

The Mesolithic and the Neolithic in China

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ABSTRACT - *The concept of a Mesolithic period was introduced in Chinese prehistoric archaeology from the West. Scholars argued in the 'seventies that the microlith cultures identified in open sites (northern China) and in cave sites (southern China) should be classified as Mesolithic. However, recent discoveries have revealed evidence of pottery production and agricultural activities in these contexts, thus challenging the notion of a Mesolithic period in the prehistory of China. The identification of Neolithic cultural development in China was based on the regional pattern of Yellow River Valley cultural sequences. It has been suggested recently that the Yangtze River Valley region was the second Neolithic centre. Cultural sequences in both regions consist of three phases. The end of the Neolithic period in China correlates with the decline of the Neolithic cultures in the Yangtze River Valley.*

IZVLEČEK - *Pojem mezolitsko obdobje je v kitajsko prazgodovinsko arheologijo prišel iz zahoda. Znanstveniki so v sedemdesetih letih dokazovali, da moramo mikrolitske kulture, ki so jih odkrili na planih najdiščih (severna Kitajska) in jamskih najdiščih (južna Kitajska), obravnavati kot mezolitske. Vendar nedavno odkriti dokazi o proizvodnji keramike in kmetovanju spreminjajo našo predstavo o mezolitskem obdobju na Kitajskem. Ugotavljanje neolitskega kulturnega razvoja na Kitajskem je temeljilo na regionalnih vzorcih kulturnih sekvenc v dolini Rumene reke. Pred kratkim so predlagali, da je bila dolina Modre reke drugi neolitski center. Kulturna zaporedja v obeh regijah sestavljajo tri faze. Konec neolitskega obdobja na Kitajskem sovпада z upadom neolitskih kultur v dolini Modre reke.*

KEY WORDS - *China; Mesolithic; Neolithic; pottery production; plant cultivation; agriculture*

I. THE MESOLITHIC IN CHINA

The concept of the Mesolithic in modern archaeology in China: an introduction

Modern archaeology was introduced to China from the West in the 1920's. Western scholars organised the first excavations of prehistoric sites in China, such as Zhoukoudian in Beijing, and Yangshao in Henan. From the beginnings of this discipline, concepts of the Palaeolithic and Neolithic were applied to interpret the remains of prehistoric cultures in China. The concept of the Mesolithic was introduced somewhat later. When Pei Wen-Chung conducted his survey in Guangxi in 1935, he located four cave sites in Wuming and Guilin, which were named Ba-qiao, Baxun, Tengxiang, and D cave, respectively (Pei

Wen-Chung 1935). Pei collected pebble implements, perforated pebbles, grinding stones and stone knives. He dated these remains to slightly later than the Palaeolithic, implying that they belong to the Mesolithic. In 1947, Pei studied the microliths discovered at the Zhalaino'er site in Ha'erbin, Helongjiang province. He regarded these microliths as specimens representing the initial period of the microlith industry in China, thus they were Mesolithic remains as well (Pei Wen-Chung 1947). Since these sites were not scientifically excavated and no reliable dates could be assigned to them, Pei remained cautious about his own observations and surveyed these sites again in the 1950's. He discovered pottery in association with remains that were contemporaneous with the micro-

liths. On the basis of this new evidence, Pei corrected his previous interpretation. However, the notion that a Mesolithic period was present in prehistoric China and that it may be associated with lower Holocene cave dwelling sites in southern China, has profoundly affected the field.

The identification of Mesolithic cultures

Since the 1950's and 1960's, more cave dwelling sites occupied during the transitional period from the Upper Pleistocene to the Holocene were found in southern China. Sites dating to this period that were excavated or intensively surveyed up until the 1980's include Baoqiao A Cave in Wuming, Baxun B Cave, Tengxiang C Cave, Guilin D Cave, Dongyan Cave, Zengpiyan, Miaoyan, Gaitoudong in Laibin, Bailan Cave (Phase II assemblage) and Dalongtan in Liuzhou, Chenjiayan in Liujiang, Aidong in Chongzuo, Huangyandong and Luojiyan in Fengkai, Dushizai in Yangchun, and Diaozhuyan in Qingtang, all south of the Nanling Mountains, as well as Xianrendong in Wannian and Sanjiaoyan, Maguaiyan, Houlongdong, Dongweiyuan and Yangjiayan in Daoxian, and Hunan north of the Nanling range. These cave dwelling sites are located primarily at the base of the southern or northern slopes of the Nanling Mountains in South China. Stratigraphically, the cultural deposits in these cave sites are later than the

Pleistocene. They contain large amounts of snail, mollusc shell and vertebrate remains. Almost all faunal remains are from modern species. The artefact assemblage includes substantial amounts of lithic, bone, antler, and mollusc shell implements. The manufacture of chipped pebble implements, characterised by the use of a direct percussion method and unifacial retouch, is a primary feature of this lithic industry. Typologically, chopping implements predominate in the lithic assemblage. Some scrapers and points are also present. Flake implements are few in number. Perforated pebbles (so-called "weight stones") and cutting tools with polished blades are the most abundant polished implements. Some localities yielded small flint tools (Fig. 1). The major types of bone, antler, and shell artefacts include awls, needles, projectile points, spades and knives (Fig. 2). Radiocarbon dates were obtained from some of the snail shell and burned bone specimens. The dates of the snail shell cluster around 12 000 bp. The youngest sample is Huangyandong ZK677, which dates to $10\,950 \pm 300$ bp. After calibration, the date of the remains should be older than 9000 bp (The dates obtained from snail shell samples are usually older than the radiocarbon date by 1000 to 2000 years in the limestone area). Burned bone samples obtained from the lower layer and the upper substratum of the middle layer at the Dashizai site yielded some early dates: $16\,680 \pm 570$ bp (BK83018),

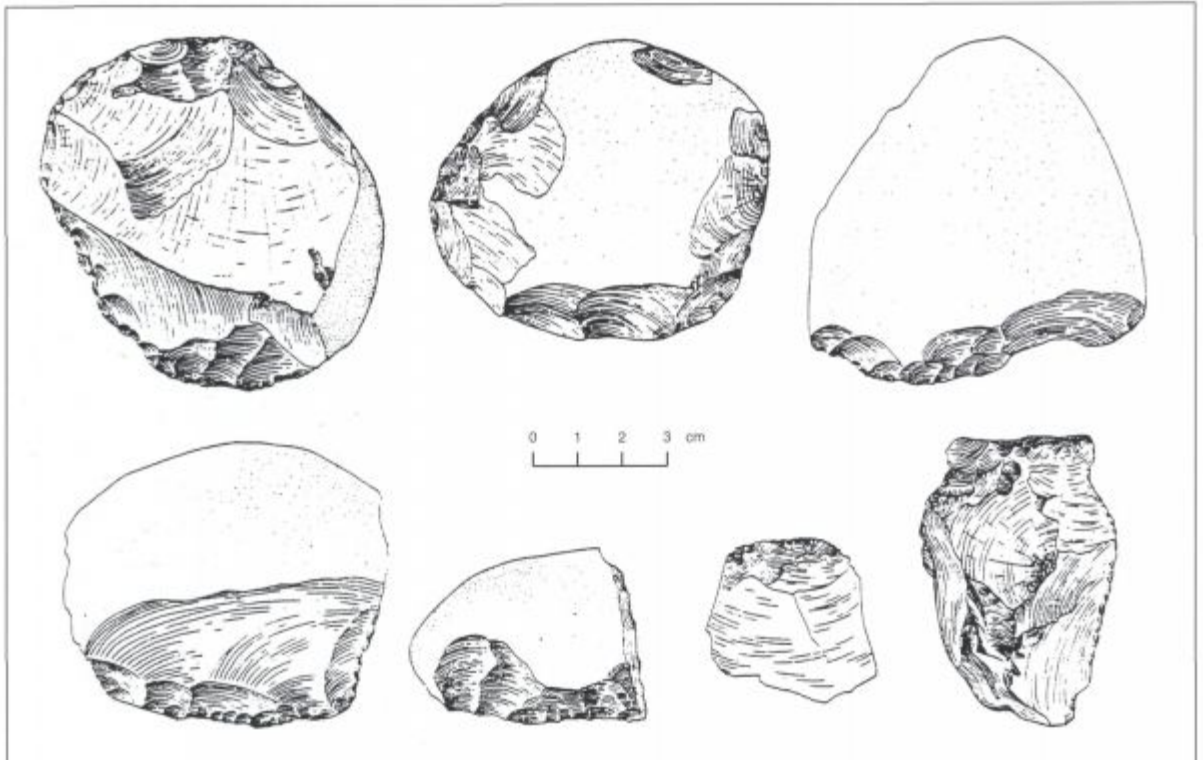


Fig. 1. Lithic tools from layer 3 of Xianrendong (1962 excavation).

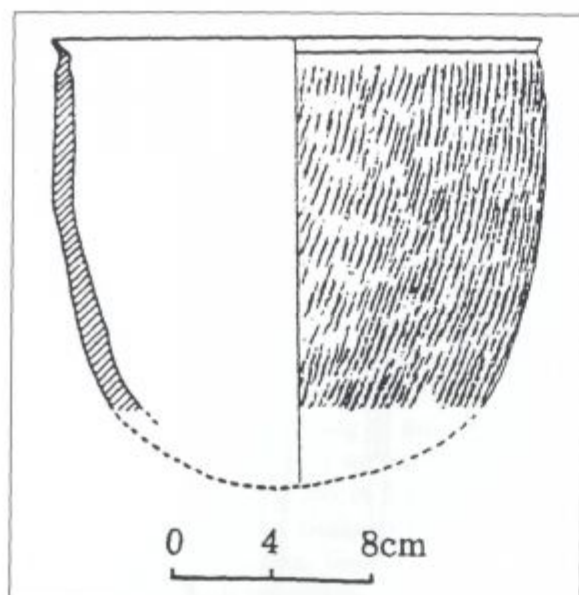


Fig. 3. Xian paddled pottery vessel from layer 3 of Xianrendong (1962 excavation).

nal variations and is thereby subdivided into the "Shayuan culture," the "Hutouliang culture" and the "Fenghuangling culture." Although most of these sites have been classified as lithic workshops and the overall characteristics of social organization are difficult to interpret, many scholars have regarded this microlithic assemblage as representative of Mesolithic cultures in northern China (CASS 1984; Yan Wenming 1987).

Discoveries of the Middle Neolithic

Before the 1970's, the Neolithic remains identified in the middle and lower Yellow River basin and the middle and lower Yangtze River basin, which together formed the heartland of cultural development in historic China, were considered representative of the highly complex Late Neolithic cultures. No association could be established between these Late Neolithic cultures and the so-called Mesolithic remains. In the 1970's and 1980's, some earlier Neolithic remains were identified in these regions: the Pengtoushan culture of the mid-Yangtze River basin in the south and the Cishan-Peiligang culture of the mid-Yellow River basin in the north.

The Pengtoushan culture is distributed in the flood plain of Dongting Lake in the middle Yangtze River basin. It is characterised by a highly advanced manufacture of pottery and bone, bamboo, wood and lithic tools. The Pengtoushan culture's lithic assemblage still contains abundant chipped pebble implements and small flint implements, and there are in-

dications that hunting and gathering still play an important role in the subsistence economy. However, the remains of cultivated rice have been identified in many of the sites. In addition to the sheer quantity of the rice remains, observations made on the morphological attributes of the rice remains excavated at the Bashidang site in Lixian county suggest complex species characteristics of the rice cultivated here. It is classified as an archaic variety representing neither *Oryza sativa indica* nor *Oryza sativa japonica*. Since the Bashidang site is located in a waterfront environment, paddy agriculture might have been practised here. In addition, all the sites of this period have yielded the bones of domesticated stock and fowl, such as pig, goat and chicken, indicating that stock-raising activities were already diversified.

It is likely that Pengtoushan culture agriculture had developed beyond the initial stage of agricultural emergence. The Bashidang site, an example of a Pengtoushan culture settlement, covers an area of 30 000 square meters. The settlement was enclosed with an earthen wall and a ditch. Inside the enclosure was a well-planned residential area, cemetery, storage area, and waste disposal area. The settlement pattern shows little difference from that of the following Zaoshi culture. Therefore, the majority of scholars regard the Pengtoushan culture as Middle Neolithic (that is, the early phase of the Middle Neolithic) in prehistoric China. The Pengtoushan culture has been dated with a series of radiocarbon dates. Most dates are around 8000 bp. The earliest date, 9100 ± 120 bp (BK87022), is an AMS date of charcoal from a pottery sherd (Pei Anping 1996).

The Cishan-Peiligang culture is distributed in Henan and southern Hebei, in the middle Yellow River basin. This culture had highly developed agriculture as well. Millet and other dry-land crops predominated in agricultural production. Over 80 storage pits filled with millet were found at the Cishan site. The weight of grain stored in these pits might have exceeded 50 tonnes. Pigs, chicken and dogs were the principal domesticated animals. The Cishan-Peiligang lithic assemblage includes pecked stone mortars and pestles, as well as polished axes, adzes and chisels. Chipped stone implements are also present. Typologically, Cishan-Peiligang pottery is highly diverse. This culture also developed an advanced industry for manufacturing bone implements. Many settlement sites are generally tens of thousands of square meters in area, with large cemeteries. In areas adjacent to the Cishan-Peiligang culture there were several contemporaneous regional cultures

such as the Laoguantai culture, the Houli culture and the Xinglongwa culture. The level of their social complexity was comparable to that of the Cishan-Peiligang culture and is indicated by the presence of large, moat-enclosed settlements and the evidence of agriculture. Microlithic tools are also present in the artefact assemblages. The Cishan-Peiligang culture was the immediate predecessor of the Late Neolithic cultures in the Yellow River basin. It does not represent the initial phase of Neolithic development in northern China, but rather should be regarded as representative of the Middle Neolithic in northern China. Chronologically, the earliest date for the Cishan-Peiligang culture so far is 8000 bp.

The search for the origins of Middle Neolithic cultures such as the Pengtoushan culture and Cishan-Peiligang culture must therefore focus on the cultural remains from the Upper Pleistocene and the onset of the Holocene, certainly before 8000 bp. Coincidentally, the remains from this period are represented by cave dwelling sites in the south and the microlithic assemblage in the north, which have been attributed to the Mesolithic, as was discussed earlier. Recent discoveries in the 1990's have shed new light on this research.

Recent discoveries in the southern region

In the 1990's, excavations of cave dwelling sites such as the Xianrendong site and the Diaotonghuan site in Wannian, Jiangxi and the Yuchanyan site in Daoxian, Hunan have yielded new information on early cultural development in the south. The Xianrendong site and the Diaotonghuan site are both located in the Dayuan basin, which is part of the hilly karst landscape in north-eastern Jiangxi. Xianrendong is a cave site situated at the base of a limestone hill in the northern part of the basin. Diaotonghuan is a rock shelter site lying atop a small hill about 60 meters high in the western part of the basin. The distance between the two sites is only 800 meters. On the basis of two previous domestic excavations in the 1960's (*Jiangxi Provincial Committee for Administration of Cultural Relics 1963; Jiangxi Provincial Museum 1976*) and a joint project by Peking University's Archaeology Department, the Jiangxi Provincial Institute of Archaeology and Cultural Relics, and the Andover Foundation (AFAR) of the United States, systematic sampling was done at the Xianrendong site, and a small-scale excavation - at the Diaotonghuan site, in the fall seasons of 1993 and 1995 (*Zhang Chi et al. 1996*). The cul-

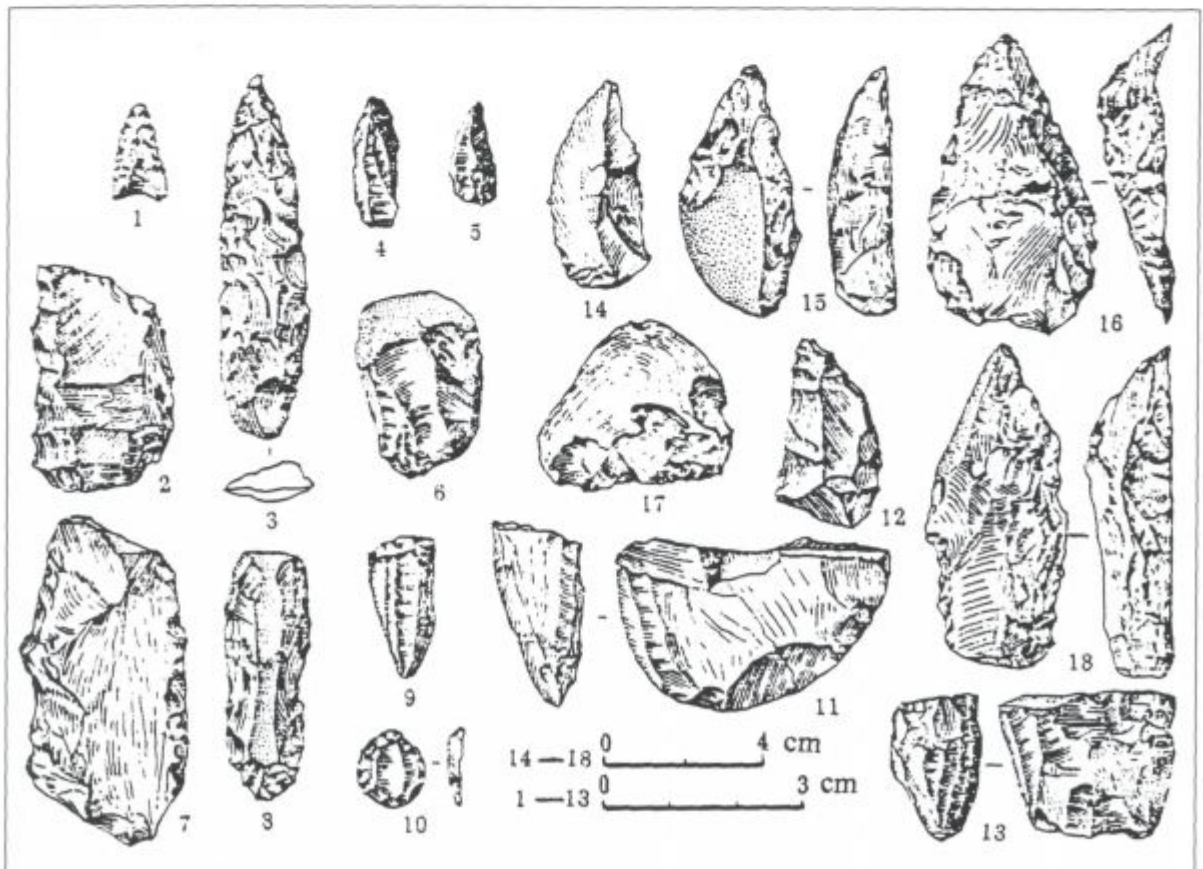


Fig. 4. Lithic tools from Shayuan.

tural deposits of both sites are generally comparable chronologically; the two sites appear to be contemporaneous.

Artefacts excavated from both sites include lithics, pottery and tools of bone, antler and mollusc shell. All lithic tools are of chipped stone. Typologically, pebble choppers scrapers and hammer stones are the most frequently encountered. There are also small lithic implements of quartz and flint. These types include scrapers, projectile points and blades. Substantial amounts of bone, antler and shell artefacts were found, including bone awls, bone needles, bone projectile points, bone harpoons, "antler adzes" and perforated shell implements (knives). These classes of artefacts have all been reported in previous excavations, as has the pottery type. The new finds, however, contribute to a better understanding of the existing data.

Over 100 pottery sherds of this period have been found in recent excavations. These are primarily body sherds, but include a small quantity of rim sherds as well. No vessels have yet been successfully reconstructed. All the pottery sherds were made of a similar clay admixture, tempered with coarse-grained quartzite. The diameter of the quartzite grit usually ranges from 1 to 3 mm, sometimes to over 5 mm. The poor sorting for the temper indicates that intensive selection was not made for it.

Since many quartzite tools have been excavated from Chinese sites of this period, it follows that the raw material for the temper might have come from an adjacent area and that the pottery might have been locally produced. Brown is the basic colour of the ceramics, with many variants that include dark brown, reddish brown and greyish brown. Some pottery sherds have a black core, indicating that the clay was not fully oxidised and that the ware might not have been fired in a kiln. Both modelling and coiling methods were used in pottery production. Pottery made with the former method is classified into two types. The first type has stroke marks on both the interior and the exterior of the vessel as a result of surface retouching. The second type has a plain surface, created by hand smoothing. The ornamentation of the stroke-marked pottery and the plain pottery is primarily the same and is characterised by V-shaped or U-shaped denticulations at 1 cm intervals along the vessels' rims. In the area underneath the rim, the exterior surface is decorated with a single row of puncture dots created by using a small stick to punch the interior of the vessel. The

wall is thick in both types of vessel, generally measuring 0.7 cm. Some vessel walls are as thick as 1.2 cm. Although we have no intact pots, the vessel shape suggested by the fragments is a round-based jar with a straight rim. Vessels manufactured using the coiling method have been stamped with a potter's paddle to reinforce the walls. The paddle was wrapped with cord or fibre and the vessel surface is consequently marked with cord impressions, producing cord-marked pottery. This type of vessel should be a jar (or urn) with a round base and slightly flared, round rim and straight sides. Pottery vessels manufactured by the coiling method were tempered primarily with coarse-grained quartzite. A small number of vessels were tempered with crushed, cord-marked pottery sherds. The manufacturing process was the same for pottery tempered with either material. A few pottery sherds made by the modelling method have straw mat or cord-woven mat impressions stamped onto their exterior surface and could be referred to as woven-pattern pottery.

Excavations of the 1993 and 1995 seasons also systematically collected soil and other ecofact samples. Over 1600 phytoliths from many species of plant were detected in more than 40 samples obtained from every layer. Researchers applied multivariate analysis to compare the double-peaked rice phytoliths statistically. Using this method, a certain number of phytoliths morphologically indicative of both wild rice (*Oryza nivara*) and cultivated rice (*Oryza sativa*) have been identified. This suggests that cultivated rice had already become part of the people's diet during this period. Results from carbon isotope (^{12}C , ^{13}C) and nitrogen isotope (^{14}N , ^{15}N) analyses of human bones excavated at Xianrendong and Diaotonghuan tend to confirm this observation.

A substantial amount of faunal remains was found at Xianrendong and Diaotonghuan. Remains include deer, boar, rabbit, fox, turtle and a variety of bird bones. Various species of deer predominate, followed by the remains of boar and bird. This would seem to reflect the general pattern of hunting activity during this period.

Charcoal samples were taken from all layers in the 1993 and 1995 excavations of Xianrendong and Diaotonghuan. Chinese and American research teams submitted over 30 samples for AMS dating. However, the dates appear to be too early. Quite a few dates fall into the range between $19\,780 \pm 360$ bp (BA 95136) and $15\,050 \pm 60$ bp (UCR3555). The youngest date is $12\,430 \pm 80$ bp (UCR3561), and comes from Layer

3B1 of the Xianrendong site. This should be close to the date of the same stratum's cultural deposit.

Two excavations were conducted at the Yuchanyan site (Yuan Jiarong 1996) at the same time as the excavations at Xianrendong and Diaotonghuan. Yuchanyan is a cave dwelling site in the limestone region of Hunan. The deposit in the cave is relatively well preserved and the cultural component is rather homogenous. The excavations revealed a wide range of lithic, bone, antler, teeth, shell and pottery artefacts. The lithic industry is all of chipped stone and includes choppers, scrapers, cutting tools and hoe-like implements, which are primarily unifacially flaked pebble implements. The small flint implements that are present at the Xianrendong site are absent here. Bone artefacts include awls and adzes. Two piles of pottery sherds situated near the bottom of the deposit are the only remains of ceramics encountered on the site. The thickness of the body sherds varies; some specimens are 2 cm thick. The ware is dark brown and its clay tempered with quartzite of various grain sizes, the majority of which fall into a range between 5 and 10 mm. A round-based urn with a slightly pointed bottom, flared rim and slanted body is the only vessel that could be reconstructed. Pottery from this site also has stamped cord marks, which were produced with a method similar to that of the cord-marked pottery from the Xianrendong site discussed earlier.

Rice phytoliths are widespread in the cultural deposit of Yuchanyan. More importantly, four rice husks were found at the site, two of which were found in layers close to the bottom of the deposit. Based on microscopic analysis of the morphological feature of the double peak on the surface of the husks, researchers believe that these rice samples retain characteristics of *Oryza Sativa indica*, *Oryza Sativa japonica*, as well as wild rice. They represent the archaic prototype of cultivated rice at the initial stage of evolution from wild to cultivated rice.

Over 40 species of plant were identified at the Yuchanyan site using the flotation method. Deer predominated among the large amount of faunal remains, which include water deer, red deer, and other species of deer, followed by boar, cattle and the Chinese bamboo rat. There are abundant bird bones as well, accounting for 30 per cent of the total faunal remains. A substantial amount of aquatic faunal remains was uncovered at the site, including fish, turtle, mollusc and snail. These remains resemble those found at Xianrendong.

Radiocarbon dates for Yuchanyan come from the AMS dating of organic carbon on a pottery sherd from Layer 3H. Among these samples, the carbon residue sample BA95057b yielded a date of $14\,810 \pm 230$ bp, and the humic acid sample BA95057a yielded a date of $12\,320 \pm 120$ bp. The date of the pottery's manufacture and utilisation should fall between these two dates (Yuan Sixun et al. 1997).

New discoveries in northern China

In the 1980's, work at the Nanzhuangtou site in Xushui, Hebei, in northern China uncovered ceramics and polished lithic implements in the same cultural context as Yuchanyan, but which date to approximately 10 000 bp. New discoveries of the 1990's come from the Nihewan basin in Yangyuan, Hebei. About ten sites containing microlithic assemblages have been excavated or intensively surveyed there, including Yujiagou, Ma'anshan, Qijiawan, Gongdiliang and Bashibutan. The dates of these sites fall into the range between 14 000 and 8000 bp. Fire hearths and ash pits were located at the Anshan site, along with lithic cores, flakes, microblades and blanks for lithic implements scattered throughout the site. The cultural deposit at the Yujiagou site consists of three layers. Its lithic assemblage includes microblades, scrapers, projectile points, burins and adzes. There are also decorative items made from mollusc shells, snail shells and ostrich eggs. The cultural deposit's faunal remains include frog, ostrich, mouse, wild horse, wild donkey, deer, bison and antelope, with the latter predominating. A small number of pottery sherds were uncovered in the middle and upper layers of the Yujiagou site. These pottery sherds were tempered with sand and are mostly reddish brown and yellowish brown, with incised, parallel arcs resembling fingernail marks on their exterior. The vessel type was probably that of a jar. One of the pottery sherds has been dated by thermoluminescence to 11 000 bp (Xie Fei 1998).

In addition, large numbers of pottery sherds have been found in the same cultural context with microliths at the Zhuannian site and the Zhejiangying site in Beijing. The pottery there was tempered with either coarse-grained quartz or mica, was brown in colour, and its vessel wall has a black core, indicating that its firing temperature was not high. Vessel types include jars and pots. Stone mortars and pestles are also present in this cultural assemblage. Both sites are radiocarbon dated to a range between 9000 and 10 000 bp (Yu Jincheng 1998).

Discussion

The recent discoveries of the southern cave dwelling sites and the northern microlithic assemblage which date to the transitional period from the Pleistocene to the Holocene have contributed much to our understanding of early cultures in China. This contribution is reflected in the following respects. First, the presence of early pottery is confirmed. Second, the emergence of rice agriculture in the southern region during this period is suggested by the analyses of rice phytolith remains. Third, a general pattern can be observed in the diversified foraging economy, especially noteworthy for fishing and hunting activities. Large mammals such as deer and boar were the principal game animals in the southern region, supplemented by bird and aquatic fauna.

The southern region has yielded the most complete data. The cave dwelling sites occupied during the transitional period from the Upper Pleistocene to the onset of the Holocene and during the Lower Holocene are distributed primarily along the base of limestone hills in the southern karst region. They are most frequently found along the southern and northern slopes of the Nanling Mountains and are the primary type of occupation site discovered in the south thus far. Open-air sites are also present, however, such as the Phase I remains recently excavated at the Dingshishan site in Yining (*Fu Xianguo et al. 1998*). It is likely that more open sites of this type will be identified in the future. Minor variations are present in artefact assemblages from these sites, although shared attributes include pebble implements with unifacial retouch, perforated "dibble discs," "cutting implements" with polished blades, artefacts of bone, antler and shell, cord-marked and plain pottery tempered with coarse-grained quartzite, and the remains of prototypical rice agriculture. The occupants of these sites shared the same ecosystem, as well as a similar subsistence economy, and developed a homogenous settlement pattern. So far, cave dwelling sites are known only in southern China. In contemporaneous sites in northern China, pottery is found in association with a widespread microlithic assemblage. The general characteristics of this cultural assemblage are not fully understood. However, the fact that the northern lithic industry is characterised by microliths is in itself a feature that distinguishes it from the contemporaneous southern tradition. The lithic industry of North China is associated with the lithic industry of Northeast Asia in this period. The lithic industry of the southern tradition had some similarities with the pebble lithic

industry of adjacent continental Southeast Asia of the same period. Based on this similarity, some scholars of Southeast Asian cultures have concluded that the southern China assemblage is part of the Hoabinhian culture which was widespread in Southeast Asia during the same period. However, the Sumatra-type pebble implement, which is the typical artefact of the Hoabinhian culture, is clearly different from the pebble implement found in contemporaneous South China. Pottery was also absent in the Hoabinhian culture, nor have remains of rice cultivation been found there.

Based on radiocarbon dating and relative dating, human occupation at the southern cave dwelling sites ceased at approximately 10 000 to 9000 bp. This precedes the deposits of the Early Middle Neolithic cultures, such as that of the Pengtoushan culture in the southern region. The lithic industry of these Early Neolithic remains, characterised by the overwhelming presence of pebble implements and the additional occurrence of small flint and quartzite tools at some sites, is a continuation of the lithic manufacturing tradition of southern China following the Paleolithic. The highly sophisticated nature of the bone and antler artefacts is a characteristic shared with contemporaneous cultures on the Eurasian continent and its adjacent areas. Their stroke-marked and cord-marked pottery vessels are the oldest known anywhere in the world to date. The stamped cord-marked pottery, however, is a distinctive local tradition. This pottery making method became widespread in the Middle Neolithic in southern China. In the subsistence economy, game animals in the Mesolithic consisted primarily of deer, boar and various kinds of aquatic resources, which is also similar to the faunal subsistence pattern of the Neolithic, except for the high frequency of bird remains characteristic of the Mesolithic cultural assemblage. The role played by rice agriculture in the subsistence economy is not known, although we do have evidence for the origin of a rice agricultural system, which became dominant in South China only later, during this period. This culture had developed some basic elements of the Neolithic cultures of the southern region. It became a major source for the development of the southern Middle Neolithic complex represented by the Pengtoushan culture, which is characterised by large, chipped pebble implements, small flint implements, cord-marked pottery and early rice agriculture. Therefore, this culture should be regarded as the Early Neolithic culture in South China. Although agricultural remains have yet to be identified in the northern microlithic cultures that

are contemporaneous with the southern finds, pottery emerged early in the north. The later phase of this microlith culture, represented by the Zhuannian site and the Zhenjiangying site in Beijing, is chronologically close to the Cishan-Peiligang culture of the Middle Neolithic. The microlithic tradition was maintained up to the Late Neolithic in the northern region.

It can be argued that the cave sites in the southern region during the transitional period between the Pleistocene and the Holocene and the microlith culture in northern China represent the two principal sources for Neolithic cultures in prehistoric China. The Middle and Late Neolithic cultures centred in the Yangtze River and the Yellow River basins arose from these two bases. The cultural assemblages that were identified as Mesolithic before the 1980's actually display characteristics of Neolithic cultures. They are clearly distinct from Mesolithic cultures in other regions of the world.

II. AN OUTLINE OF CULTURAL DEVELOPMENT IN NEOLITHIC CHINA

The presence of a Neolithic period on the territory of present-day China was proposed after the emergence of modern Chinese archaeology in the 1920's. In the first decades of its development, Chinese archaeologists could not form a comprehensive framework of cultural developments in Neolithic China due to limitations of data and research. Only after the mid-1980's did scholars start to propose a specific chronology and to synthesise the general characteristics of each period (*Yan Wenming 1987; 1989*). From then on, the archaeology of Neolithic China has made significant progress, most notably in recent years. This is especially reflected in the amount of data and research regarding the Neolithic cultures of the lower and middle Yangtze River and in the identification of Early Neolithic cultures in this area. This progress has allowed a better understanding of cultural development in Neolithic China.

The middle and lower basins of the Yellow River and the Yangtze River were the heartland of cultural development in ancient China. Although this vast region is a relatively independent geographic unit, the region's environment is highly complex and diversified. The diversity is best reflected in the differences between the north and the south. The economic and cultural differences here were a result of different ecological contexts that were already pre-

sent in the Palaeolithic. In the Neolithic, a wide range of regional cultures developed on the basis of these differences. Over time, various interactions between the regional cultures homogenised the pattern of regional development. According to current data, the development of Neolithic cultures in the heartland of ancient China went through three phases, termed the early, middle and late phases. The late phase can be further subdivided into early and late periods. After the late period, there was a transitional period to the Bronze Age or Three Dynasties civilisation, which we also call the Post-Neolithic period. In the following sections, the general features of these phases' cultural development are elaborated.

The Early Neolithic (c. 12 000–6500 BC)

The cultural differences between the north and south were already noticeable in the Palaeolithic. By the Early Neolithic, two distinctive cultural systems had clearly developed in southern and northern China.

The northern manifestation was a microlith culture distributed throughout the North China plain and its adjacent regions. Many sites or localities of this culture have been identified in Hebei, Henan, Shaanxi, Shanxi and Shandong. Over one hundred sites have been found in the hilly region in central Shandong alone. On the basis of minor differences in cultural attributes, the microlith assemblage was once further subdivided into the "Shayuan culture," "Hutouliang culture" and "Fenghuangling culture," even though these cultures' shared characteristics make them very similar. The microlithic assemblage consists of microlithic cores which conical, wedge-shaped and keel-shaped, as well as a long, narrow microblade. Both small lithic tools such as scrapers, projectile points and burins, and large lithic tools such as adze-shaped implements are present. Ceramic vessels represented by jars, stone implements represented by mortars and pestles, as well as bone and shell artefacts that include awls and pendants, have been found in the later manifestations of this microlithic assemblage. These later forms are found in the middle and upper layers of the Yujiagon site in Yangyuan, the Zhuannian site in Beijing and the Nanzhuangtou site in Xushui. Antelope was the principle game animal utilised at the Yujiagon site. Large mammals such as wild horse, cattle, wild donkey and deer were also present. Deer and boar were the primary game animals uncovered at the Nanzhuangtou site.

An early culture characterised by cave dwellings was discerned along the northern and southern bases of the Nanling Mountains in South China. To date, a dozen sites of this type have been identified. The majority of these sites are cave sites, but some are open-air sites. The use of pebble implements is a primary feature of this southern culture. Its lithic assemblage includes bifacially flaked chopping implements, perforated pebbles and cutting implements with polished blades. Small lithic tools of flint and quartz are also present at some sites. The manufacture of bone, antler and mollusc shell implements, which include awls, needles, projectile points, knives and harpoons, were highly developed in this culture. A type of round-based pottery jar which was tempered with coarse-grained quartzite was found at the Xianrendong site in Wannian, the Yuchanyan site in Daoxian, the Miaoyan site in Guilin and the Dalongtan site in Liuzhou. Reliable evidence of rice cultivation is also found at Xianrendong and Yuchanyan, although a higher proportion of hunting-fishing-gathering activities is observed in the subsistence economy. Deer and boar were the game animals that served as the main sources of protein for the foraging groups. The exploitation of aquatic fauna and birds was also significant.

These Early Neolithic sites are not extensive in area, which suggests that the organisation of these early settlements was not complex. Six hearths were identified on a single living floor excavated at the Xianrendong site, which suggests that different consumption areas might have been present within a single settlement at the same time.

The Middle Neolithic (6500–5000 BC)

Remains of agriculture have not yet been identified in Early Neolithic sites of the northern region. However, it is likely that the agricultural systems in both the north and the south during the Middle Neolithic period emerged from their preceding cultural assemblages of the Early Neolithic. In the middle and lower Yellow River basin, many northern sites of the Middle Neolithic period yield remains of foxtail millet and broomcorn millet, which are both dry-land crops. Over 80 storage pits filled with millet were found at the Cishan site. The total weight of grain is estimated at 50 tonnes when fresh. Domesticated stock and fowl include pig, dog and chicken. A large quantity of cultivated rice remains was found in the mid-Yangtze River basin, which indicates the presence of a system of paddy agriculture. Pig, buffalo, and chicken were the principal domesticated fauna in the southern region.

Several hundred sites dating to this period have been found. The northern cluster includes sites of the Laoguantai culture in Shaanxi, the Cishan-Peiligang culture in Hebei and Henan, the Houli culture in Shandong and the Xinglongwa culture in South-east Inner Mongolia. Although microlithics are still present among the remains of this period, polished stone tools comprise the bulk of the lithic assemblage. Typologically, the assemblage includes stone mortars, pestles, spades, sickles, knives, axes, adzes and chisels. The ceramic vessel types are also diverse and include jars, urns, pots and alms bowls. The northern cluster features an advanced industry of bone tools as well. The Pengtoushan-Zaoshi culture is the only group with agricultural remains known from this period in the mid-Yangtze River basin of South China. Chipped pebble implements and small flake tools were the principle types of lithics. Polished stone implements such as axes and adzes were also present. In addition, a variety of bamboo and wood implements are known from the southern assemblage. Ceramic vessel types include pots, urns, and plates, which were tempered with charcoal and impressed with cord marks. A hunting-fishing-gathering culture known as the Baozitou culture was identified in the Yijiang River basin in the Lingnan region further in the south, which also had pottery and polished stone implements.

Large settlement sites over tens of thousands of square meters in area are known from this period. Some settlements were enclosed by moats. For instance, the settlement at the Xinglongwa site in Aohan Banner, Inner Mongolia was enclosed by a moat two meters wide. The enclosed area was about 20 000 square meters and had multiple rows of house structures. The moat-enclosed settlement at the Bashidang site in Lixian, Hunan was almost 30 000 square meters in area and was comprised of a residential area, storage area, a cemetery and waste disposal area. The houses of this period were relatively large, often ranging between 30 and 40 square meters each. Social stratification in houses and in burial practices is not significant, which has been interpreted as showing the insignificant institutionalisation of social inequality at these settlements.

The Early Phase of the Late Neolithic (5000–3500 BC)

The Late Neolithic is a time of full-blown development in prehistoric China. Over ten thousand sites of this period have been found. Regional differen-

tiation in cultural attributes increased dramatically. The remains of the early phase of the Late Neolithic include the sites of the Yangshao and Beixin-Dawenkou cultures in the Yellow River basin, the Zhaobao-gou-Hongshan and Xiaozhushan cultures north of the Yellow River basin, the Daxi culture in the mid-Yangtze River basin, the Hemudu, Majiabang and Songze cultures in the lower Yangtze River basin, and the Xiantouling culture in the Pearl River basin.

The societies of this period experienced rapid development in agriculture. This is manifested in the diffusion of agricultural practice to regions north of the Yellow River basin and south of the Yangtze River basin. Moreover, rice and other crops of paddy agriculture were introduced to North China, while millet and other dry land crops were brought to the Yangtze River basin.

Goats were raised in both the south and north. Also common to both regions was a variety of crops such as cabbage, melon and hemp. Regional development gave rise to craft specialisation and specialised production zones during this period. A broad variety of pottery, including highly developed painted pottery, as well as refined stone, jade and lacquer ware are all examples of specialised production. Regional pottery-making traditions became extremely complex, as did exchange networks. Several specialised lithic manufacture centres have been identified. The largest is located in the Ningzhen region in Jiangsu. Its products reached not only the entire lower Yangtze River basin, but also the mid-Yangtze River basin and the lower Yellow River basin. The lithic production centre in the Three Gorges area was also quite large; its products are found in most areas of the mid-Yangtze River basin. The Western Liaoning and Ningzhen regions were two major jade manufacture centres. Products from the latter were distributed broadly, extending through the entire Yangtze River basin and the middle and lower Yellow River basin. The expansion of trade networks formed the basis of cultural interaction.

The area of the settlement sites during this period is generally in the range of tens of thousands of square meters, and the settlements were usually centrally organised. For instance, the moat-enclosed settlement of Phase I at the Jiangzhai site in Lintong, Shaanxi consisted of five groups of houses. The houses in each group were of three different sizes. The entrances of all these buildings faced a central plaza. The settlements' associated cemeteries were usually large, some having over one thousand indi-

viduals. The burials were usually grouped into hierarchically differentiated groups within each cemetery. This has been interpreted as varying levels of social organisation within the communities. Large settlement centres of over one hundred thousand square meters in area emerged in the latter part of this phase. Towns with earthen wall enclosures have been identified at the Xishan site in Zhengzhou, Henan and at the Chengtoushan site in Lixian, Hunan. Large burials furnished with conspicuous items started to appear, such as in the Lingjiatan site in Hanshan, Anhui. These have also been taken as indicators of intensive social stratification.

The Late Phase of the Late Neolithic (3500–2500 BC)

The archaeological cultures of the late phase of the Late Neolithic retain the general patterns of their earlier phase predecessors. In the northern region, the Yangshao culture, the Dawenkou culture and the Hongshan culture were in the later stages of their course of development. In the middle and lower Yangtze River basin, the southern region witnessed the continuous development of the Qujialing-Shijiahe and Liangzhu cultures, which had already flourished in the previous period. The dramatic development of social complexity on a regional scale was characteristic of this period.

Social stratification is the most striking feature of this period, and is reflected in the variety of settlement sizes. The size of most settlement sites falls into a range between thousands of square meters and tens of thousand of square meters. However, some sites are as large as hundreds of thousands of square meters, and a few extraordinarily large settlements such as the Taosi site in Xiangfen, Shanxi, the Dawenkou site in Ningyang, Shandong, the Liangzhu site in Yuhang, Zhejiang, and the Shijiahe site in Tianmen, Hubei reach up to several million square meters. In addition, large ceremonial centres, such as the Niuheliang site in Lingyuan of Liaoning, which was over ten square kilometres in area, date to this period. The settlement pattern often consists of clusters of a dozen or even several dozen sites. Walled enclosures constructed of stone or earth were present in several regions. The walls surrounding the central settlement at the Shijiahe site were over 4000 meters in length. The moat was 60 meters wide. It would have taken an estimated 1000 people a period of ten years to construct the wall. Such a labour force would require a community with an estimated population of 20 000 to 40 000 individuals

(*Nakamura Shinichi 1997*). This matches the population of an early city-state.

Houses in the smaller settlements were generally not large during this period. However, large structures such as palatial architecture and altars were present in the large settlements. In mortuary practice, the majority of burials in cemeteries had few grave goods. Large burials were few in number; they were generally arranged in clusters, and were furnished with substantial amounts of delicate pottery, jade carvings, lacquer ware, ivory carvings and silk garments. This suggests that elite status was already well established at this time and that it might have been hereditary.

The stone and jade production centres in the Three Gorges region and the Ningzhen region declined in this period. The elite had monopolised access to raw materials as well as the manufacture and distribution of finished goods for the production of conspicuous items such as ritual pottery ware, jade carvings, lacquer ware and ivory carvings, in order to reinforce their power of social control. The pattern of production and exchange of daily items was different from that of the previous period. Incised pictographic symbols began to appear on both ceremonial pottery vessels and ritual jade items in this phase.

The Post-Neolithic (2500–2000 BC)

The concept of a Post-Neolithic is proposed here in order to describe the period previously known as the Longshan Horizon/Period. In the Yellow River basin, the Qijia, Kexingzhuang, Wangwan and Longshan cultures comprised the Post-Neolithic. In the middle and lower Yangtze River basin, the Shijiahe and Liangzhu cultures, which had flourished in the preceding period, declined in the Post-Neolithic. Few settlement sites of this period have been found in the Yangtze River basin region, although remains from these sites clearly demonstrate cultural traits of the Yellow River basin in the north.

Contemporaneous settlements in the Yellow River basin retained local cultural features from the preceding period. The use of the potter's wheel became highly developed. Bronze items are frequently encountered. A pottery sherd incised with eleven characters was found at the Dinggong site in Shandong.

The Post-Neolithic was the transitional period from the Neolithic to the Bronze Age or Three Dynasties

civilisation of China. According to the conventional scheme, the late phase of this period noticeably overlapped with the period of the legendary Xia dynasty. The Three Dynasties civilisation emerged in the general region of the Central Plain, which is also known as the middle and lower Yellow River basin; it was a continuation of Post-Neolithic cultures in this region.

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