

THE EXCAVATIONS AT XIANRENDONG AND DIAOTONGHUAN, JIANGXI

Zhang Chi

Department of Archaeology, Peking University, Beijing 100871, China

ABSTRACT

The Xianrendong and Diaotonghuan sites are located in Dayuan basin, northeastern Jiangxi province, southern China. Xianrendong is a cave site which had been excavated in the 1960s. Diaotonghuan is a rock shelter site, only 800 m from Xianrendong. In 1993 and 1995, two seasons of excavation conducted at these sites by the joint team of the Department of Archaeology at Peking University, the Jiangxi Institute of Archaeology and the Andover Foundation for Archaeological Research yielded diagnostic artifacts that help further our understanding of early Neolithic culture in southern China. The analysis of thousands of plant phytoliths recovered from the stratigraphic zones showed an increasing proportion of domesticated rice through time, which marks the development of rice agriculture. The simultaneous rise of pottery manufacture and rice agriculture, around 16,000-10,000 BP, indicates the important transition from the Paleolithic into the Neolithic in Southern China.

INTRODUCTION

The excavations at Xianrendong and Diaotonghuan were undertaken by the joint team of the Department of Archaeology of Peking University, the Jiangxi Institute of Archaeology, and the Andover Foundation for Archaeological Research, in the context of the Sino-American Origins of Rice Project. The project's aim is to investigate how and why rice agriculture came into being in South China. Previously, the earliest domesticated rice remains had been found extensively at Middle Neolithic sites in the Middle Yangtze River region. Thus, further understanding of rice origins was expected to be achieved through research into Early Neolithic sites in South-Central China.

After a preliminary survey, the joint team found potential deposits of Neolithic cultures at both the Xianren-

dong and Diaotonghuan sites. One of these, the Xianrendong site, had already been excavated in the 1960s (Jiangxi Administration of Cultural Relics 1963; Jiangxi Provincial Museum 1976). In 1993 and 1995, two seasons' tests and excavations at these two sites, by the joint team, yielded diagnostic artifacts and ecofacts that help further our understanding of the Early Neolithic in South China.

EXCAVATIONS

Both Xianrendong and Diaotonghuan are located in the Dayuan basin, Northeastern Jiangxi Province. This small basin is approximately four kilometers east-west by one kilometer north-south, surrounded by limestone mountains. Xianrendong is a cave which lies at the base of a mountain in the north of the basin. Diaotonghuan is a rock shelter, located on the top of a small hill 800 meters to the south of Xianrendong.

The 1960s excavations at Xianrendong were undertaken at its entrance, where 69 square meters were excavated. In 1993 and 1995, the 1-meter wide by 4-meter long baulk between the original excavation trenches 3 and 4 in the west part of Xianrendong, as well as a 4-meter wide and 50 cm deep slice at the western end of original trench 6, in the eastern part of the cave, were excavated. The stratigraphy encountered in these tests is generally consistent with that seen in the 1960s excavations.

The Diaotonghuan rock shelter is oriented northwest to southeast, and is open at both ends. It measures approximately 15 meters long by 10 meters wide under its ceiling. A total of 39 one by one meter squares was excavated in this area in 1993 and 1995. One square was dug to a depth of 4 meters, but never reached the rock floor. 20 stratigraphic zones have been identified at Diaotonghuan.

According to the analysis of the artifact sequences and radiocarbon dates from these two sites, Zone 2 at Xianrendong and zone C at Diaotonghuan belonged to the Middle Neolithic. Above them lie the more recent deposits of Xianrendong 1A-1B and Diaotonghuan A-B. Zone 3 of the western trench at Xianrendong (zones 3A, 3B1,

3B2, 3C1a and 3C1b) was Early Neolithic, as were zones D and E at Diaotonghuan. Zones 4, 5, and 6 of the western trench at Xianrendong were Late Paleolithic, along with zones F-M at Diaotonghuan. In both sites the Early Neolithic complex is the richest, and it is also the one of the most general interest.

THE EARLY NEOLITHIC REMAINS

The Early Neolithic artifacts from Xianrendong and Diaotonghuan include lithics, bone, antler and shell tools, and pottery. The lithic tools can be classified into chipped and pecked pebble tools and small chipped flint and quartz tools. The pebble tools include chipped unifacial spokeshaves, flake choppers, pebble hammers, pebble peckers, chipped adzes, pebble choppers and doughnut-shaped digging stick weights. The small flint and quartz tools include unifacial projectile points and flake end-scrapers. The bone, antler and shell tools include multi-barbed symmetrical bilateral antler points with notched pointed bases, multi-barbed symmetrical bilateral antler dart tips, double pointed flat antler points, trianguloid shell points, double-pointed flat antler dart tips, ulna awls, split bone awls, bone needles with mid-point eyes, long bone rounded-end fleshers, small mussel side scrapers and large mollusk pierced threshers. The large number of bone and antler tools indicate that bone working was an important activity at these two sites.

The earliest pottery (MacNeish *et al.* 1998), all designated Xian Slab Ware, had large quartz temper, was poorly fired, and was formed in ascending tiers of rectangular slabs joined together to form U-shaped vessels. Decoration was by notching lips and punctuating from the inside out to form exterior protuberances. Xian Slab Ware is separated into two types:

1. Xian Wiped sherds, the only ceramic type in zone 3C1b at Xianrendong, which were found to have been wiped or scored with some sort of blunted object with teeth like a fork on both exterior and interior surfaces;
2. Xian Plain sherds, which occurred mainly in zone 3C1a at Xianrendong and zone E at Diaotonghuan, and which were often found to have surfaces smoothed over by hand.

In the following zones (3A, 3B1, 3B2 at Xianrendong and zone D at Diaotonghuan), the pottery, designated Xian Coiled Ware, continued to be poorly fired with heavy quartz temper, but was manufactured using different techniques. Instead of being slab-built the initial vessel was made by coiling, and then paddling was used to join the coils together and to thin and enlarge the vessel. The sherds were separated into two types:

1. Xian Paddled revealed paddling only on the exterior of U-shaped vessels with smooth interiors;

2. Xian Double Paddled had evidence of both exterior and interior paddling. The paddles used were wrapped with some kind of cord or twisted fiber.

The analysis of plant phytoliths recovered from the stratigraphic zones both at Xianrendong and Diaotonghuan (Zhao 1996) showed that wild rice (*Oryza nivara*) phytoliths occurred in late Paleolithic zones at both these sites. In the Early Neolithic zones E of Diaotonghuan and 3C1a of Xianrendong were found a mixture of wild rice phytoliths and some domesticated rice (*Oryza sativa*). Zones D of Diaotonghuan and 3B1, 3B2 of Xianrendong saw an increased proportion of domesticated rice phytoliths, suggesting incipient rice agriculture.

The study of faunal remains recovered from both sites indicate that the inhabitants focused animal procurement on wild taxa, particularly deer, pigs and birds (Redding 1995).

DISCUSSION

The early Neolithic remains recovered from the 1993 and 1995 excavations at Xianrendong and Diaotonghuan are identical with the so-called "Xianrendong Lower Layer Culture" defined by the 1963 Xianrendong excavation report (Figures 1-3). These remains came from the lower layer of zone 3 of trenches 3 and 4, which included sub-layers, e.g. the zones 3A, 3B1, 3B2, 3C1a and 3C1b. There were two radiocarbon samples dated from the 1960s excavation. One bone sample from the lower layer was dated to 8,575±235 BP, which is later than the upper layer date of 10,870±240 BP and is considered suspicious. In 1993 and 1995, 12 carbon samples taken from early Neolithic zones at both Xianrendong and Diaotonghuan were dated. The earliest date was 19,770±360, but most dates lay between 17,640±60 and 12,430±80 BP (see Chen Xingcan, this volume).

Within this time period, there are about 20 cave sites that have been found all along the north and south sides of the Nanling mountain range in South China. Among these sites, Huangyangdong and Dushizi in Guangdong; Bailiandong, Liyuzui, Miaoyan in Guangxi; as well as Sanjiaoyan and Yuchanyan in Hunan, have been excavated. The same style of pebble tools, including choppers, scrapers, hammers and digging stick weights, as well as items of bone working were recovered from these sites (Yuan Jiarong, 1991). Small flint tools were found in Bailiandong and Liyuzui, showing the same characteristics as those from Xianrendong and Diaotonghuan. A series of shell and bone samples from these sites was dated (Table 1):

Potsherds also were recovered at Miaoyan, Yuchanyan and Liyuzui. These sherds were very thick and had large quartz temper. Sherds from Miaoyan were plain like Xian Plain from Xianrendong and Diaotonghuan. Sherds from Yuchanyan had cord marking on both exterior and interior surfaces in a manner similar to Xian Double Paddled.

Sherds from Liyuzui had cord marking on the exterior surface like of Xian Paddled. Four carbon samples from potsherds from Miaoyan and Yuchanyan were dated (Yuan Sixun *et al.* 1997), these dates (Table 2) matching the Early Neolithic dates at Xianrendong and Diaotonghuan very well.

Table 1. Acceptable C14 ages from shell and bone samples

Site	Lab. No.	C14 age (yr BP)
Dushizi middle layer	BK83017	15350±250
Dushizi upper layer	ZK714	14900±300
Bailiandong 11	BK81025	12980±150
Liyuzui lower layer	BK82090	12880±220
Sanjviaoyan	BK8905	12060±120
Huangyandong	BK676	11930±200
Huangyandong	BK677	10950±300

Table 2. C14 dates for Miaoyan and Yuchanyan sherds

Site	Lab. No.	Material	C14 age (yr BP)
Miaoyan	BA94137a	humic acid	15560±500
Miaoyan	BA94137b	residue	15660±260
Yuchanyan	BA95057a	humic acid	12320±120
Yuchanyan	BA95057b	residue	14810±230

In the recently excavated site of Yuchanyan, phytolith study identified a large quantity of rice phytoliths from different layers, and two rice grains were unearthed which have been determined to be an early form of domesticated rice (Yuan Jiarong 1996).

Therefore, we may conclude that there was a developed early Neolithic culture before 10,000 BP to the north and south of the Nanling mountain range in southern China. The remains have all been found in limestone cave sites and include a pebble tool industry, bone working, pottery making and incipient rice cultivation. This culture was very different from the microlithic complex in north China at the same time. Because the Xianrendong site is the first excavated early Neolithic site in South China, we may term this early Neolithic culture as the "Xianrendong Culture." After 10,000 BP, with the rise in temperature, the Early Neolithic culture spread into the middle and lower Yangtze River valley and this area became the heartland of rice agriculture in the Middle Neolithic period.

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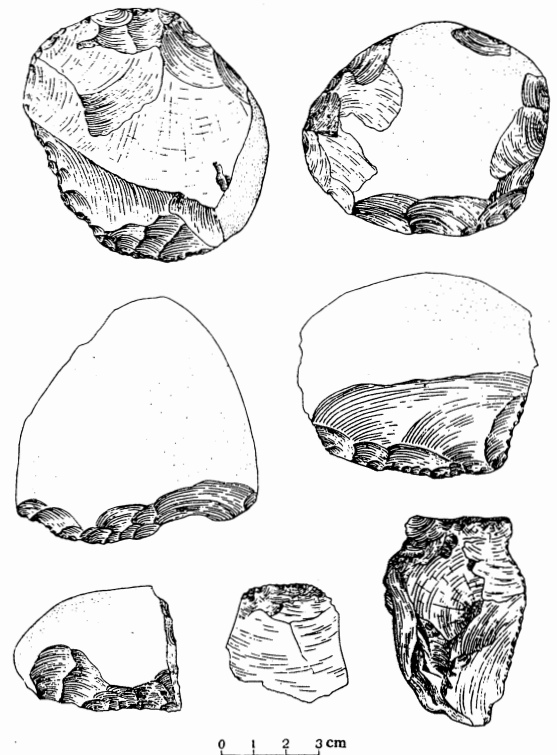


Figure 1: Lithic tools from Xianrendong layer 3 (1962 excavations)

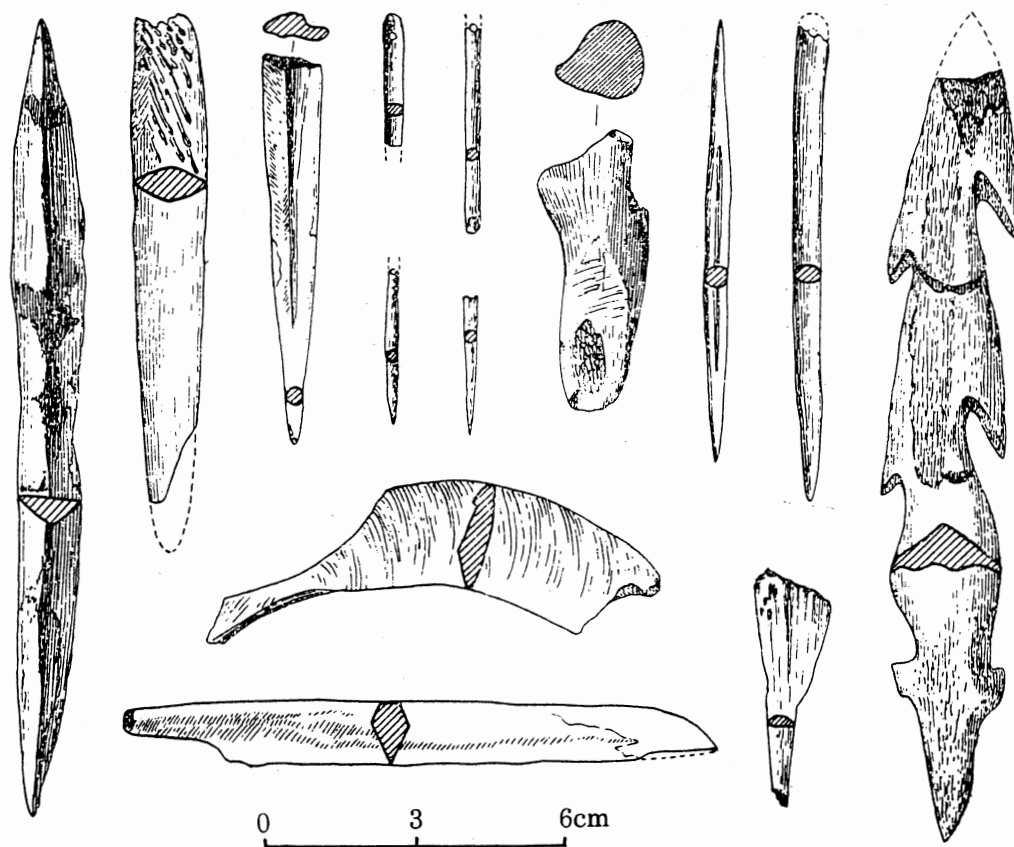


Figure 2: Bone tools from Xianrendong layer 3 (1962 excavation)

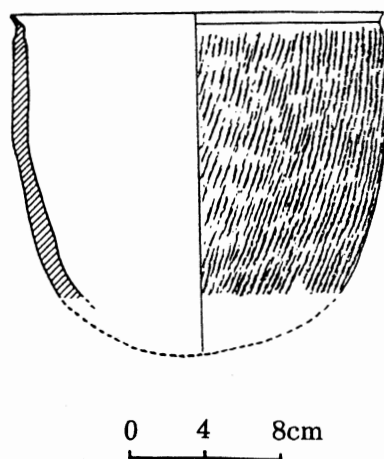


Figure 3: Xian paddled pottery vessel from Xianrendong layer 3 (1962 excavation)