3 RE-EVALUATION OF MICROBLADE INDUSTRIES AND THE FENGHUANGLING CULTURAL COMPLEX IN SHANDONG PENINSULA, NORTHERN CHINA

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INTRODUCTION

The significance of studying microblade technology in northern China lies in the interrelationship of Late Pleistocene hunter-gatherers in northeastern Asia and northwestern America. Microblade technology is considered to be of compelling evidence for the peopling of the New World (West 1996a; Madsen 2004). From a regional perspective, the microblade technique reveals technological innovation or diffusion that illustrates the development of human adaptation in these cultural regions. However, where exactly this particular technology of making composite hunting tools originated in northeastern Asia is still open to question. Vast data of microblade assemblages have been accumulated over the past decades in northeastern Asia. These may allow us to understand technological variability during the Late Pleistocene in these regions, but first we have to clearly demonstrate these regional variations. This study will thus focus on microblade industries from one of these cultural regions – the Shandong Peninsula of eastern China (Figure 3.1).

Microblades, as a truly compositional tool type, appeared in Chinese archaeological assemblages at the end of the Late Pleistocene, as a result of sudden technological innovation and/or adaptation. Microblade remains in China first came to light when foreign explorations in the northwestern steppe areas took place at the beginning of the last century (Andersson 1923, 1945; Boule *et al.* 1928; Teilhard de Chardin and Pei 1944; Teilhard de Chardin and Yang 1932). Microblade remains recovered from scientific excavations in the 1930s were primarily associated with Neolithic materials in northern China (Liang 1959a, 1959b). Not until the 1970s were microblade materials from Late Pleistocene deposits recognized in northern China (Jia *et al.* 1972; Gai 1985). Over the last four decades, archaeological sites with microblade assemblages were identified in most parts of China, concentrated in three macro-regions: central-northern China, the northeastern and northern steppe, and southern and southwestern China (for syntheses, see An 2000; Chen 1984; Gai 1985; Lu 1998). A general survey of some of these discoveries is offered by Chen Chun in this volume.

Research on microblade assemblages with a Late Pleistocene archaeological context did not start until the late 1970s, when the Xiachuan site of southern Shanxi Province and the Hutouliang site of Hebei Province were excavated revealing substantial microblade remains (Gai 1985; Gai and Wei 1977; Wang *et al.* 1978). An Zhimin's study of the Haila'er assemblages established for the first time a framework for the study of Chinese microblade materials, providing a foundation for understanding the temporal and spatial distribution of microblade data accumulated in the years that followed (An 1978).

During the 1980s, new approaches were taken by researches studying Chinese microblade industries. From a technological-typological approach, Tang and Gai (1986) applied the methods developed in studies of Japanese microblades to analyses of the Hutouliang assemblages from the Nihewan Basin of northern China. They identified four microblade techniques representing

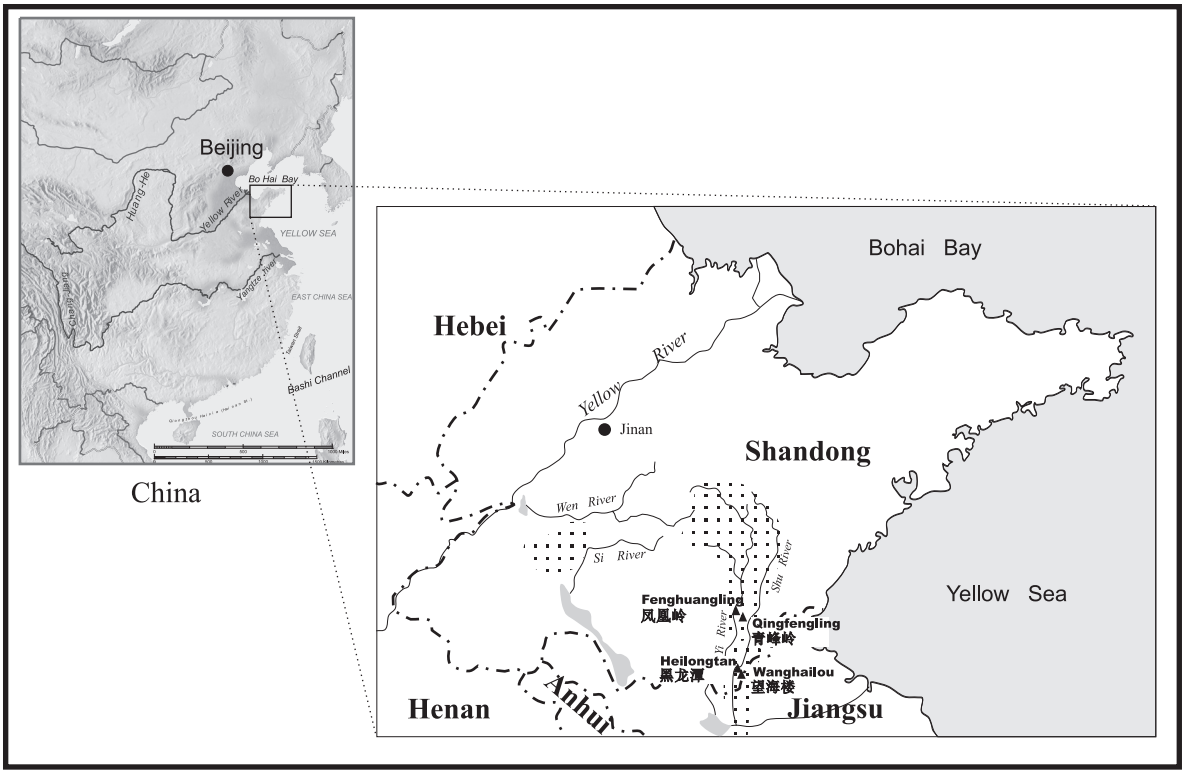

Figure 3.1: The study region showing the Shandong archaeological sites mentioned in the text.

northern Chinese industries: Yangyuan (or Togeshita), Sanggan (or Oshorokko), Hetao (or Yubetsu), and Xiachuan (or Saikai). Chen and Wang (1989) recognized technological differences in the manufacture of microblades between the Xiachuan site and the Xueguan site, suggesting that the Xiachuan industry is represented by conical microblade cores while the Xueguan microblade industry is dominated by boat-shaped and wedge-shaped cores. They further proposed that both the Xueguan and the Hutouliang techniques were developed directly from the Xiachuan technology. While Tang and Gai's (1986) study for the first time established a microblade technological link between northern China and Japan, Chen and his colleagues further examined these materials (especially from Xiachuan and Xueguan) in comparison with microblade technology from northwestern America (Chen and Wang 1989; Chen 1983, 1994, this volume).

Late in the last century, a number of important microblade sites were recovered with controlled excavations in northern China. Some important sites include Dingcun locality 77:01 (Wang 1986; Wang *et al.* 1994), Shizitan (Shanxi Sheng Linfen Xingshu Wenhuaju 1989), Youfang (Xie and Cheng 1989), and Jiqitan (Institute of Cultural Relics 1993). Among these discoveries (also see Chun Chen, this volume), a cluster of microblade assemblages were identified in the Shandong Peninsula, which are the subject of this paper. These archaeological findings provide a clear understanding of the spatial distribution of microblade technology along the middle to lower valleys of the Yellow River and its tributaries. These data, alongside limited radiocarbon dates, preliminarily established a chronology of microblade industries in northern China, although the dates of these sites need to be verified in future detailed studies. Compared to north-central China, the northern steppe and southwestern China have also yielded substantial data, but less study has been carried out in these regions. Based on these discoveries, Lu (1998) provided an updated summary of their chronological development within the above-mentioned three macro-regions in relation to Neolithic development. However, although regional traditions have been studied

within the local context, microblade technology in China is still poorly understood in terms of its origins and spread throughout northeastern Asia (Shen 2004).

As far as the origins and spread of microblades in northern China are concerned, most Chinese scholars tend to favour a "north China origin" model (Jia *et al.* 1972; Gai 1985; An 2000; Xie 2000). Data from the regions clearly indicate technological similarities between northern China to those assemblages from Eastern Siberia, Japan, and Korea, and even to those from northwestern North America. Recently, Xie (2000) proposed that microblades in China originated in the middle Yellow River region (e.g., Xiachuan or Dingcun 77:01) and then spread eastward to the Korean Peninsula along a northern route and to the east coast of China along a southern route. This hypothesis has not been tested against data from each of the five microblade zones that Xie defines. However, Xie's (2000) study at least reflects the general agreement that China's east coast, especially the Shandong Peninsula, is the important geographic area for transmitting microblade technology across East Asia.

It must be noted, however, that today our best knowledge of Chinese microblades derives primarily from only a few well-known sites in the middle Yellow River, such as Xiachuan, Xueguan, and Hutouliang. These sites are among the few that have yielded microblade assemblages from scientific excavations. Evidence from other excavated sites like Shizitan, Dingcun 77:01, Youfang, and Jiqitan, has merit to challenge traditional views on microblade technological development in northern China, but unfortunately materials from these sites have not been systematically studied yet (Shen 2004). The same holds true for materials from the Shandong Peninsula. Thus, a new examination of microblade materials from Shandong is much needed.

SHANDONG MICROBLADES AND THE CONCEPT OF THE FENGHUANGLING CULTURE

Microblades first came to light in Shandong during an archaeological salvage investigation in the suburban area of Linyi City in 1982, when microblade artifacts were found in the backfill of Han Dynasty tombs. This led to the identification of the first microblade site in Shandong at a mound called Fenghuangling (literally "Phoenix Hill"). The site was subsequently excavated by archaeologists from the Institute of Archaeology, Chinese Academy of Social Sciences (CASS). Situated 5 km east of the Yi River, the site yielded hundreds of microblades from a Late Pleistocene loess deposit (Linyi Diqu Wenwu Guanli Weiyuanhui 1983). In the following year, a series of surveys was carried out in adjacent areas, focusing on the recovery of more microblade sites. As a result, 13 localities were identified as archaeological sites with microblade remains (Luan 1996:29). Two of these sites, Qingfengling in Linyi County and Heilongtan in Tancheng County, were excavated in 1984 (Han 1985a, 1985b; Linyi Diqu Wenwu Guanli Weiyuanhui 1983; Linyi Diqu Wenwu Guanli Weiyuanhui and Tancheng Xian Tushuguan 1986). The lithic artifacts which were excavated and collected from these sites clearly demonstrate a microblade context. These discoveries triggered subsequent surveys in southern Shandong, and by the early 1990s, archaeological surveys had discovered more than 100 sites or localities that were claimed to be microblade sites. Based on these discoveries, a concept, the "Fenghuangling Culture" complex, as a distinct culture of the Late Palaeolithic, was proposed to define the cultural affiliation of these newly discovered lithic assemblages in Shandong (Gao and Shao 1984; Luan 1996:29–31; Zhongguo Sehui Kexue Yuan Kaogu Yanjue Suo 1993; Xu 1999a, 1999b).

In previous studies, the proposed "Fenghuangling Culture" included almost all the archaeological sites dated to the end of the Pleistocene, regardless of whether or not they contain microblade assemblages. According to Luan (1996), these Palaeolithic sites are concentrated in three areas: the Wen and Si River valleys in central Shandong, the middle and lower courses of the Yi and Shu rivers, and the Malingshan Mountains area in southern Shandong. Recently, Xu (1999b) has suggested that the Fenghuangling complex is represented by 100 assemblages from the Yi and Shu River valleys (including the Mt. Malingshan area). Most of these sites are located on alluvial plains and in hilly

areas. The lithic assemblages from Fenghuangling are represented by microblade cores, microblades, and small flake tools including scrapers, drills, and perforators, as well as utilized flakes. Large flakes and tools are rarely found. It was especially noted that, unlike other places of northern China, ground stones or pottery were not associated with microblades. The dates were estimated primarily based on the geological formation of Quaternary loess sediments pointing to Late Pleistocene deposition. Raw materials are predominantly chert and quartz, with low frequencies of agate, crystal, and sandstone. These previous studies suggest that the "Fenghuangling Culture" represents a hunting-gathering-fishing economy that existed probably at the end of the Pleistocene and the beginning of the Holocene in the region.

RESEARCH PROBLEMS

The above generalization of the Fenghuangling culture was based on very limited observations derived from archaeological surveys of site distribution. No detailed studies of cultural materials from excavated sites had been conducted. However, the materials available to date provide us with a sketchy outline of what is known and what needs to be known about lithic industries of the Palaeolithic in Shandong (Shen 2005; Shen *et al.* 2003).

First, while the overall pattern of Palaeolithic occupation in Shandong is not clear yet, results from archaeological surveys point to a sudden cultural change in the region at least during the Late Pleistocene. An increased number of archaeological sites emerged; however, the nature of these sites is not clearly defined and their spatial distribution is still poorly understood. Survey data suggests that most of the artifacts were not collected in primary context. In particular, previous studies on the Fenghuangling complex have not clearly discriminated microblade assemblages from non-microblade assemblages. Clearly, there are sites without any microblade elements within these temporal and spatial ranges, but the relationship between sites with a microblade context and those without one have not been explored yet.

Second, the dating of the Shandong microblade industries is also problematic. Like many of the other sites with microblade assemblages in northern China, none of these Shandong assemblages has been radiocarbon dated. The chronology was roughly estimated based on biostratigraphy and geological formations, which fall within a time range of the Late Pleistocene. We do not in fact know when exactly these people began to develop the microblade technique in Shandong, and under what circumstances (ecologically or culturally) microblade industries were introduced to Shandong: was it diffusion or migration?

Third, lithic artifacts from excavated sites have so far not been studied in detail. What is unfortunate is that some of the lithic artifacts may have been wrongly classified in the previous survey reports. Lithics (microblades and non-microblades) from both collected and excavated contexts at the Palaeolithic sites are abundant enough to enable us to do a thorough examination of lithic technology, but we cannot understand the specific manufacturing techniques and functions of these microblade tools until qualitative and quantitative analyses are carried out. The techniques of the Shandong microblades and the extent to which they are similar to their counterparts from surrounding regions (for example, Shanxi, Hebei, and Inner Mongolia) need to be investigated.

COLLABORATIVE RESEARCH AND 2001 FIELDWORK

These research problems justify the need for a systematic study of the Shandong Palaeolithic. It is clear that Shandong offers a great opportunity for a long-term project with promising goals of understanding microblade technology and human behaviour. In 2000, a collaborative research project was launched between the Institute of Archaeology (CASS) and the Royal Ontario Museum of Canada, with the assistance of Shandong University. This long-term research program aims to investigate the origin and development of microblade industries in Shandong. As for its initial stage, this study would focus on examining the lithic technology of microblade techniques in stratigraphic context. Our specific objectives are to investigate the nature and distribution of Palaeolithic sites by conducting archaeological surveys, especially in the middle Yi-Shu Valley and in the Wen-Si

Valley, and to understand lithic technology in general, and microblade techniques in particular, of the Palaeolithic in the study regions by conducting a detailed analysis of lithic artifacts from previously excavated materials. In addition, field investigation was carried out to obtain suitable samples for AMS ^{14}C dating and/or other archaeometric methods in order to establish the absolute chronological timeframe of the Palaeolithic in the study region (Shen *et al.* 2003).

In 2001 a small scale excavation was carried out at the Heilongtan site. This site, located 4 km east of the Shu River on a hilly slope of the west side of Malingshan Ridge on a north-south stretch, was first excavated in the fall of 1984. At the beginning of our investigation, I noticed that lithic materials from the Heilongtan site display a great deal of technological distinction from the other two excavated sites, Fenghuangling and Qingfengling, located about 50 km to the north in the middle of the Yi-Shu River valley. In addition, the site's topographic features might have caused a series of secondary deposits at the site, which would result in some complication or difficulties in defining the nature of the microblade context at this particular site. Therefore, the test excavation had two purposes: firstly, to clarify the depositional processes of the Palaeolithic remains at the site, and secondly, to obtain suitable samples for AMS radiocarbon dating.

The 2001 excavation exposed three 2 by 2 m squares, along a hilly slope. Consistent with the 1984 excavation, three depositional layers contained archaeological materials. However, sediment deposition as well as the artifact distribution observed in the three stratigraphic layers appear to indicate that only the lowest cultural layer (layer 4) is likely to be in primary context, where a large number of artifacts were densely distributed *in situ* (Figure 3.2). Artifacts from layers 2 and 3 are rare and scattered in fluvial sediments. These materials were probably eroded from upland of the site, transported, and re-deposited at the current places at a much later time in prehistory. It may indicate that the artifacts from the two layers probably belong to either the same period of the site represented by layer 4, or derive from an unknown site further upland. Therefore, this fieldwork season suggested that the three cultural layers identified during the early excavation are not indicative of chronological differences, but of secondary versus primary deposits only.

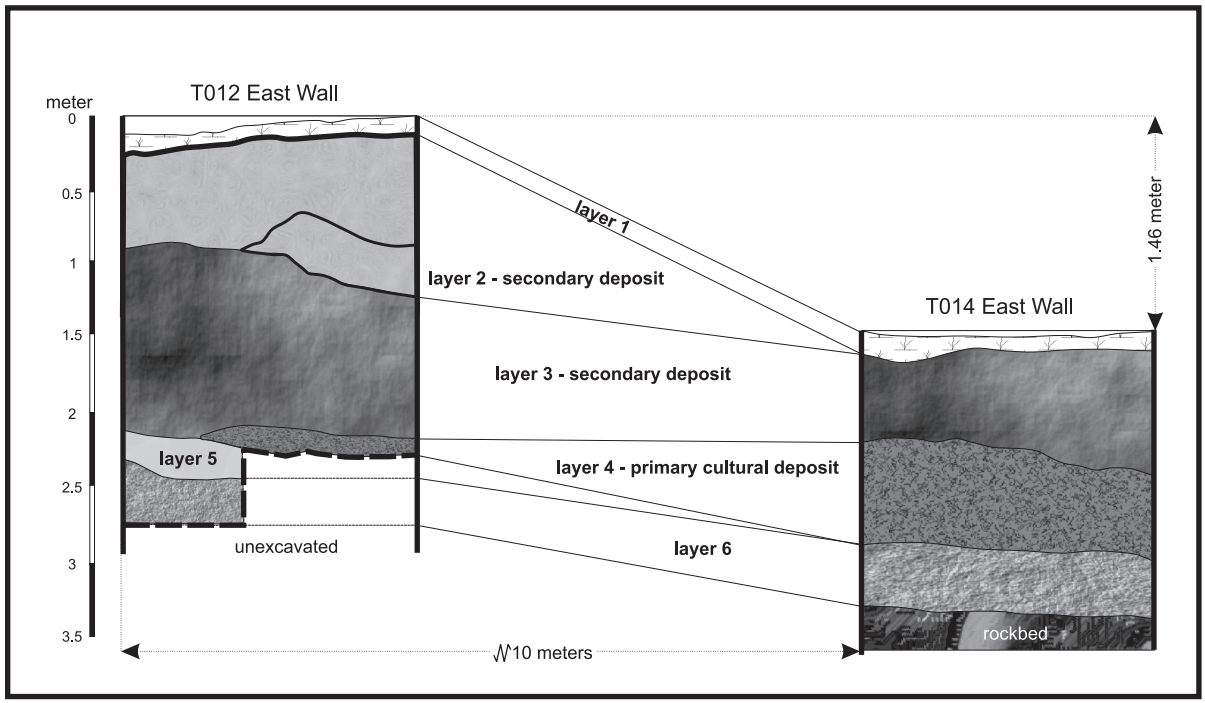

Figure 3.2: Stratigraphic profiles of the Heilongtan 2001 excavation.

Most importantly, the 2001 excavation revealed that the lithic assemblage from Heilongtan is distinct typologically and technologically, suggesting a possibly different cultural context from that represented by Fenghuangling and Qingfengling. The following section will provide more details on this matter.

The 2001 fieldwork also included a small test excavation at the Wanghailou site, which is located on a hilltop (the peak is called Wanghailou), about 1.5 km southeast of Heilongtan. This site was first identified during the 1984 survey, and more than 1000 lithic artifacts, among which are microblade cores and flake tools, were collected. The lithic assemblage is representative of a microblade context in terms of its quality and quantity; much small debitage and debris was collected as well. The stratigraphic provenience of the artifacts was unknown at the time of collection. During the 2001 excavation at Heilongtan, our field crew also conducted another survey at Wanghailou, and recovered a large number of lithic artifacts. The survey confirms that lithic artifacts, collected primarily from gullies, were eroded from loess deposits about 0.5–1 m deep on the hilltop surface. Most of these surfaces were eroded completely to the bedrock, and thus the original context of the artifacts is not well known.

However, it is fortunate that during the 2001 survey at the site, one original deposit with a Palaeolithic context on the hilltop was identified, and our team immediately carried out a test excavation at the edge of this location. This place was not eroded because of a historical structure in place since about the 7th century AD (Tang Dynasty); a shrine was built here for local ancestor worship. According to local elders, the historic structure was destroyed in the 1950s, and now the site is a crop field, where historical remains, such as Tang (AD 618–907) and Song (AD 960–1279) dynasties porcelain sherds and coins, were found. One 1 by 3 m test square revealed that the Palaeolithic deposit was located beneath a 30–50 cm thick historical deposit. A half dozen microblade cores and a few microblades were found *in situ* in the Palaeolithic deposit. As a result of this field investigation, the primary context for over 1000 lithic artifacts collected previously has been identified. Thus, analyses of the Wanghailou lithic assemblage now has the same contextual significance as that of the three other excavated sites. Therefore, in this article, I present the analysis of four lithic assemblages from these sites that have so far been excavated in Shandong.

LITHIC ASSEMBLAGES

Fenghuangling

The Fenghuangling site is the first microblade site found in Shandong, thus the site name is used for representing this new cultural manifestation – the Fenghuangling culture complex. The site is near Linyi City in the southern part of the province, on an earth mound, originally about 10–20 m high. After the 1982 excavation, the mound was removed completely because of railway construction nearby, thus the site no longer exists today.

The 1982 excavation exposed a more than 400 m^2 area. It is a multi-component site with deposits as deep as 7 m. Over 1700 lithic artifacts were recovered (Table 3.1). Among these, over half are debitage flakes, while modified or shaped tools account for 10% of the total. Products of the microblade technique, such as microblade cores, microblades, and microblade rejuvenation flakes, represent a substantial percentage of the assemblage. Wedge-shaped cores comprise one third of the microblade core component at the site. It should be noted that bifacial production was also a major reduction method, as bifacial products are also dominant, evident from the large quantity of bifacial thinning flakes present. Other tools made on flake blanks include scrapers and drills as well as modified flakes (Shen 2005:8–9; Figure 3.3).

Qingfengling

Qingfengling is located about 5.5 km north of the Fenghuangling site. It is situated on a hilly slope, at an elevation of about 65–70 m above sea level. The site was excavated in the early summer of 1984, exposing an area of 112 m^2 and yielding over 3000 lithic artifacts. The site is well preserved today as the deposit is deep (Shen 2005:9–11).

Production of microblades at this site is even more obvious than at the Fenghuangling site. Typical microblade cores and microblades are predominant (Table 3.1). One quarter of microblade cores are classified as wedge-shaped cores (Figure 3.4). Backed microblades are also found, although in

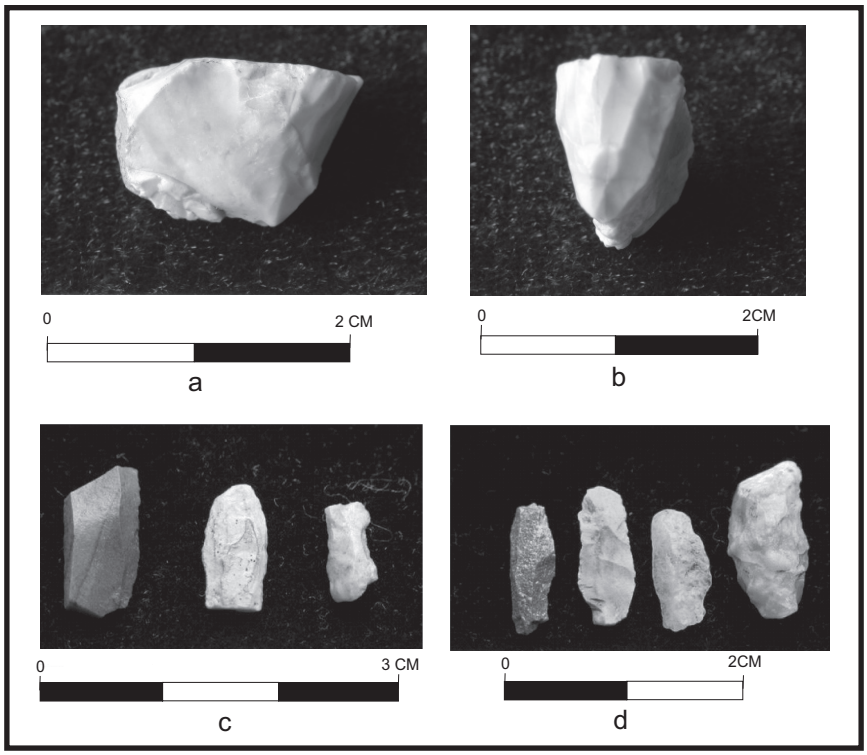

Figure 3.3: Microblade artifacts from the Fenghuangling site.
a and b: microblade cores; c and d: microblades.

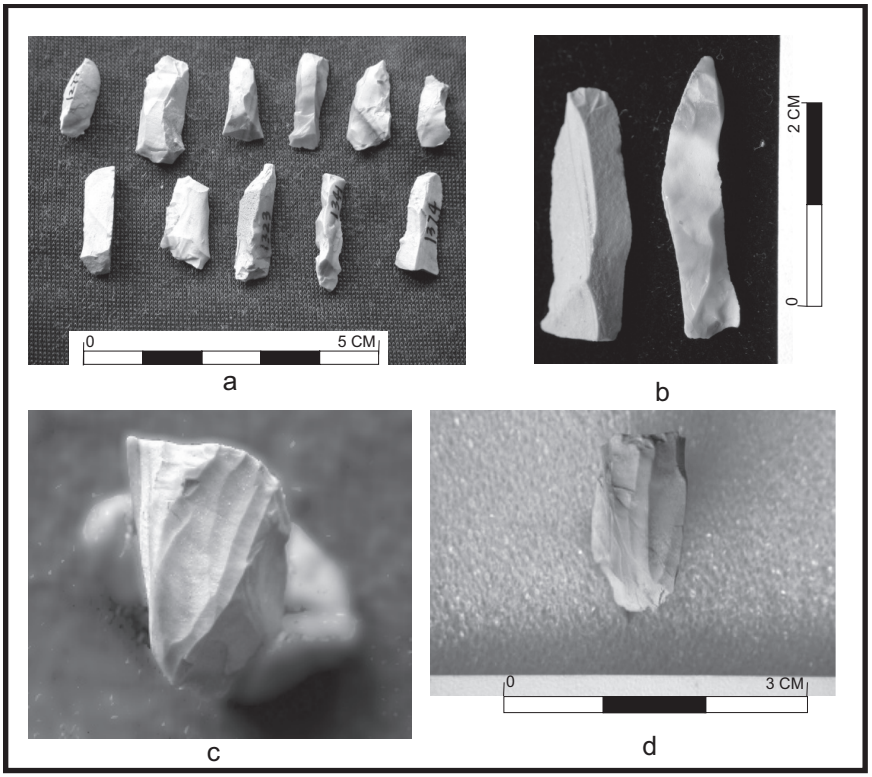

Figure 3.4: Microblade artifacts from the Qingfengling site.
a and b: microblades; c and d: microblade cores.

Table 3.1: Lithic assemblages of the Fenghuangling, Qinfengling, Wanghailou, and Heilongtan sites in Shandong.

		Fenghuangling		Qingfengling		Wanghailou		Heilongtan	
Class	**Types**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Nodule									
	Nodule	0	0.0%	0	0.0%	1	0.1%	24	1.6%
subtotal		0	0.0%	0	0.0%	1	0.1%	24	1.6%
Cores									
	Core	10	0.6%	7	0.2%	8	0.5%	73	5.0%
	Core fragment	21	1.2%	16	0.5%	32	1.9%	71	4.9%
	Microblade core	84	4.8%	152	4.8%	68	4.1%	35	2.4%
subtotal		115	6.5%	175	5.5%	108	6.5%	179	12.2%
Formal Types									
	Backed microblade	0	0.0%	2	0.1%	8	0.5%	0	0.0%
	Biface	17	1.0%	28	0.9%	40	2.4%	11	0.8%
	Biface preform	0	0.0%	0	0.0%	24	1.4%	2	0.1%
	Burin	0	0.0%	0	0.0%	2	0.1%	0	0.0%
	Chopper	0	0.0%	0	0.0%	0	0.0%	1	0.1%
	Drill	7	0.4%	1	0.0%	2	0.1%	0	0.0%
	Microblade	92	5.2%	417	13.1%	95	5.7%	7	0.5%
	Modified flake	24	1.4%	41	1.3%	74	4.4%	50	3.4%
	Notch	0	0.0%	0	0.0%	0	0.0%	1	0.1%
	Point	2	0.1%	19	0.6%	6	0.4%	4	0.3%
	Perforator	0	0.0%	0	0.0%	5	0.3%	1	0.1%
	Scraper	15	0.9%	20	0.6%	27	1.6%	16	1.1%
	Uniface	3	0.2%	2	0.1%	5	0.3%	0	0.0%
subtotal		160	9.1%	530	16.7%	288	17.2%	93	6.4%
Debitage									
	Biface split	2	0.1%	0	0.0%	6	0.4%	0	0.0%
	Blade	15	0.9%	58	1.8%	37	2.2%	7	0.5%
	Flake	279	15.9%	453	14.3%	361	21.6%	377	25.8%
	Flake, bifacial thinning	532	30.3%	644	20.3%	245	14.7%	28	1.9%
	Flake, core trimming	21	1.2%	45	1.4%	72	4.3%	1	0.1%
	Flake, microblade	6	0.3%	65	2.0%	8	0.5%	1	0.1%
	Flake, primary	23	1.3%	31	1.0%	7	0.4%	33	2.3%
subtotal		878	49.9%	1296	40.8%	736	44.1%	447	30.6%
Flaking Debris									
	Chip	336	19.1%	863	27.2%	202	12.1%	159	10.9%
	Chunk	269	15.3%	309	9.7%	335	20.1%	561	38.3%
subtotal		605	34.4%	1172	36.9%	537	32.2%	720	49.2%
Grand Total		**1758**	**100%**	**3173**	**100%**	**1670**	**100%**	**1463**	**100%**

very low numbers. Similar to the Fenghuangling site, bifacial thinning flakes are a major component of the debitage, indicative of bifacial production at the site. Other flake tools include scrapers, points, and drills, as well as modified flakes.

Wanghailou

This site is located on a hilltop of Malingshan Mountain, near the border of Shandong and Jiangsu provinces, about 67.5 km south of the Fenghuangling site. Wanghailou was first identified during the 1984 survey, and more than 1000 lithic artifacts, including a large number of microblade cores and flake tools, were collected. Our survey in 2001 identified primary Palaeolithic deposits at the site, from which we recovered a half dozen microblade cores and a few microblades *in situ*.

In all, 1670 pieces, including 143 pieces from the 2001 excavation, were catalogued. The results show

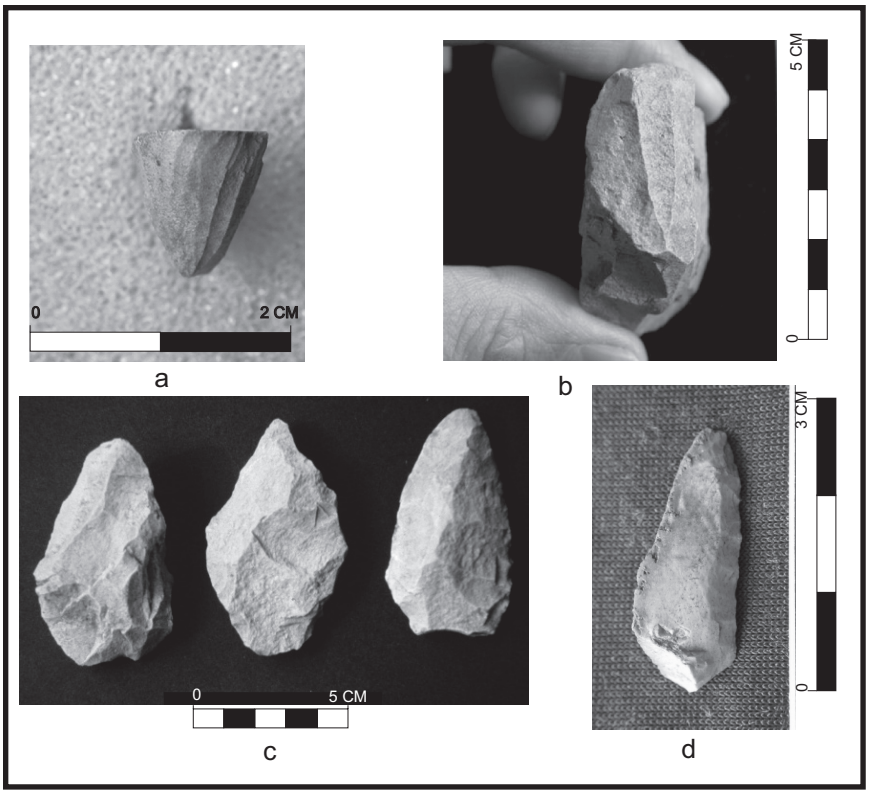

Figure 3.5: Artifacts from the Wanghailou site.
a and b: microblade cores; c: bifaces; d: point on flake.

that while microblade products are still very numerous (Table 3.1), there are also bifacial tools and by-products as well as flake tools and debitage flakes from flake-core reduction. Large bifacial tools are distinctive in terms of their manufacture and function in the region (Shen 2005:11–13; Figure 3.5).

Heilongtan

The last site examined was Heilongtan. This site was first excavated in the fall of 1984, exposing an area of 224 m^2, recovering more than 600 lithic artifacts and a large number of faunal remains. The 2001 excavation exposed three 4 m^2 pits, and an additional 735 lithic artifacts and more than 200 faunal remains were recovered. A total of 1488 artifacts were examined (Table 3.1).

The recent field investigation firmly suggests that the microblade artifacts found in the earlier excavation had probably eroded from an upland site like Wanghailou (see above). Thirty-three classified microblade cores were all surface collected in 1984, except for three from the 2001 season. Five of the seven microblades were surface collected in 1984, while the other two pieces were recovered from the layer of the 2001 excavation unit (secondary deposits). Typologically, the Heilongtan assemblage is dominated by flake core products, such as modified flakes and flake blanks (Shen 2005:13–14; Table 3.1, Figure 3.6).

TECHNOLOGICAL-TYPOLOGICAL COMPARISONS

Cores

Within the three categories of cores – flake cores, microblade cores, and core fragments, it is now clear that the microblade cores from Heilongtan appear to be of surface context. Both the Fenghuangling and Qingfengling core assemblages contain the highest frequencies of microblade cores with up to 80% (Figure 3.7). Both the Wanghailou and Heilongtan sites have a relatively high frequency of core fragments, i.e., between 30–40% of the core assemblages. It is now obvious that the Heilongtan site has the highest occurrence of flake cores (over 40%). It is worth noting

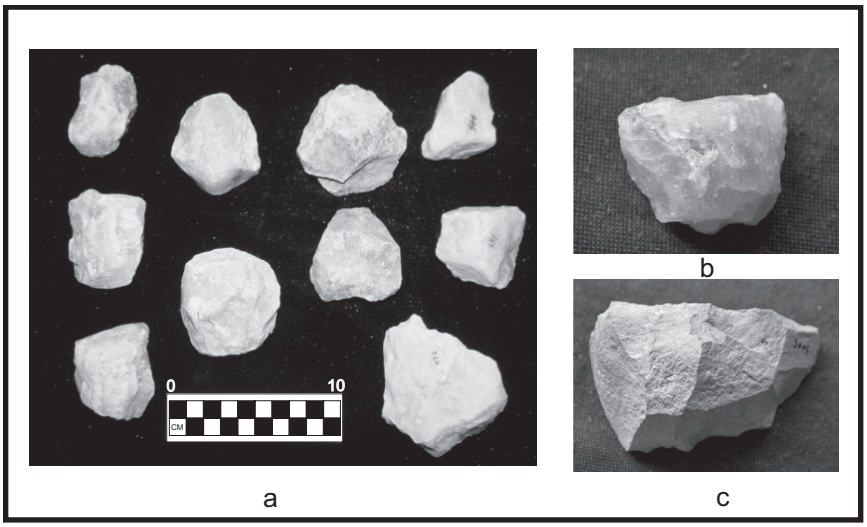

Figure 3.6: Artifacts from the Heilongtan site.
a: flake cores; b: flake; c: modified flake.

that the Wanghailou core assemblage has a good representation of flake cores as well (30%).

Formal Types

Within the formal tool type class, i.e., modified tools, typological examination also suggests that the Heilongtan site has a toolkit substantially different from the other three sites (Figure 3.8). At Heilongtan, tools are predominantly modified flakes (54%), followed by scrapers (17%) and bifaces (12%). At both Fenghuangling and Qingfengling, over half of the toolkit comprises microblades, accounting for 78% and 57%, respectively. The two sites show similar frequencies of the other types of flake tools, although the Fenghuangling assemblage displays slightly higher frequencies of bifaces and scrapers.

The distribution of tool type frequencies of the Wanghailou lithic assemblage seems to be between Heilongtan and the other two assemblages. Compared to Fenghuangling and Qingfengling, the Wanghailou assemblage contains relatively fewer microblades but still a fairly good representation (33%) of microblade products. Clearly, modified flakes have a higher frequency at Wanghailou compared to Fenghuangling and Qingfengling. In addition, Wanghailou has the highest presence of bifaces among the four assemblages, accounting for 14% of tools. It should be noted that there are substantial numbers of biface preforms (unfinished products of biface manufacture) at the Wanghailou site compared to the other three sites, suggesting a strong preference for bifacial tool production at the site, that is rarely seen at the other three sites.

It appears that there are more varieties of tool types at Wanghailou and Heilongtan than at Fenghuangling and Qingfengling (Table 3.2). Some other tool forms, although occurring in low numbers, are also indicative of a unique specialized toolkit at each of these sites. Choppers and notches are only seen at Heilongtan, although there is only a single specimen of each in the assemblage. It is also apparent that the Heilongtan toolkit is different from the others in the absence of drills and unifaces. More backed microblades were found at Wanghailou than at Qingfengling, and these do not occur in the other two assemblages. Biface preforms and perforators appear only at Wanghailou and Heilongtan. Therefore, it is clear that typological examination suggests three possible toolkit groups: 1) Fenghuangling and Qingfengling are very similar, while 2) Wanghailou is different from these and also from 3) Heilongtan. These groups are likely to represent different cultural manifestations.

Debitage and Flaking Debris

If the above observations truly indicate technological differences among these four assemblages, we should also expect to see a similar trend in debitage type variations among them. When we look at the typology of debitage products, which are likely indicative of core reduction strategies, the trend

Table 3.2: Tool types of the four lithic assemblages.

	Fenghuangling	Qingfengling	Wanghailou	Heilongtan
Chopper	No	No	No	Yes
Notch	No	No	No	Yes
Drill	Yes	Yes	Yes	No
Uniface	Yes	Yes	Yes	No
Backed microblade	No	Few	Yes	No
Biface preform	No	No	Yes	Yes
Perforator	No	No	Yes	Yes

observed suggests a similar division among the four assemblages (Figure 3.9). Both Fenghuangling and Qingfengling are similarly dominated by bifacial thinning flakes (50–60%), followed by flakes (30–40%). This may indicate bifacial production in the manufacture of wedge-shaped microblade cores. In contrast, Heilongtan has the highest flake occurrence and the lowest bifacial thinning flake frequencies, suggesting a very different lithic production system, probably hard-hammer flake core reduction. The Wanghailou debitage distribution falls in-between these two production systems, having roughly equal percentages of flakes and bifacial thinning flakes. The Wanghailou debitage assemblage is distinctive also by its relatively high percentage of blades and core trimming flakes. The presence of bifacial splits and microblade flakes at Fenghuangling, Qingfengling, and Wanghailou, strongly indicates that microblades at these sites were products of bifacial core reduction.

The flake core reduction strategy at Heilongtan is also indicated by an overwhelming presence of chunks instead of chips in the debris category (Figure 3.10). The higher frequency of chunks at Heilongtan may have resulted from the shattering process during quartz tool manufacture; quartz is the primary raw material at the site. Chips, possibly the products of pressure flaking and soft-hammer reduction, are more frequent in the other three assemblages. These clearly represent a by-product of the microblade reduction strategy.

WORKING HYPOTHESES

As the Shandong project is on-going, and detailed examination of the artifacts is still in process, the current technological-typological investigation can only suggest the following working hypotheses. First, the data suggest the possibility that two different technologies coexisted in Shandong at the end of the Pleistocene – flake-tool traditions and microblade traditions. Second, Shandong microblade industries likely consisted of different microblade techniques, but this requires further investigation. Shandong lithic industries feature more variability than we previously thought. Thus, the previous concept of a "Fenghuangling" cultural complex needs to be revised. Given the data available, I am proposing the existence of the following cultural variations in this region (Figure 3.11).

The Heilongtan assemblage does not manifest microblade technology at all. The lithic assemblages may represent a tradition that manufactured and used flake cores from flake-core reduction, a technique that was persistent in northern China during the Pleistocene. It may suggest that this lithic tradition represents a local manifestation existing in the region before microblade technology was introduced. Technologically, the Heilongtan tradition utilized local quartz raw materials for making stone tools. Their economic strategies were likely mutli-dimensional given the variety of tool types made on flake blanks.

Based on the use of raw materials, the toolkit, and core reduction, this study suggests that the Fenghuangling and Qingfengling assemblages appear to have possibly the same cultural affiliation. The variation within the Shandong microblade industry may be called the "Fenghuangling Tradition." The technology of Fenghuangling microblades possibly resembles other microblade industries in central China, but with a greater diversity. These two sites produced extremely small microblade cores and microblades on local cherts

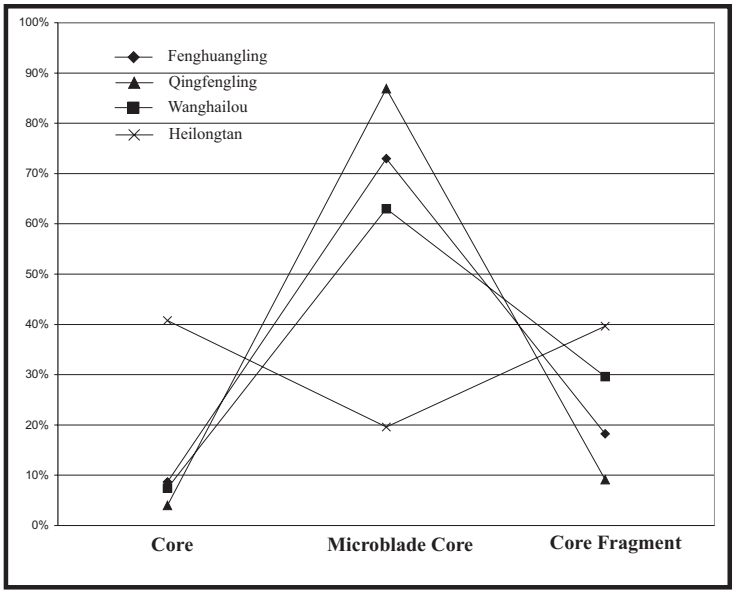

Figure 3.7: Distribution of core type frequencies.

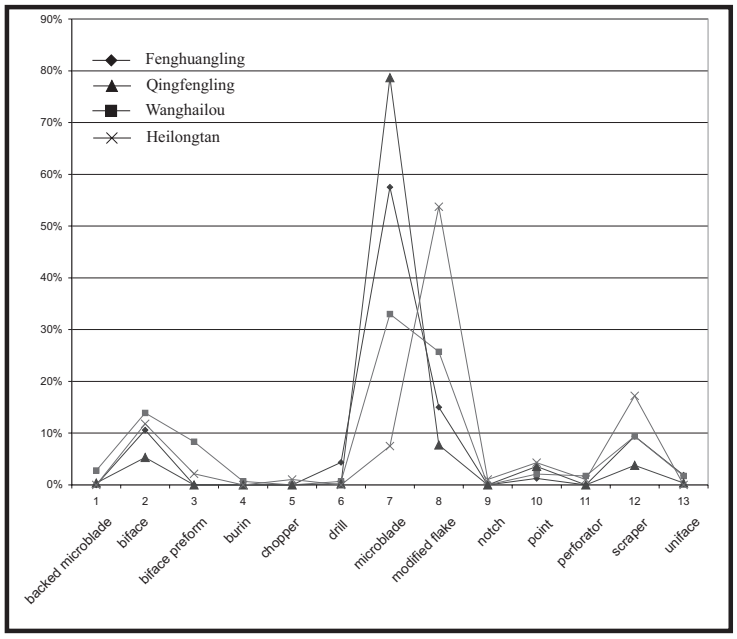

Figure 3.8: Distribution of formal type frequencies.

as well as quartz. These microblades are morphologically more similar to those found in Hebei and Shanxi provinces, but the quality of manufacture is relatively poor. This may point to cultural interactions between the Shandong and northern groups in the middle of the Yellow River valley.

It seems clear that the Wanghailou tradition represents a southern regional variation of microblade industries: the assemblage is characterized by some degree of different tool use, core reduction, and use of raw materials compared to those of the Fenghuangling tradition in the middle Yi-Shu Valley, about 50 km to the north. One important aspect of the Wanghailou tradition is the utilization of large bifacial cutting tools that were not observed in its northern counterparts.

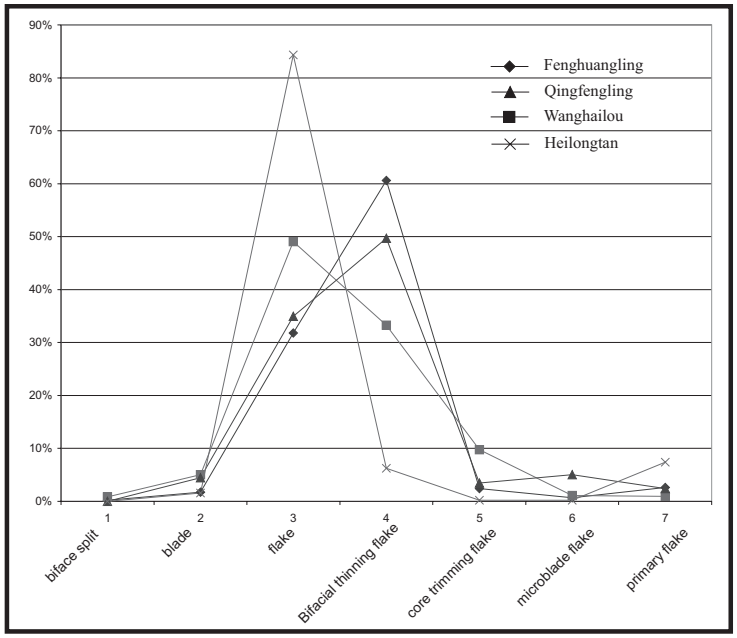

Figure 3.9: Distribution of debitage frequencies.

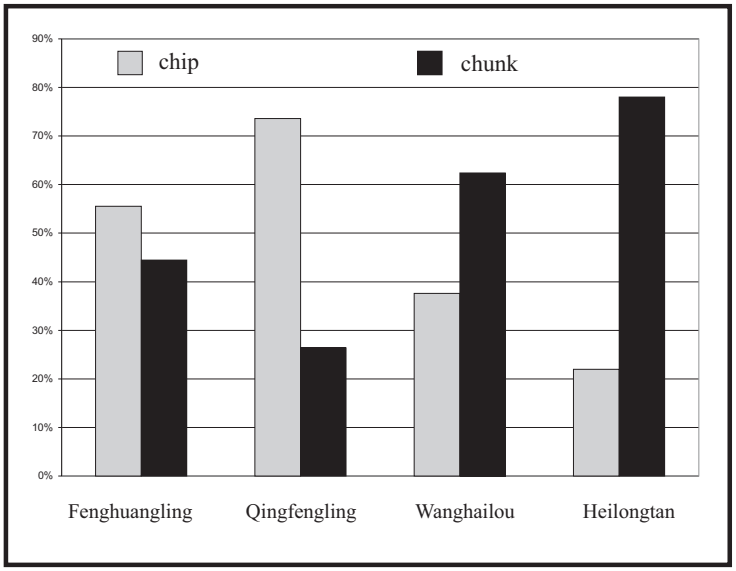

Figure 3.10: Distribution of flaking debris frequencies.

The Wanghailou assemblage probably shares close relations with assemblages found in the southern part of the Malingshan Mountains in northern Jiangsu Province (Zhang 1985, 1987; Ge and Lin 1985).

In addition, cultural materials from other surface collection sites (or localities) may also be indicative of other manifestations in the region. Lithic artifacts collected from a few dozen localities in the Wen-Si River valley appear to be non-microblade lithic industries as well (Zhonggou Sehui Kexue Yuan Kaogu Yanjue Suo 1993). These likely represent a small flake tool industry, utilizing the locally available black chert, in northern China during the Late Pleistocene. Whether or not a microblade technique similar to that found

in the Yi-Shu Valley was employed in this region needs to be further investigated.

CONCLUSION

The preliminary results suggest that the late Upper Palaeolithic in Shandong at the end of the Pleistocene is more complex than we previously thought (Shen 2004, 2005). All of this evidence indicates that a variety of cultural interactions existed in this region. Although we still cannot ascertain whether the Shandong microblade industries were an indigenous development or a foreign invention, the current evidence may be in favour of a migration hypothesis, as the Shandong microblade traditions seem to indicate cultural interactions with those from both northern and southern regions. The characteristics of the production and functions of the Shandong microblade industry have to await future research. But this study suggests that the Fenghuangling concept clearly needs to be revised. In other words, the use of the "Fenghuangling Culture" to characterize the Shandong Palaeolithic industry with microblades is no longer valid in demonstrating the technological variability present during the Late Palaeolithic in this region.

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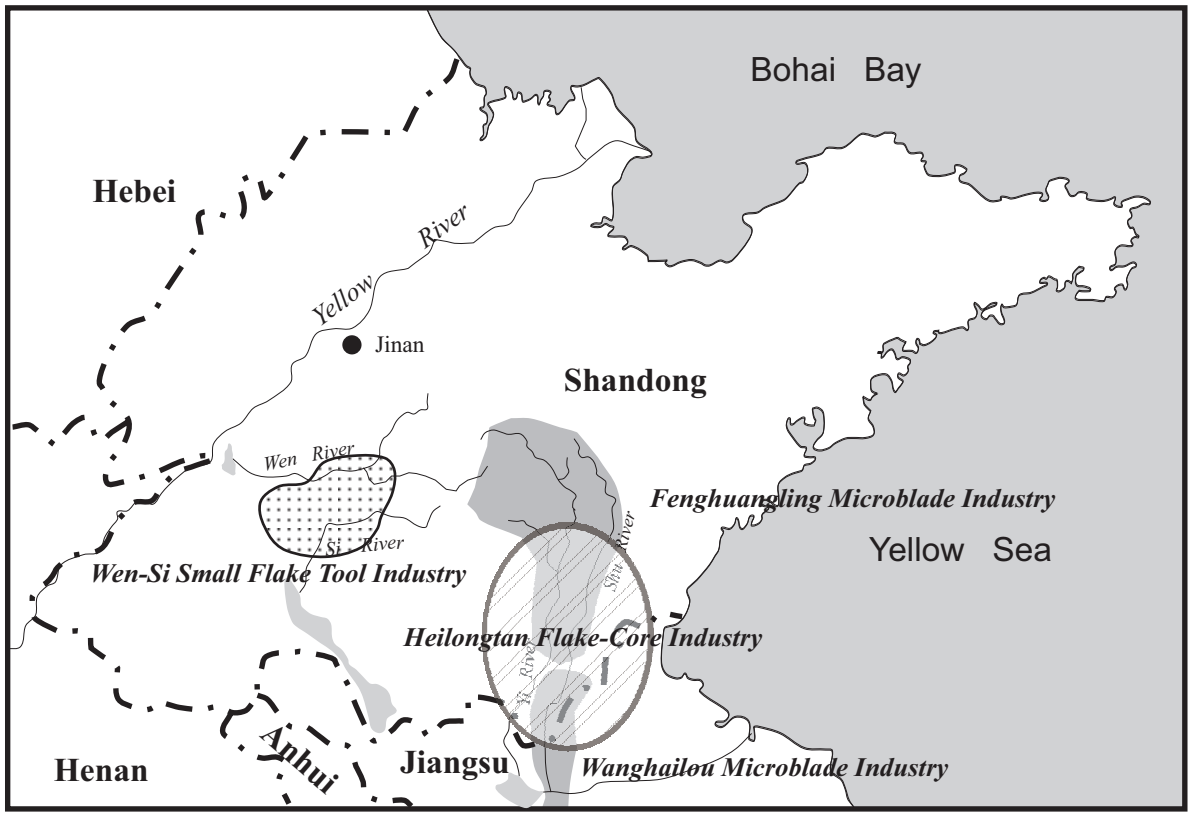

Figure 3.11: Shandong lithic industries in the Late Pleistocene.