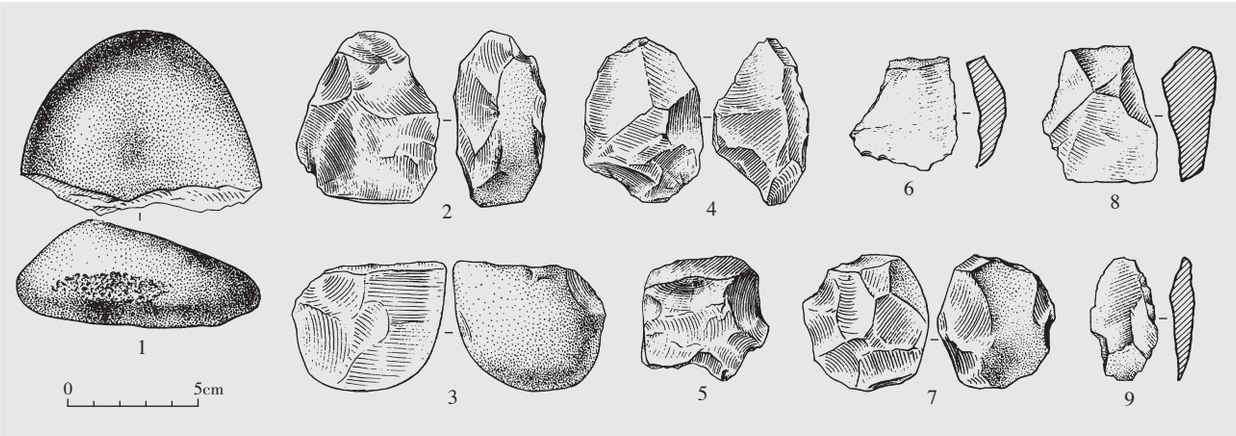

Figure 3 The unearthed stone implements.
1. hammer (6L1674) 2. double-platform core (6L1777) 3. single-platform core (6L2045) 4. disc-shaped core (6L1663) 5. double-platform core (6L1462) 6. flake (6L1767) 7. disc-shaped core (6L1430) 8 and 9. flakes (6L1964 and 6L1897)

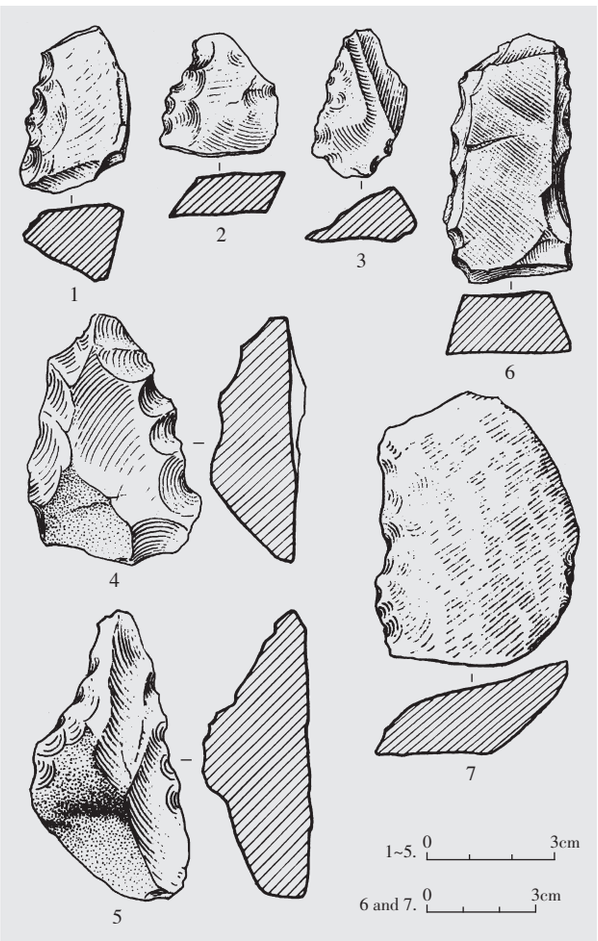

Figure 4 The unearthed stone implements.
1–4. single side scrapers (6L1413, 6L285, 6L1648 and 6L1449) 5 and 6. double side scrapers (6L292 and 6L1466) 7. single side scraper (6L1629)

Figure 5 Stone hammer (6L499).

Figure 6 Stone anvil (6L1653).

Figure 7 Stone single-platform core (6L770).

Figure 8 Stone double-platform core (6L1777, Obverse and Side).

Figure 9 Stone multi-platform core (6L1237).

Figure 10 Stone disc-shaped core (6L1533, obverse and reverse).

Figure 11 Stone flake (6L1767).

Figure 12 Stone flake (6L1968).

Figure 13 Stone single side scraper (6L1648, obverse and reverse).

Figure 14 Stone single side scraper (6L285).

Figure 15 Stone double side scraper (6L1466).

Figure 16 Stone single side burin (6L681).

Figure 17 Stone double side burin (6L1382).

Figure 18 Stone linear point (6L286).

Figure 19 Stone linear point (6L1557).

Figure 20 Stone angle point (6L430).

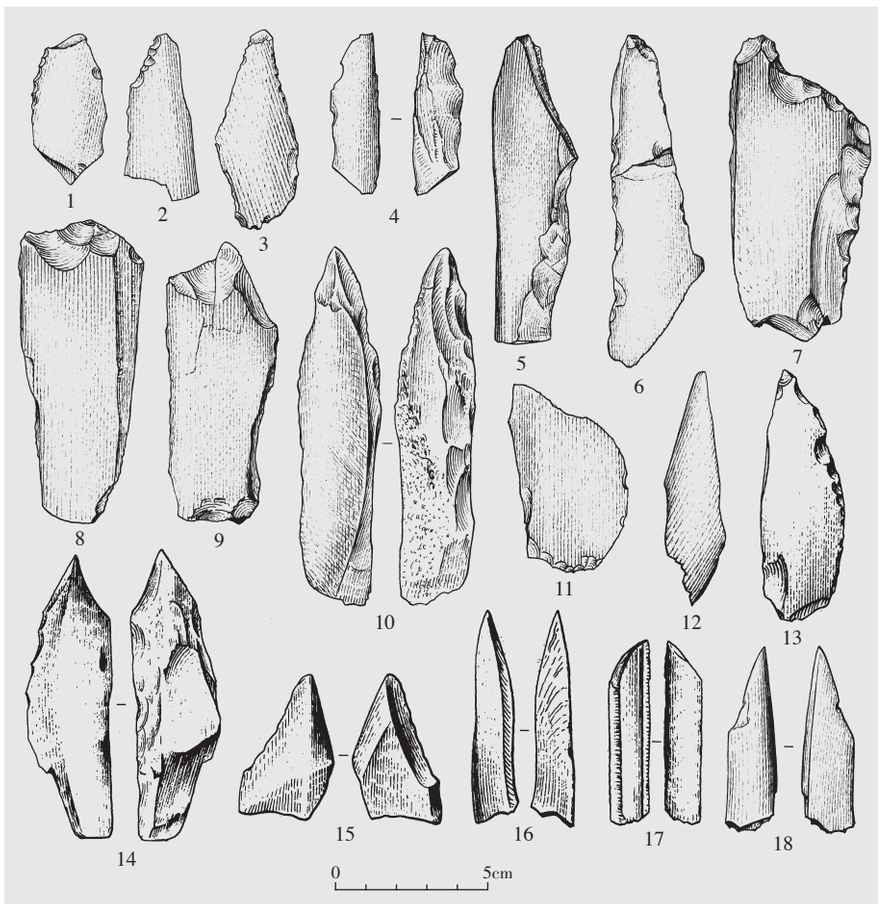

Figure 21 The unearthed bone implements.
1–5. single side scrapers (6L773, 6L1768, 6L1548, 6L2033 and 6L1474) 6 and 7. double side scrapers (6L1746 and 6L1013) 8. end scraper (6L1907) 9 and 10. points (6L1775 and 6L1464) 11. end scraper (6L1521) 12. point (6L771) 13. touched point tool (6L2095) 14. double side burin (6L1494) 15. used point Ttool (6L774) 16. double side burin (6L1900) 17. single side burin (6L1892) 18. point (6L1465)

those made of quartzite were relatively large.

3) A few flakes and tools bear use-wears. A large amount of debris and chunks suggest the site was primarily functioned as a manufacturing camp of making and use of stone tools. Majority of lithic artifact does not display weathering and abrasion, therefore they should be buried *in situ* in primary context (of course, this does not exclude that the ones found in the lacustrine deposits were transported in short distance by underground water).

4) The flaking method was predominated by freehand percussion, while a few quartz tools were produced by bipolar percussion. There are more incomplete flakes among quartz tools than complete, suggesting the fragile nature of raw material.

5) Tool blanks consist mainly of flakes and chunks, accounting for 70.6% of all tools. Complete flake tools were less frequent, and the shapes of tools tend to irregular.

6) The lithic assemblage is predominately by scrapers made of vein quartz, while the choppers were made of quartzite.

7) Stone tools were

produced by free-hand percussion. A majority of tools were retouched from the dorsal side, where a proportion of the tools were also retouched from the ventral side. Alternative retouch appears but in low frequency. A few specimens were made finely, while some were made coarsely. Some of tools were made with application of pecking retouch, which is the earliest known application of this technique in China, indicating that Lingjing lithic industry reached a relatively high level.

8) Disc-shaped core is a characteristic of the Lingjing lithic industry.

9) The existence of bolas provides comparative data with those in other Middle Paleolithic site in northern China. Large pebble-stone tools that appeared in at Lingjing also reflect its relationship with the Pebble-Core Tool Industry of South China. It suggested that Lingjing lithic assemblage is characterized by North China lithic industry, while its pebble-choppers attest the elements of South China lithic industry.

2. Bone tools. 113 pieces in total, predominated by scrapers, followed by points, burins and dual-pointed tools. Consistent with stone tools, bone tools were also produced through freehand percussion. Followings are the summary of the characteristics of the Lingjing bone assemblage (Figures 21–31).

1) Bone tools were classified into four types: scrapers, points, dual-pointed tools, and burins. Among this, the scraper, 63 in total, is the predominant type, accounting for 56% of the total bone tools. The next frequent types in number are points, burins, and dual-pointed tools, in decreased order. Compared to other Paleolithic sites in China, the quantity of bone tools at Lingjing is the highest occurrence so far. In addition, the manufacturing

Figure 22 Bone single side scraper (6L1548, obverse and reverse).

Figure 23 Bone single side scraper (6L2033).

Figure 24 Bone double side scraper (6L1013).

Figure 25 Bone end scraper (6L1521, obverse and reverse).

Figure 26 Bone end scraper (6L1907).

Figure 27 Bone point (6L771, obverse and reverse).

Figure 28 Bone point (6L1775, obverse and reverse).

Figure 29 Bone touched point tool (6L2095, obverse and reverse).

Figure 30 Bone single side burin (6L1892, obverse and reverse).

Figure 31 Bone double side burin (6L1900, obverse and reverse).

technique is the most advanced, similar to microblade production. This provides a firm foundation for future systematic research on bone tool industry.

2) Most bone tools were made of limb bones from large herbivores.

3) The manufacture techniques of these bone tools were through freehand percussion, which is similar to those of stone tool making. However, retouching points were made through different orientations, showing more flexibility than the latter.

4) In general, most pieces were retouched at the butts of the tools.

5) Except a few specimens with surface abrasions, most of the bone tools remain edge sharpness, reflecting the nature of lacustrine or shallow-shore lacustrine deposit process.

6) There are also a number of used bone tools, in additional to abundant touched bone tools. Whether or not making and use of bone tools indicate the transformation of tool-use patterning is an interesting research topic for the future.

The nature and date of the site

1. The site formation of the Lingjing Site is of typical lacustrine and shore lacustrine deposits transforming into terrestrial deposits. Climatically, it experienced the transformation from arid to humid intervals.

The burying of cultural remains at the site has two types. Shore lacustrine deposits resulted short distance transportation of artifacts, but in general it is still primary contact formation. In lacustrine deposits the artificial remains did not show a general pattern but only reflected the hydraulic movement of burying materials or similar forces.

The site near spring sources and lakes is probably functioned as a camp where people made stone and bone tools for hunting, meat processes, and hide processes. It differentiated from residential camps. So far the excavation only reveal the area that is probably close to the north side of the lake, while materials from the south side of the lake is not clear.

2. The Lingjing Site is an open-air site centered by the spring sources. Separated by the travertine layer, the above was the deposits belonging to the Neolithic through Bronze Ages. Below the Neolithic layers, there is a pure sandy silt deposit, yielding microblade remains. Underneath the travertine layer is the deposit yielding a large amount of faunal remains and lithic artifacts. According to the faunal remains including those extinct species, the date of the site should be associated with the Middle Paleolithic. It corresponds to North China loess deposit of S1 (palaeosoil, dating 128, 000–75, 000 BP). The bottom of Loess S1 is considered as the boundary of the Middle and Late Pleistocene.

There is eight extinct species among the Lingjing faunal assemblage, accounting for 44% of total faunal remains. A majority of faunal remains belong typically to the Late Pleistocene faunal assemblage, although it include some relatively older species like *Dicerorhinus mercki* as well as other species indicative typical animals of the Middle Pleistocene. Therefore the author believes that the faunal assemblage is suggestive of the early Late Pleistocene.

In 2008, Professor Zhou Liping from Peking University applied the Optically Stimulated Luminescence (OSL) dating technique to samples taken from Layers 11 and 12, and the results show their ages fall in 100, 000–80, 000 BP.

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Postscript

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