

CHINA'S EARLIEST FARMERS: THE EVIDENCE FROM CISHAN¹

*Sally Rodwell
Cambridge, U.K.*

INTRODUCTION

Recent excavations in northern China have produced evidence of farming communities in the sixth millennium B.C. These people were hunter-gatherers as well as farmers, and they preceded the Yangshao farmers by a thousand years. Of particular interest is the Chinese archaeologists' claim that the chicken was domesticated at this time, some three thousand years before the appearance of the domesticated chicken at Mohenjodaro in the Indus valley.

In the West, participants in the British Academy Project in the early history of agriculture have emphasised the gradual transition to agricultural societies in Europe in the post-glacial period, and the variety of ways in which societies have exploited their environments, ranging from the most casual gathering of food to the most intensive methods of propagating plants and rearing livestock. Jarman, Bailey and Jarman (1982) have shown that many of these practices are overlapping and that often there is no clear-cut dividing line between hunter-gatherer and farmer. Bailey (1981) prefers to classify the continuum of man/resource relationships as a shift from

- a) direct exploitation of the environment (entailing casual gathering of plants and random predation of animals) to
- b) controlled exploitation (where cropping is regulated and there is deliberate propagation of favoured plant species) to
- c) indirect exploitation (where effort is expended less in the efficient culling of an existing crop and more in an attempt to foster the living resource population and increase its productivity).

In this paper the evidence from Cishan will be discussed in the light of these studies in Europe. Thus, according to Bailey's scheme, the communities in northern China in the sixth millennium B.C. practised controlled exploitation of millet, pigs, dogs and chickens as well as direct exploitation of nuts, berries, deer, small mammals and fish.

CHRONOLOGY

The archaeological site at Cishan was excavated between 1976 and 1978 and reported in March 1981 in Kaogu Xuebao. It is the typesite for two recent excavations in Hebei province, and the sites

concerned have been grouped as the Cishan culture by Chinese archaeologists. A second cluster of sites located south of the Yellow river in central Henan has been named the Peiligang culture, and a third group in the Weishui valley of Shaanxi has been named the Laoguantai culture. All of these sites date from the sixth millennium B.C. As yet the only detailed reports to have been published are of Cishan and Peiligang, a burial site.

The discovery of these sites helps to fill a gap in the archaeological record in northern China between the terminal Pleistocene sites of Zhoukoudian, Sjava-osso-gol, Shiyu and Xiaonanhai and the farming communities of the Yangshao period of the fifth millennium B.C. Apart from the Cishan, Peiligang and Laoguantai cultures, reports are beginning to emerge of a pre-agricultural microlithic tradition in the Northern Plain. A solitary human skull found at Ziyang in Sichuan province has been dated to the sixth millennium B.C. at the earliest. The later transition to agricultural societies in southern and eastern China was based on rice rather than millet cultivation.

The three radiocarbon dates for the earliest layers at Cishan (ZK 439, 440 and BK 78029) range from 5405 - 5110 b.c., calibrated to 6005 - 5794 B.C. The three radiocarbon dates from Peiligang are 5935 + 480 b.c. (ZK 434), 5195 + 300 b.c. (ZK 571, calibrated to 5879 B.C.), and 7350 + 1000 B.C. (ZK 572). There are also three dates for the Beigang site in Egou (Peiligang culture), ranging from 5315 - 5025 b.c., calibrated to 5916 - 5737 B.C. (An 1980:37).

THE MODERN ENVIRONMENT OF CISHAN

The Cishan site lies on a river terrace twenty kilometres southwest of Wuan, the county town of Hebei province, and one kilometre southeast of Cishan village close to the Ming river. It is on the boundary of two ecozones in the foothills of the Taihang mountains. The mountains to the west are covered with a thick layer of loess. Most of the natural vegetation has been cleared for cultivation, and the rain, falling in heavy downpours, washes away the fine soil into the deltas of the eastern seaboard. To the east on the coastal plain are the brown podsollic soils resulting from the moderate rainfall and forest cover. The original vegetation was broad-leaved forest, but with centuries of cultivation and timber-felling little remains. Crops grown in the area include winter wheat, millet, cotton and kaoliang (Fullard 1975). The climate of Cishan is one of hot, humid summers (30 - 35°C) and cold, dry winters with temperatures below freezing point, and low annual rainfall. Most of the rain falls in the summer but it may either fail altogether or be torrential.

THE PREHISTORIC ENVIRONMENT OF CISHAN

After the last glaciation the climate in East Asia began to ameliorate reaching a hypsithermal between 8000 and 4000 B.P. At its height the temperature was probably 2 - 3°C higher than it is today. This probably resulted in a more moist environment with thicker vegetation (Chang 1970). The Wu-ch'eng pollen profile from Shanxi province (Ho 1975:27-31) shows that in the terminal Pleistocene/early Holocene period the loess highland had few trees and herbaceous plants predominated, particularly sagebrush (*Artemisia*), reflecting the semi-arid environment. However, water-courses cutting through the loess encouraged strips of woodland along their banks and were bordered by shallow lakes, marshes and reedy meres where animal and plant life was abundant (Bishop 1933:389-390).

In his report on the faunal remains from Cishan, Zhou Ben Xiong (1981:339-347) considers that the animal bones of tropical and sub-tropical species reflect the hypsithermal warmer climate. The discovery of aquatic animals, fish and bivalves shows that the Ming river provided an abundant supply of water. Nowadays water deer are found mainly in the Yangtze basin. As Zhou points out, the presence of wild boar, masked civet and monkey in the assemblage indicates forested areas nearby, and it would appear that the area of sub-tropical afforestation at about 5000 B.C. was further north than it is today. The distribution of rhesus monkey, a sub-tropical species, is limited nowadays mainly to southwest China and south of the Yangtze river. In the north there are only a few in Henan province and south Shanxi, and those which escaped from the Imperial Park in Hebei province in the Qing dynasty (1682-1911).

REMAINS OF ANIMALS, BIRDS AND RIVERINE SPECIES

Of the animals, birds, fish and bivalves found at Cishan, Zhou considers dogs, pigs and chickens to have been domesticated, and their remains constituted 60% of the assemblage. He does not indicate how this figure was calculated, whether it was by weight or by numbers of bones. Wild boar were also present, and some dog bones which were difficult to identify. There were no remains of sheep. The wild animals included moles, hares, monkeys, badgers, masked civets, leopards, sika deer, red deer, David's deer, roe deer, water deer, muntjak, short-horn oxen, wild boar, wolves, a single bean goose, turtles, carp and bivalves. The range of species present indicates a rich environment and the availability of riverine and forest resources. The quantity of each species is not reported.

DEER

Zhou states that deer remains were the most abundant in the faunal assemblage. Six species of deer are reported in the site,

and Zhou considers, from the evidence of the antlers, that Cishan was occupied all the year round. In each species the antlers were at different stages of growth, and the shedding times of the antlers of each species are at different seasons of the year. Cishan was probably well-placed for year-round hunting of deer. Deer rarely occupy large, dense forests but are inhabitants of a borderline zone between forest and steppe (Mitchell, Staines and Welch 1977:8). M.R. Jarman (1972:125) has shown how deer were usually the most important constituent in Mesolithic economies in Europe and they continued to be important resources even when farming was well under way.

DOGS

Most of the dog bones found at Cishan were broken and incomplete, apart from one or two found at the bottom of grain storage pits. Wolf bones were also found but they are thought to be those of immature animals. Zhou concludes from his measurements of skulls and jawbones that the dogs were domesticated. Their bodies were quite small, and they had short jaws. The molars indicated omnivorous feeding and the angle of the lower jawbones curved sharply upwards forming a hook shape. The brow areas showed a clear swelling. The nasal bones were shorter than those of wolves.

In Europe the only archaeological site which is thought to have produced evidence of different stages of domestication in dogs, varying from the wild Canis lupus to the domestic Canis familiaris, is Vlasac in the Iron Gates gorges region of the Danube in Rumania. In his analysis of 1,914 specimens, Bokonyi (1975:167-178) considers that a complete range of wild and domestic dogs is represented. Unfortunately, the measurements of the canid remains from Cishan cannot be compared with those from Vlasac because different measurements on the skull and lower jaw have been taken.

Clutton-Brock (1975:21-25) has drawn attention to the difficulties facing archaeologists when they wish to compare faunal material from different sites, and it is hoped that in the future a standardised system of measurements might be used by archaeozoologists in all parts of the world.

In the case of Vlasac the question remains - was there a range of specimens of wild wolves, domestic dogs and transitional, semi-domesticated types as Bokonyi has suggested? Clutton-Brock (1981: 43) reminds us of the hazards of attributing a wild or domestic status to an archaeological assemblage of canid remains:

Examination of a population of scavenging curs associated with any single peasant community at the present day would be likely to produce all the shapes and sizes of skull that have been found throughout the world from pre-Neolithic times.

That is not to say that local populations of prehistoric dogs did not differ from each other, only that it is inaccurate and inappropriate to describe them in terms of modern breeds. The only assessment that should be made from skeletal remains is one of size and proportions drawn from direct measurement of the bones and teeth.

Zhou considers the dogs at Cishan may have been reared as hunting companions as well as for food, but what is not clear is the nature of the relationship between man and dog, or perhaps man and wolf. From the bones alone one cannot tell if the animals were reared as companions, for food or as aids to hunting; whether they were controlled or allowed to roam at will or whether any selective breeding took place.

At archaeological sites in China from the Yangshao period onwards, pig and dog bones are the most numerous in faunal assemblages and have been considered to be those of domestic animals (Chang 1978:95; Ho 1975:93-95). This view has found wide acceptance. It seems likely that the Cishan material of a thousand years earlier reflects the later dependence on these species.

Pigs

Zhou reports that numbers of pig bones at Cishan were fewer than found at sites of the Yangshao period. However, the lower third molars of Cishan pigs were of similar dimensions to those found at Yangshao sites. This would indicate a continuity in the population, and Zhou considers that pigs were domesticated. The discovery of pig figurines at the Peiligang site of roughly the same period supports this view. Certainly, the environment at Cishan in the sixth millennium B.C. (broad-leaved forest and a marshy river valley) favoured pigs, and their predominance at later Yangshao sites presupposes a long and close relationship with man in preceding centuries. In this respect I would agree with Olsen and Olsen (1980) that China was probably an early centre of pig domestication.

Chickens

Zhou reports that relatively large numbers of chicken bones were found at Cishan. These included clavicles, humeri, femora, ulnae, and radii as well as metatarsals. He compared the metatarsals with specimens of modern chickens in the Peking Natural History Museum and found that those from Cishan resembled those of the red junglefowl, the chicken's wild ancestor. The Cishan metatarsals comprised thirteen bones with spurs, belonging to cocks, and one without a spur which was thought to belong to a hen. The average length of the metatarsals was 79 mm., and that of the hen 70 mm.

Zhou then compared the Cishan metatarsals with those of various members of the pheasant family - common koklass, the golden pheasant, the brown-eared pheasant, the Korean ring-necked pheasant and the red junglefowl, as well as the modern domestic chicken. He found that the Cishan specimens were larger than those of the modern red junglefowl but smaller than modern domestic chickens, and concluded that although the Cishan fowl might have been wild they were probably early domesticates. It seems that the prehistoric birds grew larger with domestication rather than smaller. This is the reverse of the effects which archaeozoologists have observed in mammals but it is similar to the effects observed by Sewell and Guha in chickens at Mohenjodaro, and quoted by Zhou. It should be noted that modern breeds of Chinese chickens, the Langshan and the Cochin, are particularly large and heavy in bone (Jull 1938:13-15). The standard weight of a Cochin cock is 11 lbs. and that of a Langshan is 9½ lbs.

Zhou supports his view that the chickens were domesticated by postulating that the preponderance of cocks in the assemblage reflected either their use for ritual purposes or their slaughter for meat, and the preservation of females for egg-laying.

Zhou points out that chicken bones were found in quite large quantities at the Baoji site, Baoshouling (dating to the fifth millennium B.C.), and a few bones were found at Banpo covering the same time span. Earthenware models of chickens were found at the Qujialing site (dated to the third millennium B.C.), and at Tianmen in Hubei. Finds of chicken bones from the Miaodigou II site have also been dated to the third millennium. It would appear that, as in the case of pigs, there was continuity through time in the exploitation of chickens in northern China.

In his report Zhou discusses the evidence for the earliest domestication of the chicken in the world, including the material from Mohenjodaro, Egypt and Western Asia, as well as the literary evidence. The remains of chickens at Cishan predate those found at Mohenjodaro by more than three thousand years. Indeed, bones of red junglefowl found at Xianrendong in Jiangxi province have been dated to the seventh millennium B.C. (Ho 1975:98), and the continuity of their appearance in faunal assemblages throughout the later Chinese Neolithic period implies early exploitation in this part of the world.

Riverine resources

Carp, turtle and bivalve remains were found at the Cishan site as well as fishing net weights and hooks made of bone. It would appear that the inhabitants made good use of the resources of the Ming river.

PLANT REMAINS

In the main archaeological site report on the excavations at Cishan various plant remains are mentioned. These included wild walnuts (Juglans regia), hazelnuts (Corylus leteraphylea), and hackberry seeds (Celtis bunseana), as well as what was thought to be millet (Setaria italica). Heaps of rotted grain were found in eighty pits. For the most part the heaps were between 30 cm and 2 metres deep. When first excavated small bluish green spheroids were apparent but, soon after exposure to the air, they crumbled to dust. An analysis of this dust was made and it was found to bear traces of foxtail millet, Setaria italica. Regarding the context of the finds of millet, An Zhimin (1980:37) has written:

The ash pits are round, rectangular or irregular; some of the rectangular pits are more than five metres deep and were probably storage pits.

From the report it would seem that millet and its storage was an important part of the economy. Setaria italica was grown extensively in the loess highlands in the Yangshao period (Chang 1978:94-5; Ho 1975:54), and it now seems that millet may have been grown considerably earlier at Cishan. The domestication of millet, entailing morphological change, may have taken place by the sixth millennium B.C. or earlier. Its wild ancestor is Setaria viridis (de Wet pers. comm.). The two taxa cross readily and their hybrids are fully fertile. De Wet considers foxtail millet was probably domesticated independently in both China and Europe and the evidence from Cishan supports his view.

The finds of both walnuts and hazelnuts were carbonised. The walnuts were about 2 cm in diameter, rather smaller than modern varieties, and the hazelnuts were 1.5 cm in diameter. The hackberry seeds resembled peas with a diameter of 0.7 cm. The nuts and berries were probably collected in season and the nuts may well have been preserved by accidental carbonisation when being dried for storage. Alternatively, the nuts may have been burnt with refuse (Dennell 1972:151). In the report the context of the nuts and berries is not clear.

Stone tools and pottery

Stone tools at the Cishan site included footed querns, grindstones, narrow, elongated and flat stone spades with two convex edges, and some sickles. The pottery was coarse-textured and hand-thrown with walls of uneven thickness, and it has been estimated that firing temperatures ranged between 700°C and 900°C. There were double-lugged jars, wide-mouthed pots and bowls with either three legs or round bottoms. Patterns were either comb-impressed or cord-marked and there was some painted pottery.

Summary

The evidence from the Cishan site report and from Zhou's faunal analysis suggests that the inhabitants of the site in the sixth millennium B.C. hunted wild animals, especially deer, fished from the Ming river and collected nuts and berries in an environment that was warmer, wetter and more densely wooded than it is today. They probably practised controlled exploitation, as defined by Bailey (1981:5-8), of dogs, pigs, chickens and millet.

Regulation and cropping of avian resources can be inferred from the unequal male and female remains of chickens. Deliberate propagation of plant species can be inferred from the remains of domesticated millet in storage and rubbish pits, and control of animal movement can be inferred from the large quantities of pigs and dogs in the faunal assemblage.

What we do not know from Zhou's report is the precise quantity of pig and dog bones found. Archaeozoologists would be particularly interested in mortality profiles of these species. It would have been interesting to compare the Chinese data on prehistoric dogs with those from Vlasac. Similarly, detailed Chinese data on pigs would provide a standard against which other East Asian prehistoric finds could be compared. The data on the chicken are of great interest since there has been little work undertaken in the West on the origins of the domestic fowl. These zoological and avian considerations apart, additional evidence for the controlled exploitation of pigs, dogs, chickens and millet at Cishan lies in the combination of a sedentary settlement, a favourable environment, and the continuity of the Cishan traits with the traits of sites of the later Yangshao period.

FOOTNOTE

1. For fuller documentation see Rodwell 1983.

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