

A COMPARISON OF THE LOWER AND MIDDLE PALAEOLITHIC IN EAST AND WEST ASIA

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ABSTRACT

The palaeoenvironment, chronology and lithic industries of the Lower and Middle Palaeolithic both in East and West Asia will be discussed in this paper. West Asia, especially the Mediterranean Levant, occupies an important geographic position between Africa, East Asia and Europe. It served as the corridor for the early hominid migration out of Africa. The Lower Palaeolithic assemblages in this area, such as the early assemblage of 'Ubeidiya, were similar to those of the Early Palaeolithic in China and other regions of the Far East in representing core-chopper industries, not Acheulean.

After that time, the relationship of the Palaeolithic industries between the two regions became increasingly weaker. A comparison of the Lower to Middle Palaeolithic sequences between East and West Asia indicates the following conclusions: (1) that connections between East and West Asia probably existed earlier than 1 mya; (2) that there were bottlenecks in cultural and gene flow between East and West Asia from the late Lower Pleistocene into the early Upper Pleistocene; and (3) that the principal reason for interruptions between East and West was the geographic barrier created by the dramatic uplift of the Qinghai-Xizang (Tibetan) Plateau since the Lower Pleistocene.

West Asia, especially the Mediterranean Levant, occupies an important geographic position between Africa, East Asia and Europe. It was the corridor for early hominid migration out of Africa and a bridge for hominid gene and cultural flow between East Asia and the western part of the Old World. During the last several decades, increasingly more Lower and Middle Palaeolithic remains have been found in both East and West Asia. Research on Quaternary geology

and related disciplines also has added much more knowledge about the Pleistocene environment and chronology of the two regions. This paper will discuss these developments, and make a comparison of the Lower to Middle Palaeolithic in East and West Asia, in order to further our understanding of the history of human evolution on the Asian continent.

CHRONOLOGY AND ENVIRONMENT

Chronology

The earliest hominid site in West Asia is Dmanisi in Georgia, which has been dated to the Olduvai subchron, based on the fauna and one K/Ar date of 1.8 ± 0.1 mya from the lava flow under the site (Bar-Yosef 1995). The 'Ubeidiya site in the Levant is about 1.4-1.0 my old, on the basis of long distance faunal correlations and the reversed palaeomagnetic situation which indicates an age within the Matuyama chron (Opdyke *et al.* 1983; Tchernov 1992). In East Asia many hominid sites are older than 1 my, including Longgupo and Yuanmou in south China (Huang *et al.* 1991, 1995; Qian 1985), Gongwangling (Lantian) in central China, and Donggutuo and Xiaochangliang in the Nihewan Basin in north China. Though there is still some debate regarding the age of the discoveries in south China, Gongwangling, Xiaochangliang and Donggutuo are older than 1 mya, based on biostratigraphical and palaeomagnetic studies (Wei 1995, 1997).

Recent research on the Quaternary chronology of East Asia has established the basic chronological framework of several regions in China. The stratigraphic section of the Chenshan (Xiangyang) site in Xuanzhou City in Anhui Province includes 15 layers, dated to about 0.8 to 0.1 mya by the ESR method (Zhao and Yang 1995). The framework for the Nihewan Basin that was recently proposed by Wei (1997), based on palaeomagnetism, biostratigraphy and Quaternary geology, indicates a chronological sequence from the Lower to the Upper Palaeolithic in this area.

Compared with the Lower Palaeolithic, many more developments in chronology have occurred for the Middle Palaeolithic in West Asia. New TL and ESR dates indicate that the early Levant Mousterian manifestation may be 0.270 my old (Bar-Yosef 1994, 1995). A chronological comparison of the Lower and Middle Palaeolithic between East and West Asia is presented in Table 1.

Environments

West Asia and East Asia lie approximately at the same latitude. Today, both regions are dominated by cool winters and hot summers, although the rainy seasons are in different periods of the year (winter in West Asia, summer in East Asia). Even though geographical features in both East and West Asia consist of the same topographic combination of mountains, plateaux, alluvial plains and desert landscapes, regional variability nevertheless seems to be more complex in the West.

The global climatic cooling had its most pronounced effects in West Asia and the northern regions of East Asia. When the climate became colder during the glacial periods, the vegetation and fauna adapted to warm conditions moved to lower latitudes. During interglacials, they expanded to higher latitudes. These changes should have considerably affected the lives of early hominids. For instance, the *Homo erectus* fossil found recently at a locality south of the Changjiang (Yangzi) River, near Nanjing City in south China, was associated with a fauna very similar to that found at Zhoukoudian Locality 1 and contained no faunal elements characteristic of southern China (Nanjing Municipal Museum and Archaeology Department of Peking University 1996).

Another important event that affected Pleistocene environments was the uplift of the Qinghai-Xizang Plateau. The result of the uplift of this huge mountain range in the central part of the Asian continent was not only the appearance of a physical barrier to cultural and genetic exchange between East and West Asia, but also a change in the global climatic system which formed the monsoon climates of East Asia and the dry climates of Central Asia and adjacent areas (Qi 1989; Gamble 1993).

Recent multi-disciplinary research has produced more detailed information on the timing and altitude of the Qinghai-Xizang Plateau uplift and its impact on the surrounding areas. Uplift was slow before 0.7 mya, but there was rapid uplift between 0.7 and 0.6 mya which gave the present northern part of the Plateau its principal features (Ge *et al.* 1995). Prior to 0.7 mya there was a humid-cool climate with a landscape of many lakes in the northern part of the Plateau, similar to the environment of the Nihewan in North China (Cui *et al.* 1995). But at the beginning of the Middle Pleistocene, the uplift caused glaciation to reach its

Table 1: The chronology of the Lower and Middle Palaeolithic in Asia

Time myr B.P.	Geological Epoch	East Asia	West Asia
0.01-	Holocene		
0.05-	Upper Pleistocene	Upper Palaeolithic	Upper Palaeolithic
0.10-		Banjing Guangyindong A Xujia Yao	Amud Tabun B Kebara Qafzeh Tabun C Skhul
0.25-	Middle Pleistocene	Guanyindong B Chenshan A	Tabun D Hayonim E Zuttiyeh Acheulo-Yabrudian
0.50-		Zhoukoudian Locality 1	
0.70-		Chenshan B	Gesher Benot Ya'aqov
1.00-	Early Pleistocene	Cenjiawan Donggutuo Gongwangling (Lantian) Xiaochangliang	Acheulean Ubeidiya
1.50-			Dmanisi
2.00-	Pliocene	Yuanmou Longgupo	

maximum extent. This led to a dry climate in the western part and northern flanks of the Plateau. Numerous formerly separated deserts in the Taklamakan Basin became joined together to form one enormous desert. To the east of the Plateau, the lakes dried out and the loess area was enlarged (Shi and Zheng 1995). These developments occurred during the same period as the dispersal of *Homo erectus* to the Asian continent and should have dramatically affected the evolution of early hominids in this region.

THE LOWER AND MIDDLE PALAEOLITHIC IN EAST ASIA

Flake-tool industries

Most recent Lower and Middle Palaeolithic discoveries in East Asia belong to the flake-tool industry or tradition and consist mainly of scrapers, points and other light-duty tools made on flake blanks. Among new developments, the Nihewan Basin has become increasingly central to research on the Palaeolithic of East Asia. Many early hominid sites have been found here during the last two decades, such as

Xiaochangliang, Donggutuo, Cenjiawan, Xujiayao and Banjing (e.g., Schick *et al.* 1991; Wei 1991, 1997; Xie 1991). The first three sites are situated on the margins of ancient lakes or river banks in the eastern part of the basin. Thousands of stone artefacts, animal bones and teeth have been recovered during excavations of these sites. The raw materials for stone tools were collected from nearby hills, where weathered quartzite rocks and other materials were available (Huang 1985; Wei 1985; Xie 1991; Xie and Li 1995).

A living floor was unearthed at the Cenjiawan site, where many stone artefacts and animal bones were found together. 14.6% of the stone artefacts could be refitted. Many animal bones have cut marks or other modifications made by early hominids (Xie and Li 1995). Features like these indicate that the behaviour of early hominids in East Asia was similar to that identified elsewhere in the Old World during the same period of time (Keates 1995).

The small flake-tool tradition in the Nihewan Basin continued to exist with no obvious change from the Early to the Late Pleistocene. Xujiayao, a Late Pleistocene site in the western part of the basin, is dated to 0.110 to 0.100 mya by the uranium series method, and its industry classified as Middle Palaeolithic by Chinese archaeologists. There are no distinct differences in lithic technology and typology between Xujiayao and earlier assemblages. The same also applies to Banjing, another Middle Palaeolithic site dated to about 70 kya (Xie 1991; Li *et al.* 1991). Almost all of the Middle Palaeolithic industries in the Nihewan and elsewhere in north China are in the flake-tool tradition. The principal fabrication technique was direct percussion with a hard hammer. Lithic inventories consist of scrapers, points and other small tools made on flake blanks. Only a few choppers and other heavy-duty tools have been found, except for the thousands of spheroids associated with the small flake tool assemblage at Xujiayao (Chia and Wei 1976; Chia *et al.* 1979).

Flake-tool industries also have been found in the lower latitude areas of south China. Those confined to the plateau-mountainous region of southwest China date to before the late Late Pleistocene. A few stone artefacts with two teeth of *Homo erectus* have been found at Yuanmou, Yunnan, which dates to the Early or Middle Pleistocene (Liu and Ding 1983; Qian 1985). But more evidence on the occupation of early hominids in this region comes from a number of cave sites. Guanyindong Cave in Qianxi County, Guizhou, has yielded many stone artefacts and animal bones in seven cultural layers dated to between 0.040 and 0.190 mya by the uranium series method (Shen and Jin 1992). Though early humans occupied this cave for a long time, lithic assemblages did not change from the oldest to the youngest layers. Most implements are less than 5 cm long and made on flake blanks, except for a few choppers made on cobbles. The principal means of reducing nuclei and retouching tools

was simple direct percussion with a hard hammer. The tools include side scrapers, end scrapers, points and drills (Li and Wen 1986). The same pattern has been reported from many other caves in south China (Zhang 1987; Huang *et al.* 1997).

The Core-chopper industries

Several hundred localities with core-chopper industries have been found recently along the river valleys of south China, and these have become one of the most important findings on the East Asian Palaeolithic during the last two decades (Wang 1991, 1997). The lithic raw materials of these industries are mainly cobbles from local river banks. The basic fabrication technique was direct percussion with a hard hammer. Such assemblages consist of choppers, picks and spheroids, as well as heavy-duty scrapers.

The Chenshan (Xiangyang) site mentioned above is an example of such an industry with an early phase from late Early into early Middle Pleistocene, and a later phase from the late Middle into the beginning of the Late Pleistocene. The basic lithic technology and components of these two assemblages are the same. Choppers were the dominant tools, together with picks and heavy-duty scrapers. Tools were mainly made from cobble blanks by direct percussion with a hard hammer. Flakes have also been found, but few are modified. The core-chopper industries continued in this area for about 700,000 years (Fang *et al.* 1992; Fang 1997; Zhao and Yang 1995).

The same types of core-chopper industries are distributed in the Hanshui Valley, the middle and lower ranges of the Changjiang (Yangzi) River, and the Youjiang valley in the Baise Basin in south China. There was some variation among these industries within this huge area. Spheroids seem to be more important in the Hanshui Valley, picks in the middle Changjiang, and choppers (about 80% of the tools) in the Wushui Valley. However, the basic lithic technology, raw materials and basic components of these lithic assemblages are the same, and continued until the early part of the Late Pleistocene (Wang 1991, 1997).

Many core-chopper sites have been excavated recently in south China. The Jigongshan site is one of these, and is situated on the second terrace of the Changjiang River, near Jingzhou City, Hubei Province. Ten thousand artefacts were found within a living floor of about 500 m², and many of these specimens could be refitted *in situ*. Lithic technique and raw material are similar to the Chenshan site, but stone tool inventories are distinctive. Picks are the dominant tools, and were made using the same technique with a similar size, averaging about 16-18 cm in length and 6-8 cm in width. There are also many choppers and chopping tools, but few spheroids have been found. According to its Quaternary geology, Jigongshan should be dated to the late Middle

Pleistocene or the early Late Pleistocene. However, the lithic assemblage is still in the core-chopper tradition, and is a continuation of the earlier industries of this region (Wang 1997).

In sum, both flake-tool and core-chopper industries continued to develop from the late Early Pleistocene to the early Late Pleistocene in East Asia. There seems to be no discernible difference of lithic technology and typology during this long time span. The terms Lower and Middle Palaeolithic used here have the same chronological meanings as in the West.

COMPARISON AND DISCUSSION

Early Pleistocene sites in West Asia, such as Dmanisi and 'Ubeidiya, like the early East Asian sites, are also situated on the margins of ancient lakes or river banks, with abundant stone artefacts and fragments of animal bone. The lithic assemblage of Dmanisi primarily consists of core-choppers. There are also scrapers made from flakes, as well as worked bone objects (Bar-Yosef 1994). The lithic assemblages are more complex at 'Ubeidiya than at Dmanisi, and include two different groups (Bar-Yosef and Goren-Inbar 1993). There are numerous core-choppers, spheroids and flakes. The earliest layers lack handaxes, while these occur in various frequencies in the younger layers of this long sequence. Though there is considerable similarity in the basic knapping techniques between the two groups, the researchers consider that the assemblages of the younger layers can be defined as 'Developed Oldowan B' or early Acheulean, and probably indicate a new immigration of hominids (Bar-Yosef 1994).

Early and Middle Acheulean assemblages have been found in many places in West Asia, on the coastal plain of Israel, the terraces of Nahr el Kabil, the Orontes river and on the Middle Euphrates in Syria. Among them, Kefar Menachem is the oldest site with numerous core-choppers, flake-tools, and a few crude ovate handaxes (Gilead and Israel 1975; Bar-Yosef 1994). The site of Latamne in the Orontes valley, dated to the early Middle or the late Early Pleistocene, has a similar lithic assemblage to that found at 'Ubeidiya (Clark 1967). A different Acheulean assemblage was found at the Gesher Benot Yafiaqov site, where bifaces and cleavers were made from basalt as in Africa (Goren-Inbar *et al.* 1991, 1992).

The Upper Acheulean in West Asia can be placed between 0.8 and 0.4 mya (Bar-Yosef 1995). During this time period, Acheulean assemblages are found in both open air sites and caves. Handaxes are considerably more symmetrical and refined, and the first use of the Levallois technique appeared towards the end of this period (Goren-Inbar 1985; Bar-Yosef 1994). Acheulo-Yabrudian sites are known only from the northern and central Levant. Except

for handaxes, the lithic assemblages also include some typical tools of Mousterian and Upper Palaeolithic industries, such as side-scrapers made on thick flakes, end-scrapers, burins and backed knives (Copeland and Hours 1983; Jelinek 1982). However, the Acheulo-Yabrudian probably dates from 0.400 to 0.270 mya according to the new TL dates of the Tabun cave (Mercier and Valladas 1994).

If we look at the Lower Palaeolithic of East Asia, we find that there are more similarities with West Asia during the earliest phase. The simple lithic techniques and components of the lithic assemblages are the same, and can be defined as 'Mode 1 technology' according to Clark (1977) and Schick (1994). The Mode 1 technology was soon replaced by the Acheulean industries, that is, the Mode 2 technology in West Asia, and continued to develop from the Lower Acheulean to the Acheulo-Yabrudian. However, as mentioned above, core-chopper and flake-tool industries continued in East Asia for a long time. Although there have been recent reports of handaxes (Huang 1987, 1993), the existence of an Acheulean or Mode 2 technology in East Asia is still controversial (Lin 1994, 1996; Gao and Olsen 1997; Schick 1994), the problem being that most of the samples of handaxes are from surface collections.

Some scholars argue that there was no true Acheulean technology in East Asia (Lin 1994, 1996; Schick and Dong 1993; Schick 1994; Pope and Keates 1994). It is a fact that handaxes have indeed been found at many localities in East Asia, but lithic technologies are still distinctive between East and West Asia. It seems that there were two evolutionary paths after the earliest Mode 1 technology: the Acheulean dominated in the West, but cobble and flake tools continued to develop in the East (Lin 1996; Wang 1995, 1997).

According to the most recent dates, the Middle Palaeolithic in West Asia dates to 0.270-0.047 mya. Even though there was much temporal and spatial variation, Mousterian industries or traditions dominated in West Asia for about 200,000 years. The basic technological and morphological characteristics of the Mousterian differ considerably from the East Asian Palaeolithic within the same time span. As with handaxes, the existence of the Levallois technique in East Asia requires more evidence before a conclusion may be reached (Huang *et al.* 1997). In sum, the East Asian Middle Palaeolithic was a continuation of the core-chopper and flake-tool tradition in this region, and different from the Mousterian industries of West Asia.

This comparison of the East and West Asian Lower to Middle Palaeolithic industries and their chronologies indicates that connections between East and West Asia existed probably earlier than 1 mya, but that bottlenecks formed in cultural and gene flow between the two regions during the late Early Pleistocene, Middle Pleistocene, and

early Late Pleistocene. It is still a mystery why there was this interruption. Recent research on the uplift of the Qinghai-Xizang Plateau and its effect on the environment of surrounding areas have provided much new information for seeking the answer to this mystery. As mentioned above, during the Early Pleistocene, the height of the plateau was only about 1500-2000 m, not yet a high enough physical barrier to stop the migration of early hominids (Cui *et al.* 1995; Ge *et al.* 1995). There was a similar environment throughout the region from the Nihewan Basin, north China to the northern part of the Qinghai-Xizang Plateau, which was probably the route for cultural and gene flow during the Early Pleistocene. However, after the rapid uplift of the early Middle Pleistocene, the plateau became a high physical barrier and changed the global climate system, especially affecting the surrounding areas to create a huge, dry desert in Central Asia. This may have been the bottleneck which reduced exchange between East and West Asia.

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