

SOME OBSERVATIONS ON THE ARCHAEOLOGICAL SITE OF HEMUDU,  
ZHEJIANG PROVINCE, CHINA<sup>(1)</sup>

*Liu Jun,  
Zhejiang Provincial Museum  
Hangzhou, China.*

Situated between the Siming Mountains and the Ning-Shao Plain, and covering an area of 40,000m<sup>2</sup>, the archaeological site of Hemudu was excavated from 1973-4 and from 1977-8<sup>(2)</sup>. The excavations, over an area of 2630m<sup>2</sup>, have uncovered more than 7000 artefacts. The present paper will put forward some ideas based on the evidence unearthed, but first a brief introduction to the site is required.

SITE DESCRIPTION AND STRATIGRAPHY

Lying 35 kilometres east of the town of Yuyao and 30 kilometres west of the city of Ningbo, Hemudu has the Siming Mountains to its south and a fertile plain to its north. It lies on the northern bank of the Yaojiang River, which flows eastwards. Being close to the river some of the deposits have been exposed by erosion. They are divided into 4 layers, and the two lowest (layers 3 and 4) lie below the present water-table. Since the soil is also slightly acidic there is excellent preservation of organic remains; the leaves and stalks of rice are still very fresh in colour. The boundaries between the layers are clear-cut. The pottery found in all four layers appears to represent a single evolving tradition.

The first (upper) layer of cultural deposits (calibrated radio-carbon age c.3400 B.C.) has produced 12 extended burials, a number of postholes, and also irregular pieces of red fired clay. No traces of wood or bone have been found. Stone implements include axes with central perforations, and adzes with rectangular plans and cross-sections. Jades include huang (a jade of square shape with a central hole) and jue (a jade penannular ring). Pottery is usually handmade and fired at about 1000°C, and some sherds may indicate use of a potter's wheel. Decoration is mainly cord marked. Vessel types include fu cauldrons, ding (with three or four legs), dou, hu, yi, and there are also baked clay spindle whorls. Fu cauldrons with greatest widths at their shoulders and dou with perforated stands are common - ding are rare.

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(1) Liu Jun, an archaeologist at the Zhejiang Provincial Museum in Hangzhou, was able to attend the 12th IPPA Conference in Penablanca with a grant from the Asian Cultural Council in New York. Wang Chaobo, an English teacher from Zhejiang University, travelled to the Philippines with Liu Jun and read the paper in English.

(2) Reports with illustrations are listed after the text.

The second layer of cultural deposits (c. 3900-3700 B.C.) is thin, and yielded few artefacts. Bone arrowheads and bone ssu-spades are now preserved, and there is also one wooden ssu-spade with an attached handle.

The third layer (c. 4300-4000 B.C.) contains wooden house piles, and burials are mostly flexed on their sides. Stone tools are usually only ground smooth along their blades. Bone items include arrowheads, awls and ssu-spades, and there are some ivory butterfly-shaped objects (a stone object of this type was found in layer 2). Wooden items include painted bowls and parts of looms. The pottery is fired at only about 850°C and is still mainly cord-marked. Shapes are less diversified than in layers 1 and 2, but include fu cauldrons, bo, dou, zeng, and a portable pottery stove.

The fourth basal layer (c. 5000-4600 B.C.) is particularly rich in remains owing to waterlogging. There is a quantity of woodwork with mortise and tenon joints, and many other wooden items including ssu-spade handles and adzes handles. Bone artefacts include ssu-spades, arrowheads, whistles, chisels, awls and needles. Pottery (Fig. 1) is cord-marked, and sometimes incised with geometric, plant or animal designs. Forms include fu cauldrons, two-eared jars, plates, deep basins and flat-bottomed bo. Some jade ornaments occur in this layer.

#### THE NATURAL ENVIRONMENT AND CLIMATE OF HEMUDU

Over 50 species of animals have been identified at Hemudu, including tiger, elephant, deer, rhinoceros and monkeys. Animals such as these imply the existence of a forested and hilly environment. In addition there are many remains of birds, including pelican (Pelecanus philippensis), egret (Phalacrocorax sp.), cormorant (Ardea sp.) and duck (Anas sp.). Fish include carp (Cyprinus sp.), crucian carp (Carassius sp.), black carp (Mulopharyngodon piceus) and catfish (Parasilurus sp.). These creatures, together with tortoise (Chinemys reevesi) and Chinese turtle (Amyda sinensis), suggest the existence of lakes and swamps in the vicinity of the site.

These impressions of the environment around Hemudu are reinforced by pollen and spore analyses. Species which belong to the flora of hilly regions include Liquidambar formosana, Quercus myrsinaefolia, Q. gilva, Altingia chinensis, Castanopsis tibetana, Castanopsis farg, Phoebe sheareri, Cinnamomum chingii, Lindera glauca, Castanopsis sclerophylla and Murraya paniculata. Dense forest species include Lygodium microstachyum, Lygodium salicifolium, Ophioderma pendula, Microsorium superficiale and Loxogramme dimensis. Species characteristic of lakes and swamps include Typha angustifolia, Potamogeton distinctus, Trapa bispinosa, Nelumbo nucifera and Euryale ferox. Other species documented include Prunus persica, Choerospondias axillaris, Lonicera japonica, Artemisia sp., Polygonum spp. and Rubia cordifolia. Further proof

of the existence of lakes and swamps close to the site lies in the discovery of a layer of peat to its north.

Indicators of the climate of Hemudu in the period of layer 4 include elephant, rhinoceros and red-faced monkey, and the plant species Liquidambar formosana, Altingia chinensis and Castanopsis farg. All these prefer a climate warmer than that of the region around Hemudu at present, and the fern species Lygodium microstachyum and Lygodium salicifolium only grow today in Guangdong and Taiwan.

#### RICE AND ITS CULTIVATION AT HEMUDU

Large quantities of rice remains have been found at Hemudu. In layer 4 the deposits of grains, husks, straw and leaves attain an average thickness of 40-50 cm, with a range from 10-60 cm. Many stalks still have roots attached, and leaves still have discernible veins. All are fresh in colour. Burnt rice remains also occur in ash deposits, and some of the fu cauldrons have burnt rice crusts left in their bottoms from cooking. Rice husks were also used as temper in some of the black pottery, and one vessel has an ear of rice engraved on it. All this information points to rice cultivation in the period of layer 4, possibly on the swampy lowland soils around the site.

Examination of the rice indicates that it belongs to both the indica and japonica (sinica) varieties, and the degree of variation suggests that the Hemudu rice had already developed a long way from the wild form towards modern varieties.

While the abundance of rice at Hemudu owed much to the natural environment with its swampy lowlands, it also partly reflected the relatively advanced farm tools. Of these, the numerous bone ssu-spades (Fig. 2) are of particular interest. They are approximately 20 cm. long, and the thicker ones are perforated near their proximal ends. All have two holes made through their blades on either side of a shallow slot, made to take a T-shaped handle tied by rattan through the holes. All these spades show heavy signs of use. Other tilling implements include hardwood picks and simple pointed sticks. These are like the guola and songmu used by Dulong farmers (Yunnan) before Liberation, and probably had similar uses for loosening the soil and weeding.

Other important food resources at Hemudu included gourds, acorns and water chestnuts, and pig, dog and possibly water buffalo were domesticated.

#### THE WOODWORK OF HEMUDU (Fig. 3)

Architectural remains are most abundant in layer 4. Houses were constructed on piles, and the surviving parts reveal a developed system of mortise and tenon construction, together with

the use of dowels (Fig. 3). One house in layer 4 was over 23m long (the full length has not yet been revealed), 7m wide, and had a porch attached 1.3m wide. The house floors were covered with reed mats, many fragments of which have survived.

In the upper layers of the site the houses were built at ground level, posts being either sharpened and driven into the ground, or set in postholes packed with stones, sherds and clay.

What is amazing about the Hemudu architecture is not only its antiquity, but the fact that it was constructed with such simple tools of stone, wood and bone. Although crude, the Hemudu woodwork clearly represents an early and very important stage in the general evolution of Chinese architecture.

#### THE SOCIETY OF HEMUDU

The relative simplicity of the stone implements and pottery vessels unearthed from layers 3 and 4 suggest that the mode of production of the people of Hemudu was still at an underdeveloped stage. True, agriculture had already entered the ssu-spade tilling phase and rice was grown on a large scale, but this did not free the people from the need to gather and hunt important food resources. Life-expectancy was fairly short, and most of the burials are of young to middle-aged persons, rather than old by present standards. Grave goods are few (rarely more than 5 or 6 pottery vessels per tomb), and most deceased were buried singly. The society was evidently still basically egalitarian, and is considered by Chinese archaeologists to belong to the matriarchal level of development.

#### CONCLUSIONS

The discovery and excavation of Hemudu marked a major breakthrough in Chinese archaeological studies - one of the most significant since Liberation. Since discovery of the site in 1973 many other investigations have taken place on the Ningbo-Shaoxing Plain of northern Zhejiang and in the Zhoushan Archipelago, and other similar sites have been discovered. These point to the existence of a distinctive Neolithic culture.

#### REFERENCES

Although available reports on Hemudu are mainly in Chinese, English summaries (with Chinese main text and illustrations) can be found in Kaogu Xuebao (K'ao-ku Hsüeh Pao) 1978, part 1, pages 94 and 106-7. See also Chang, K.C., 'The affluent foragers in the coastal areas of China', in Senri Ethnological Studies 9: 177-86, 1981.

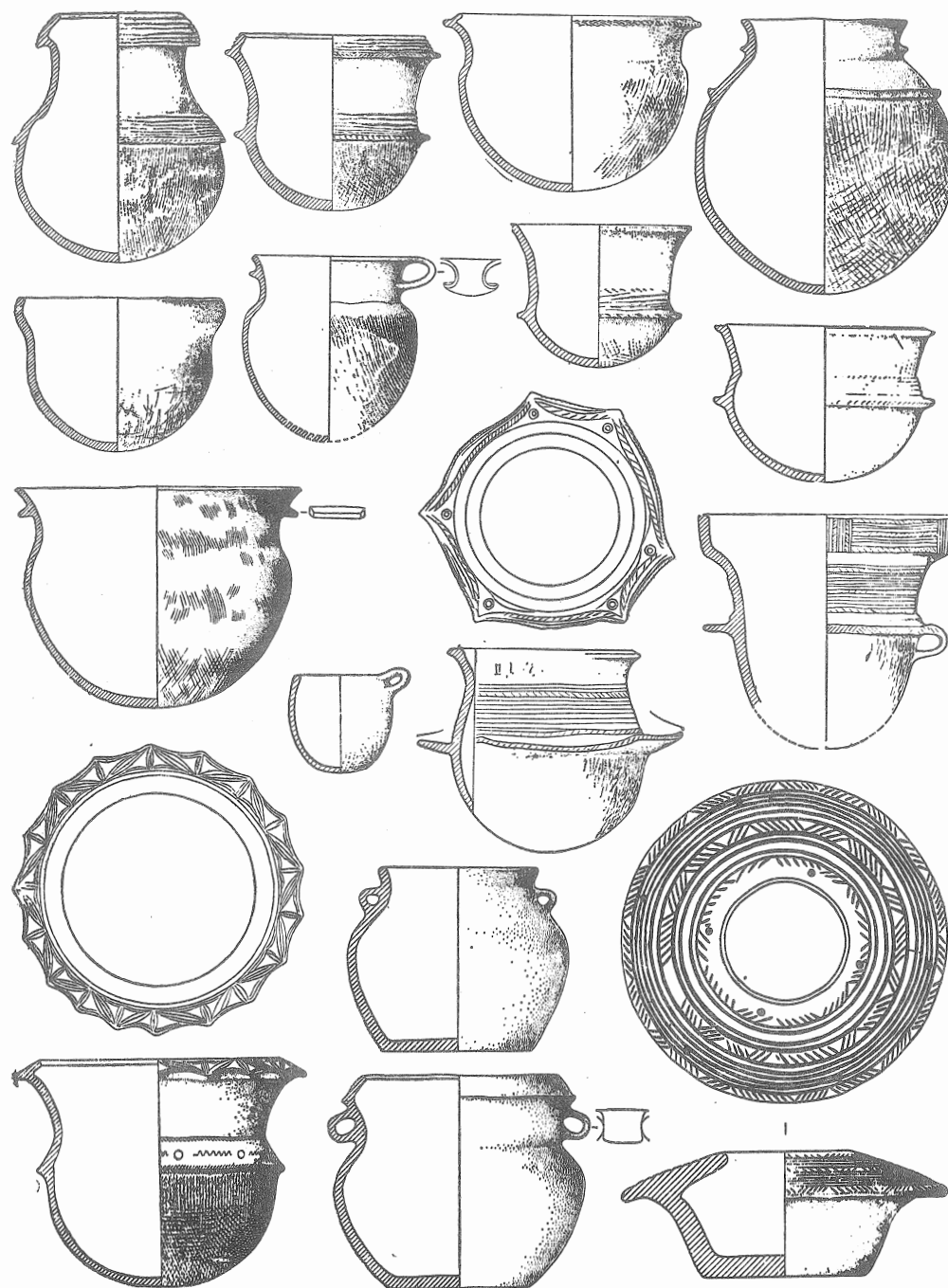


Figure 1. Pottery from Hemudu layer 4. Reprinted from Kaogu Xuebao 1978, part 1.

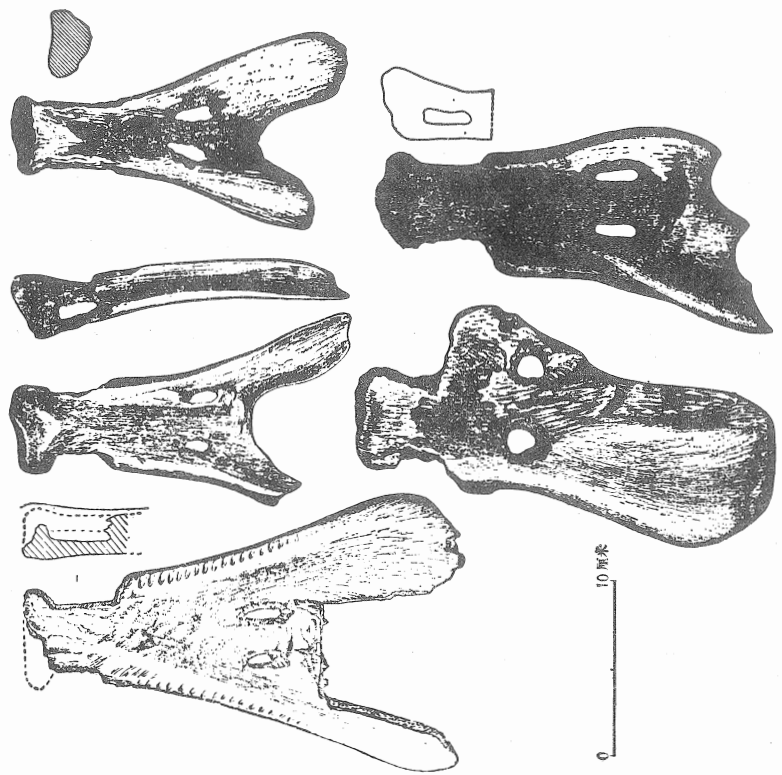


Figure 2. Bone ssu-spades from Hemudu layer 4.  
Both figures reprinted from Kaogu Xuebao 1978, part 1.

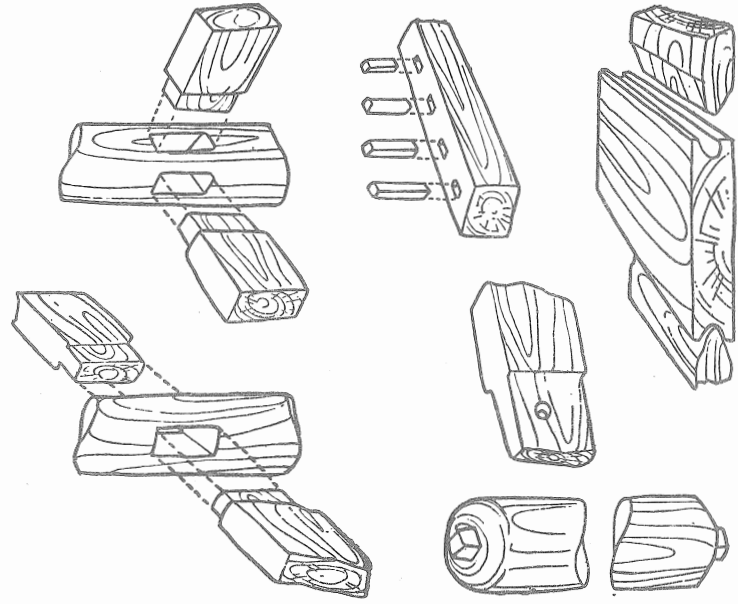


Figure 3. Details of Hemudu carpentry.  
Both figures reprinted from Kaogu Xuebao 1978, part 1.