

## Introduction

### 1.1 Aims of Faunal Analysis at the Haimenkou Site

This book is based on the analysis of the faunal assemblage recovered from the Haimenkou site in Yunnan Province, China. A vast amount of faunal remains were unearthed from clear stratigraphic contexts at this site. They represent a time span from the late Neolithic Period (*ca.* 5000 B.P.) to the middle Bronze Age (*ca.* 2400 B.P.).

Haimenkou is located in Jianchuan County, Yunnan Province, southwestern China. The site is the most extensive water-logged settlement characterised by pile-dwelling constructions discovered to date in China (YPICRA, et al. 2009a:599). During three seasons of excavation (1957, 1978, and 2008) many artefacts and ecofacts were revealed, including a large number of animal remains.

The Haimenkou site is of special significance, particularly in the field of zooarchaeology. Firstly, as it was occupied for several thousand years, Haimenkou provides a great opportunity to explore the changes in human-animal relationships and human subsistence economy across this long period from the aspect of the faunal assemblage, such as the exploitation patterns for different animals and the processes of animal domestication.

Secondly, due to its pivotal position, Yunnan itself was an important region for cultural communication and human migrations in prehistory. The introduction and exchange of animals is an important topic for study. In the third excavation report for the Haimenkou site, it is noted that material remains are an indication of cultural interaction and population movement from other regions in China, such as northwestern China (YPICRA, et al. 2009b). This assumption will be evaluated by the close observation of animal remains from Haimenkou, in terms of the range of taxa, the distribution of faunal remains in different layers, and the phenomena reflecting animal domestication.

Thirdly, the study of the faunal assemblage from Haimenkou may provide important data for zooarchaeological study in Yunnan Province. So far, relatively limited research on faunal assemblages has been undertaken at Haimenkou and surrounding areas in Yunnan Province. From the 1920s onward, more than 300 Neolithic sites were discovered in Yunnan, and dozens of them were excavated (Yang, F., et al. 2010:1). These excavations undertaken in Yunnan have provided important zooarchaeological information and large quantities of faunal remains (Zhang, X. 1987:370). Based on these finds, a picture of animal hunting, domestication, and utilisation in prehistoric Yunnan was established. However, most

of these faunal assemblages were simply mentioned as a list of animal species revealed in surveys or excavations in archaeological reports. This ‘laundry list’ style reporting is evident in the brief report of the Baiyangcun site (YPM 1981) and an earlier report of the Haimenkou site (YPM 1995). In other cases, even a complete list of animal species was absent, as in the Yinsuodao excavation report which stated that, ‘a relatively large number of animal bones were found here, including fish, mice, and pig mandibles and teeth’ (YPICRA, et al. 2009c:25). Only a few sites have provided specialised zooarchaeological reports, such as the Dadunzi site in Yuanmou County (Zhang, X. 1985). Although the artistic representations of many animals uncovered from several Bronze Age sites in Yunnan, such as Shizhaishan (Zhang, Zengqi 1998) and Lijiashan (YPICRA 2007), have been reported in detail and provided useful information for the investigation of subsistence patterns and human-animal relationships, further study based on animal bones themselves is needed for a fuller understanding of the complex human-animal relationships in ancient times. In sum, while other archaeological research, on pottery, stone implements, and bronzes has been undertaken in Yunnan Province, there is still a lack of research from the perspective of zooarchaeology.

Based on the study of the faunal assemblage recovered from the site, the aim of this book is to fill in this blank by exploring the human-animal relationships at Haimenkou. This includes a study of the animal exploitation patterns and local animal domestication processes, along with human subsistence strategies and communications between Haimenkou and other regions in prehistoric China. The research questions may be summarised as follows:

What is the mixed spectrum of animal taxa living at prehistoric Haimenkou? Among these animal taxa which were domesticated and which were wild? Where did the domestic animals come from? Were they locally domesticated or introduced from other locations in China?

How were these domestic animals exploited? What was the structure of the subsistence economy of the Haimenkou people? What changes in the Haimenkou people’s subsistence economy occurred during the long occupation of Haimenkou? What role did Haimenkou play in cultural communication between other regions in prehistoric China?

The questions proposed above will be answered in subsequent chapters. In order to provide important background on previous zooarchaeological research in Yunnan, a brief introduction to zooarchaeological history in China and in

Yunnan itself will be presented in the following section.

## **1.2 Brief Introduction to the History of Zooarchaeology in China and Yunnan Province**

### ***1.2.1 A Brief Zooarchaeological History of China***

The earliest zooarchaeological work conducted in China dates back to the 1930s (Teilhard de Chardin and Young 1936). This research may be considered pioneering work in the history of zooarchaeology in China. Nevertheless, research during this period was limited and was largely suspended during World War II. The main zooarchaeological history of China is typically considered to have started after the establishment of the People's Republic of China in 1949.

Yuan (1995a:84) suggested that the zooarchaeological history of China may be divided into two periods, with the 1950s to 1970s being the formative period, and the 1980s to recent times being the developing period. Based on this division, the Chinese zooarchaeological history is described below.

#### *1.2.1.1 Formative Period (1950s–1970s)*

From the 1950s onward, the focus of archaeological studies in China was mainly on the reconstruction of ancient historical temporal sequences and their spatial framework (Liu, L. and Chen 2001). As a result, Chinese archaeologists devoted considerable attention to the study of stone implements and pottery recovered in China, as well as comparisons among varying artefact assemblages from different regions and periods. The study of animal bones played a subordinate role in these contexts. In the formative period of zooarchaeology, faunal assemblages were relatively neglected and poorly collected. Scholars who engaged in zooarchaeological studies were most often palaeontologists with little archaeological background. During this period, a noteworthy zooarchaeological study allowed Y. Li and Han (1959) to introduce the Banpo site with its cultural and environmental backgrounds in their zooarchaeological report. They (Li, Y. and Han 1959) also described the faunal assemblage and identified the animal specimens to the most precise taxonomic level possible, as well as classifying them into three categories: domestic and probably domestic animals, game animals, and animals that may have burrowed or intruded into the site later. The methods employed in this report included morphological observation, age profile construction, and measurements of available specimens. At the end of the article, they discussed the site environment and animal domestication, and noted correlations between the faunal assemblage and ethnic groups. The format and methods employed in this article made a significant impact on subsequent zooarchaeological research in China and formed a methodological basis that is still widely followed in modern Chinese zooarchaeological reports. Nevertheless, the weakness in the Banpo research was the lack of specific stratigraphic information on the locations

of the animal remains. This problem was already present in the Anyang report of the 1930s (Teilhard de Chardin and Young 1936), but was a tradition of palaeontologists in the era. The Banpo researchers were not aware of the importance of data comparisons among different periods in the Banpo research, or in their subsequent research on the faunal assemblage from the Zengpiyan site (Li, Y. and Han 1978).

#### *1.2.1.2 Developing Period (1980s to Present)*

Although the excellent example of Y. Li and Han (1959) was present in the formative period, some modern zooarchaeological reports persisted in only listing the taxa of identified faunal specimens. These are sometimes added in the form of appendixes to archaeological excavation reports and are lacking in any real interpretation (e.g., Li, T. 2001; Zhu 1987). These 'laundry lists' of faunal remains hinder zooarchaeological study. To address this concern, Qi (1983) proposed eight important issues for zooarchaeological investigation, including: the recovery and reconstruction of the environment of ancient settlements; the study of hunting techniques and prey selection; the procedures of food processing; the study of long-term or seasonal site occupation; the investigation of ancient social structure and settlement patterns; the study of ritual practice and taboo; the study of ancient trade; the investigation of sources of raw material of artefacts; and research into animal domestication. In addition, Qi (1988) was the first scholar who applied MNI (minimum number of individuals) in Chinese zooarchaeology. In the zooarchaeological report of Jiangzhai, a famous Neolithic site in Shaanxi Province, she (Qi 1988) completed a plan of the locations of the unearthed animal remains, and speculated about the human population distribution at this site based on the faunal assemblage.

A resource also worth mentioning in this developing period was the publication of the more-than-150-page monograph, 'Zhejiang Yuyao Hemudu Xinshiqi Shidai Yizhi Dongwuqun [The Fauna from the Neolithic Site at Hemudu, Zhejiang]' (Wei, et al. 1989). This introduced an extensive style of research writing to the Chinese zooarchaeological field. Approximately 61 taxa of vertebrate and invertebrate remains were recovered from the third and fourth layers of Hemudu during the excavation seasons of 1973–1974 and 1977–1978. However, only identifiable specimens were described in this monograph. Species, environmental exploitation, animal domestication, bone tool manufacture, and folklore reflected by the animal remains were discussed in this book based on the faunal assemblage.

In the 1980s the first article focusing on the study of fish remains was published as an appendix to a field report, 'Jiao Xian Sanlihe [The Sanlihe Site in Jiao County]', of a Neolithic site of Sanlihe in Jiao County, Shandong Province (Cheng 1988). In the article, Cheng (1988) identified fish remains, compared them with modern fish reference specimens, and made the interesting inference

that the people who lived at this settlement would scale fish before eating them.

During the 1990s, besides normal laboratory work and report writing, Chinese zooarchaeologists began to pay more attention to the history and development of zooarchaeology both worldwide and of China. It was a time for Chinese zooarchaeologists to reflect upon developing the discipline in a more systematic way. Yuan (1995a) and other researchers summed up the history of Chinese zooarchaeology, while Qi and Yuan (1997) and others reviewed the history of zooarchaeological development in the Western world. Moreover, Yuan (1995b) and others discussed the theories, aims, and methods of zooarchaeology. At the same time, much translation work, from Japanese and English to Chinese, was underway (e.g., An and Long 1993; Li, T. 1992; Qi and Yuan 1997; Yuan 1992; 1993; Yuan and Jiao 1993; Yuan and Qin 1994). At the end of the 1990s, Yuan (1999) classified different characteristics of meat-acquiring patterns from several main Chinese Neolithic regions. He (Yuan 1999) classified them as dependence on wild animals, elementary animal domestication<sup>1</sup>, and advanced animal domestication. Based on these three stages, he proposed a model of meat acquisition that demonstrated the basic developmental process of meat acquisition in Neolithic China. He believed the process could be summed up in a theory of passive development, because the sequential changes of meat acquisition patterns happened and developed due to the restrictions from surrounding natural and environmental sources. Yuan's article indicated the direction of zooarchaeological study in China for the next decade focussing on animal domestication, although this model is less commonly used nowadays.

Since the 21st century, Chinese zooarchaeological studies have concentrated on animal domestication and related issues. Yuan (2001) proposed criteria for the identification of domestic animals from the Neolithic sites in China and discussed when and where the earliest Chinese domestic animals may have appeared. These arguments were maintained in his subsequent publications concerning animal domestication (e.g., Yuan 2002; Yuan and Flad 2002). According to Yuan (2001; 2002), in China animal domestication was focused on pigs. Pigs have a domestication history which may be traced back to over 8,000 years ago in China (Luo and Zhang 2008). They have also been one of the most important food resources in ancient China (Chang 1997; Yuan 2001). Other zooarchaeologists have also shown a keen interest in this area of pig domestication, such as X. Ma (2007) and Luo and Zhang (2008). In the light of newly discovered material from the seventh season of excavation at the Jiahu site in Henan Province, Luo and Zhang (2008) reanalysed the pig remains from all seven seasons of this excavation. They (Luo and Zhang 2008) arrived at an important conclusion that domestic pigs had been bred by the Jiahu people from the first phase of the site. This suggested that the first appearance of

domestic pigs in North China may be traced back to about 8,500 years ago (Luo and Zhang 2008). This result was later supported by other researchers (Cucchi, et al. 2011).

In addition to the research on domestic pigs, animals important in the zooarchaeological field of China include water buffaloes, cattle, sheep, horses, dogs, and other domesticates. For example, L. Liu and colleagues (2006) discussed the origins of domestic water buffaloes (*Bubalus mephistopheles*) in China based on measurements of buffalo specimens and a review of literature. They suggested that water buffalo remains recovered from the Neolithic and Bronze Age sites in China represented wild taxa. This conclusion is contrary to the previous belief that buffaloes were domesticated and played an important role in farmlands during the Neolithic period and the Bronze Age in China (Liu, L., et al. 2004; Liu, L., et al. 2006). In other examples, ancient DNA was employed in the study of animal origins and domestication, including in research on the remains of water buffaloes (e.g., Yang, Dongya, et al. 2008), sheep (e.g., Cai, et al. 2007), horses (e.g., Cai, et al. 2009), and dogs (e.g., Okumura, et al. 1999).

### ***1.2.2 Zooarchaeological Studies in Yunnan for Periods from the Early Holocene Epoch to the Bronze Age***

As mentioned previously, more than 300 Neolithic sites have been discovered in Yunnan Province (Yang, F., et al. 2010:1). Despite this, fewer than 40 sites have been excavated and their details published (Wang, N. 1992; Yang, F., et al. 2010). Although a large number of faunal remains have been uncovered and collected from the archaeological excavations in Yunnan Province since the founding of the People's Republic of China, zooarchaeological studies based on faunal remains are scarce and neglected. Usually the animal species are listed or only mentioned in the description of a site, such as in the brief excavation report of the Baiyangcun site in Binchuan County, Yunnan (YPM 1981). Articles focusing on investigation and discussion of faunal remains are rare, but include zooarchaeological reports on the Huangjiaying site in Tonghai County (Yang, Z., et al. 1985), and the Dadunzi site in Yuanmou County (Zhang, X. 1985) (see locations in Figures 2.23).

X. Zhang has made a large contribution to the study of animal remains recovered from sites in Yunnan. In his (Zhang, X. 1987) article 'Yunnan Xinshiqi Shidai de Jiachu [Domestic Animals in Neolithic Yunnan]', the finds of domestic animal remains from the early Holocene Epoch to the Bronze Age in Yunnan were outlined, with some sites discussed in detail. This article collected all the reported data of animal remains found in Yunnan prior to publication, provided a brief illustration of the distribution of animal species from the early Holocene Epoch to the Bronze Age, and drew preliminary conclusions from discussion of the data.

Other articles by X. Zhang and his colleagues focused on the analysis of animal remains from specific sites in Yunnan. These include the Tangzigou site in Baoshan City

<sup>1</sup> The definition of domestication used in this book follows Bökönyi (1989:22) and is discussed more in chapter four.

(Zhang, X., et al. 1992) and the Dadunzi Site in Yuanmou County (Zhang, X. 1985). During these analyses, the descriptions, measurements, and abundance of animal specimens were presented, along with primary discussions. However, these articles still emphasised species lists and elaborate descriptions of the specimens in terms of morphology, and no age profile or kill-off patterns were provided or discussed.

Like other scholars in the last decades in China who specialise in studies on animal remains from archaeological sites, X. Zhang is actually a palaeontologist. This is probably why his goals and methods of studying animal remains differ from that employed by modern zooarchaeologists. His palaeontological descriptions focused on horns, antlers, skulls, mandibles, and teeth, with no limbs or vertebrae included. This indicates an obvious bias in specimen selection and collection during excavations, reflecting palaeontological rather than zooarchaeological interests.

Other researchers to publish more interpretive zooarchaeological papers include Z. Yang and colleagues (1985). They (Yang, Z., et al. 1985) published an article describing more than 20 taxa of vertebrate fossils, including *Homo sapiens*, recovered from Holocene sedimentary deposits in Qilu Lake, Tonghai County, Yunnan Province. Z. Yang and colleagues also have palaeontological backgrounds, thus no age profiles or kill-off patterns were given in this article. However, they did note the lack of analysis of limb bones by X. Zhang (1992), a topic that was covered in their paleontological descriptive research.

After the publication of X. Zhang and colleagues' (1992) article on faunal remains in 1992, few zooarchaeological studies in Yunnan were carried out and few published articles focused on faunal remains. Nevertheless, these early studies helped to build a database for comparative purposes in this study.

### 1.3 Date and Citation Style

Dates presented in this book are given as they were in the original publication. Earlier publications typically presented dates as uncalibrated or in years B.C. To avoid the complexities of modern calibration programs these older dates, which typically refer to a lengthy range or time

period, and are generally widely understood and accepted in China, are retained here. The preference throughout has been to present dates in approximate years B.P.

References cited are presented according to the American Anthropological Association (AAA) 2009 style guide<sup>2</sup>. This style guide is based on the Chicago Manual of Style (15th edition). This means that where authors have the same surname, as is common in China, primary initials are used to distinguish between them. Where primary authors have the same first surname and the same initials, in-text references give the full name to allow differentiation of cited authors.

### 1.4 Structure of the Book

To answer the questions proposed in Section 1.1, the following chapters of this book will discuss several important issues regarding the human-animal relationships at the Haimenkou site. These issues include an investigation of animal exploitation patterns and the local animal domestication processes. The human subsistence economy based around faunal remains is another topic of discussions. Cultural communication or interaction with other people in prehistoric Yunnan and from other regions in China is another key issue that this research aims to expand on. Chapter two describes the environmental setting and archaeological background of the Haimenkou site. Chapter three outlines the basic procedures and limitations of the analyses carried out on the faunal assemblage from Haimenkou. Chapter four presents the analysis of the range and relative importance of identified taxa from Haimenkou. Chapter five presents the analysis of skeletal part representation and bone modification details for the site. Chapter six presents an analysis of kill-off patterns for domestic animals.

A general discussion and outline of conclusions that may be drawn from the zooarchaeological study of the Haimenkou site is presented in chapter seven. The origins of domestic animals at the site will be discussed, along with the exploitation patterns of animals from this site. The changes in human subsistence economy through time, and implications for understanding communications between Haimenkou and other regions in prehistoric China will also be discussed. Directions for further research are offered.

<sup>2</sup> URL: <http://www.aaanet.org/publications/guidelines.cfm>.