FROM BONES TO BEHAVIOR: ZOOARCHAEOLOGY AND CHINESE FOODWAYS IN IDAHO MINING CAMPS

By

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Abstract

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Near Placerville along Grimes Creek in Southern Idaho's Boise Basin is a Chinese-occupied placer mining site, BS-780. As the site where gold was first discovered in the Boise Basin in 1862, Grimes Creek was subject to intensive placer mining in the late nineteenth and early twentieth centuries. Chinese miners began arriving in the Boise Basin in the mid-1860s. Between 1870 and 1890, mining camps in places like Idaho City, Placerville, Centerville, and Pioneerville were home to nearly 2,000 Chinese individuals. The focus of this research is on the faunal remains and the insight they can provide on meat consumption habits and food culture of Chinese in Idaho. Evidence from the assemblage shows that the Chinese miners of Boise Basin consumed a variety of meats, and seemed to have a strong preference for pork, but due to the low cost of the beef, consumed sizable amounts of both meats.

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Introduction

Gold was first discovered in the Boise Basin by George Grimes and his company in 1862 at what is now known as Grimes Creek. Chinese miners began arriving in the Boise Basin a few years later. Between 1870 and 1890, mining camps in places like Idaho City, Placerville, Centerville, and Pioneerville were home to nearly 2,000 Chinese.

The Boise Basin was a unique place for mining in Idaho because there were good mining returns for quite a while in the 1860s (Zhu 1997: 106-110). However, it wasn't until the 1870s that many of the American and Euroamerican miners moved out once the returns fell, leaving the mining population largely Chinese in the basin (Zhu 1997: 59). Although their occupancy was brief, Chinese immigrants left an enduring legacy in the Boise Basin, which today includes a vast landscape of mining features, historical buildings in Idaho City and Placerville, and over 300 Chinese-occupied archaeological sites.

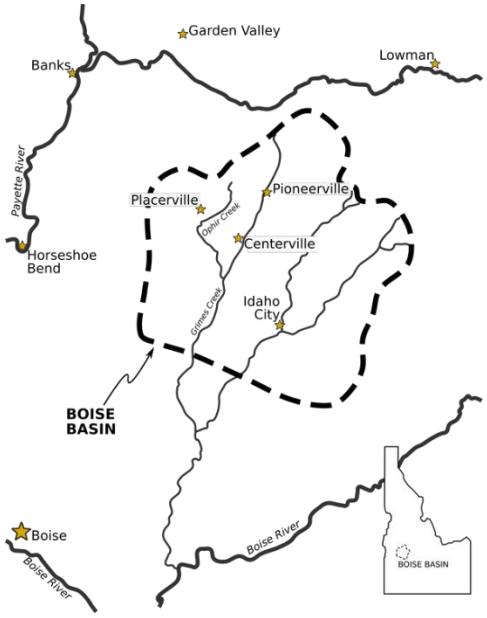

Figure 1: Mining Cities in the Boise Basin

One of these sites includes 10BO357 (also BS-780), which was recorded by the Boise National Forest (BNF) personnel in 1984 during a land exchange survey. Because of the diversity of surface material and the evidence of ongoing looting, the site was excavated in 1985

(Geer 1985:1–3). In a letter report on the 1985 excavations, Geer and his colleagues note a depression that may have been a cellar or foundation.

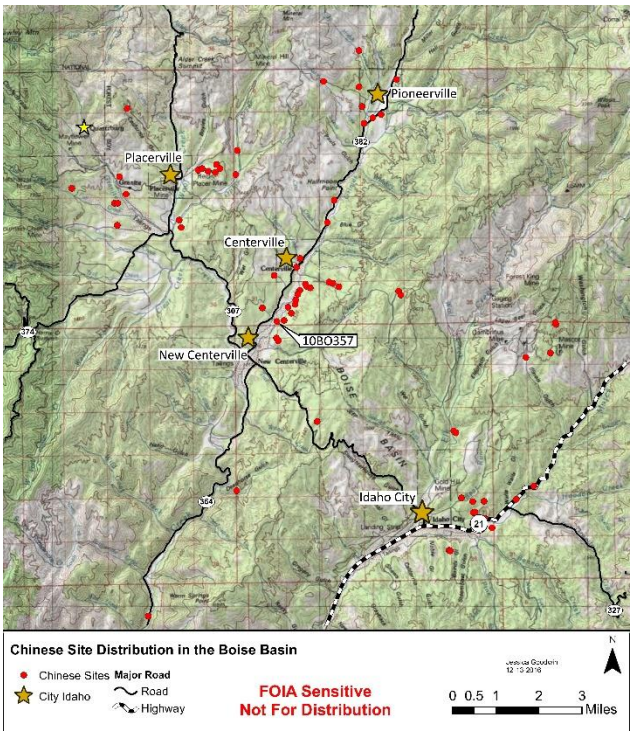

Figure 2: Chinese Site Distribution in the Boise Basin

Most artifacts appear to have been recovered from this feature and from a refuse scatter that may have been used to backfill a placer ditch. The authors describe recovering a variety of Chinese manufactured goods from the site, as well as a relatively large faunal collection. The faunal assemblage contains around 424 bones, most of which are either pig or large mammal bones. In this project, I used the bones to understand the foodways of the Chinese mining culture in America.

The study of foodways provides unique insights into how people understand and communicate their world. "What we eat, as well as how we get, prepare, serve and consume food are peppered with the influences of economics, social standing, necessity, and cultural preferences" (Hamilton 2008: 10, Goody 1982, 1997; Douglas 1997; Levi-Strauss 1969; Mintz 1996). The study of animal bones from archaeological contexts can say a lot about humans, including what meat they preferred, the technology used to butcher the animals, the quality of meat the people were consuming and how it relates to the economic status of the people

consuming the meat and an array of questions about the environment. Through the data from bone assemblages, what foods people ate and how the food was prepared can be interpreted. This site was mostly populated with Chinese immigrants, consequently, the foodways and consumption patterns reflected in the bones will examine Chinese-specific questions of identity, economics and culture

This project focuses on the faunal remains excavated from the BS-780 archaeological site, while also using a thorough investigation of meat market ledgers from a nearby historical meat market in Placerville. These two sources of data were used to identify purchasing patterns of the Chinese in Idaho and shed light on meat economics and availability and how these factors influenced cultural preferences of Chinese miners. In addition, I will also be comparing the Idaho City faunal data with other Chinese-occupied sites in the region, such as Pierce, Idaho. This thesis uses a combination of faunal and historical date to explore the foodways of a Chinese mining community and the role food played both in affirming Chinese heritage and adapting to an unfamiliar environment.

Archaeology

Anthropology is a field of study of human culture. Archaeology is a branch of Anthropology that focuses on the material remains that humans left behind to study past cultures. Archaeology is a very diverse field in that there are so many things to be studied, such as architecture, ceramics, stone tools, bones, jewelry, art, plant remains, historic writings, metal, and many other things the study of these groups of objects is commonly broken down into subfields of study with in the broader umbrella of archaeology. Subfields include, geoarchaeology, zooarchaeology, archaeobotany, historical archaeology, underwater archaeology, and many others.

Archaeology is more than answering the questions of who, when and where of human cultures; it is also the how and the why. It seeks to understand the processes cultures undergo as time passes, identifying patterns that might give insight into the how and why cultures change over time.

Historical Archaeology

As mentioned before, Archaeology - while a subfield of Anthropology - is still quite a broad field that is further divided into two basic categories: prehistoric (also known as precontact archaeology) and historic. These are categories that apply to most other subfields of Archaeology.

Prehistoric archaeology deals with the material remains of people and cultures that existed without or before written records. Historical archaeology deals with the material remains of people and cultures that existed (or still exist) after the development of written records. There are no set dates associated with these two categories of archaeology because prehistoric and historic divisions are not consistent worldwide. Historical archaeology pieces together “data from the ground, from the archives, from maps and photographs, and rom oral history consultants around the material remains left by the participants in this process” (Praetzellis and Praetzellis 2004: 6).

Zooarchaeology

Zooarchaeology is a subfield of archaeology dealing with animal bones and other faunal remains. It focuses on archaeologically recovered animal bones and what they can tell us about the people that utilized animals in the past. The study of animal bones from archaeological contexts can say a lot about humans, including what meat they preferred, the technology used to butcher the animals, the quality of meat the people were consuming and how it relates to the economic status of the people consuming the meat and an array of questions about the environment. It is one of the more specialized subfields of archaeology (Reitz and Wing 1999; Davis 1987; Hesse and Wapnish 1985; O’Connor 2000).

Piecing together historical archaeology and zooarchaeology we can see how they work together as its own discipline of historical zooarchaeology. David B. Landon (2005) outlines the major goals of faunal analysis in historical contexts. These archaeologists "view bones as part of a comprehensive system of food production, preparation, distribution, consumption and disposal" (11). As archaeologists move into the interpretation of data, they find that "an assemblage often includes detailed information about the function of a site, the people that occupied it, when it was occupied, and the basic nature of subsistence practices. This can extent to detailed information

about the social, political, economic, occupational, ethnic, or religious background" (Landon 2005: 11) of the occupants of a particular society.

Reitz and Wing (1999) define modern zooarchaeological research using three aspects: methodological, anthropological, and biological (28). The methodological aspect involves issues such as whether zoologists or archaeologists should do the faunal analysis. Finally, this aspect concerns how a site is excavated and how the remains are identified; an issue that concerns all areas of archaeology.

The second aspect is anthropological, which seems to be the biggest aspect when doing zooarchaeology. The anthropological aspect focuses on the human behavior factor when identifying causes for either continuity or change in humans' interactions with their environment, especially subsistence patterns. Settlement patterns and catchment areas are defined based on the identification of the age at death of the animal. Human behavior is also identified by the butchering methods and the body part representations and the locations of these butchering marks on the bones. Other conclusions about human behavior that can be drawn from bones include social status, ethnic identities, symbolism, and domestication, which can then help describe the society from which the bones came (Reitz and Wing 1999: 29).

The issue of animal domestication also overlaps with the third aspect of zooarchaeological research—namely biology. This facet can also give insight into paleoenvironments, or any environmental condition through changes in morphology and domestication. This work associates humans with the processes of species extinction and impacts on historical ecology (Reitz and Wing 1999: 29). Zooarchaeology incorporates anthropology, biology, and even geology, to understand the human past.

Chinese and the Gold Rush

Chinese immigration to America for the Gold Rush

Many Chinese traveled to America in the early 1850s at the beginning of discovery of gold in California. Chinese people continued to immigrate to other places as more and more gold was discovered in surrounding areas. The first recorded immigration occurred in 1849 when 325 Chinese immigrated to the U.S. The numbers of migrants quickly grew with; 2,716 in 1851; 20,026 in 1852; leaving a total of about 63,000 Chinese in America by 1870 (Takiki 1994: 21). In California, the Chinese were welcomed at first, but that eventually changed as more and more Chinese were coming to the U.S. They were eventually viewed as a threat because "the Chinese

took jobs that should have been held by Americans, and they brought customs and values that were alien to 'the American way'" (Takiki 1994: 24). "Chinese customs and Chinese food were frequently condemned" (Horsmann 2008: 198), because many people thought that the Chinese way of cooking was not hearty enough, or it smelled and tasted funny.

Many times, the Chinese would switch from mining to other jobs to avoid hostility from white miners. They worked in railroad crews, factories or were self-employed in stores, restaurants and laundries (Takiki 1994:49). Some gave up and went home, but many could not afford to return home to China.

In many cases, Chinese men immigrated to America in search for their fortunes with the goal of getting what they need for their families and going back home to China. This meant that the mining camps were mostly inhabited by men, creating a large gender imbalance. Men often lived in households with other Chinese that had similar family names or came from the same part of China, often Canton. They were usually homesick, and many went back home after giving up, but if they enjoyed the food they had in America, they were more likely to stay (Chung: 28-29). Usually one miner of the household was the cook for the group, often called companies.

The large influx of Chinese immigrants was not well received, so much that in 1882 Congress passed the Chinese Exclusion Act preventing any more Chinese from immigrating to America. The need for cheap labor had passed with the completion of most of railroad building and the exhaustion of many gold mines (Barlow and Richardson: 1979, 6). However, this did not completely stop the Chinese from entering the country illegally (Zhu 1997: 4). To further discourage Chinese immigration, many states imposed a foreign miners' tax. In Idaho, this tax was $5 per month. Many Chinese would try to find ways to avoid paying this high tax, considering that was nearly an entire days' worth of income (Zhu 1997: 121).

Chinese miners in Idaho

Gold was discovered in the Clearwater Mountains in 1860, leading to the gold rush in 1861 in places, such as Pierce, in northern Idaho. Many miners rushed to other mines in Idaho in the following years (Stapp 1993: 3-5). Many of the Chinese immigrants to mining sites were men that had left their families to seek riches. However, many Chinese were not allowed into major mining cities until much of the gold had already been extracted (Sisson 1993:36). As the Chinese

were then allowed to purchase mining land, a new rush of Chinese immigration began later in the 1860s (Longenecker and Stapp 1993: 98).

Other groups of Chinese ventured all over the west in search of other sources of gold. Many explored into the Rocky Mountains in 1856 eventually settling in the Boise Basin area following the Oregon-California Trail to Idaho. At their arrival, friendly Shoshone and Bannock Indians helped them get settled by giving them some food and showing them the areas that contained gold (Zhu 1997: 27-28). Word eventually spread to other Chinese miners in the west about gold in Idaho in 1862 when a band of miners led by George Grimes found gold in the Boise Basin. This and other discoveries of gold in northern Idaho led to a gold rush in 1863 causing tens of thousands of other miners to flock to many places in Idaho, including the Boise Basin; however, most of the Chinese miners waited to come to Idaho until many of the mining sites were "depleted" and the Euroamericans were willing to sell their mining property, or when there were more convenient travel routes later in 1865 (Zhu 1997: 28). Eventually a route was established from northern Nevada into southwestern Idaho to Silver City, then to Fort Boise where the miners followed the Boise River into the mining towns of Idaho City, Centerville, Pioneerville, and Placerville (Zhu 1997: 30).

Near Placerville is a Chinese-occupied placer mining site, 10BO357 (also BS-780), located along Grimes Creek in Southern Idaho's Boise Basin. As the site where gold was first discovered in the Boise Basin in 1862, Grimes Creek was subject to intensive placer mining in the late nineteenth and early twentieth centuries. Chinese miners began arriving in the Boise Basin in the mid-1860s. Their arrival coincided with repeal of the law excluding Chinese miners from the basin and the departure of Euroamerican miners as easy-to-work claims were exhausted (Wegars 1995:8). In many cases, Chinese immigrants purchased claims abandoned by others, thus revitalizing local communities. Between 1870 and 1890, mining camps in places like Idaho City, Placerville, Centerville, and Pioneerville were home to nearly 2,000 Chinese individuals, who accounted for as much as 49.9 percent of the entire population (Zhu 1994:71; US Bureau of the Census 1870, 1880). Although their tenure was brief, Chinese immigrants left an enduring legacy in the Boise Basin, which today includes over 300 Chinese-occupied archaeological sites, a vast landscape of mining features, and historical buildings in Idaho City and Placerville.

Placer mining

Placer mining was the most common mining method among Chinese immigrants because it could be done individually with a relatively small amount of equipment. It is a method of searching for nuggets or flakes using the simple mining method of panning or sifting through gravels and soils by hand. "A placer miner either owned the claim that he worked, or he worked another's claim and would pay a rent or percentage of the findings to the owner of the claim. His income depended on how much he extracted from the claim." (Hamilton 2008: 21).

Methods

BS-780 Faunal Assemblage

Skeletal identifications were made using the University of Idaho's comparative osteological collections. Additional assistance was provided by Dr. Colin Grier at Washington State University. Dr. Grier's zooarchaeology lab was instrumental in the identification of some bison elements (discussed further below). When necessary, osteological manuals were also consulted (Amorosi 1989, Gilbert 1990, Olsen 1964, Schmid 1972, Cohen and Serjeantson 1996, Gilbert et. al. 1985). The analysis process included identifying various characteristics of the bones and entering the identified characteristics into a Microsoft Access database with categories of the physical characteristics. Each bone was identified to animal class (e.g. mammal, bird, fish, etc.), genus and species (when possible), the particular element (e.g. tibia, femur, humerus), side (left or right), the portion of the element present (complete, 3/4 complete, 1/2 complete, etc.), approximate age of animal at death, the number of fragments and their weight. As appropriate, epiphyseal fusion and tooth eruption were also recorded as well as any post-mortem modification of the bones such as burning, butchery, rodent or carnivore gnawing. More importantly for this project, the retail meat cuts were identified when possible. In some cases, the cuts can correlate to economic status and/or cultural preferences.

Animal Class

Identification of each bone began with determining animal class. These are bird, fish, reptile, crustacean, mollusk, mammal, or unknown. Since mammal is the most common, this class is further divided into small mammal, medium mammal, and large mammal, or simply mammal if it is unidentifiable to mammal size. Specific size definitions are discussed below

Species

Species was identified in this category if it was known from evidence from the bones. When a bone could not be determined to a certain species because of fragmentation or weathering, the categories "unidentifiable bird" or "unidentifiable mammal" were selected. In many cases a bone was identifiable to mammal, and could also be determined to a mammal size, such as small, medium, or large. These terms follow standard zooarchalogical classification: Small mammals are those such as rabbit, squirrel, rat, and so on. Medium mammals include those such as sheep, pig, goat, deer, and others. Large mammals include cow, elk, horse, moose.

Element

Element refers to the specific bone identified such as humerus, tibia, scapula, lumbar vertebra, and so on. In most cases, these were easily identifiable in this assemblage, but if it was not identifiable, "unidentifiable" was selected.

Fragment of bone

This category is used to provide an approximation of the percentage of bone present. The categories used are complete, 3/4 complete to complete, 1/2 to 3/4 complete, 1/4 to 1/2 complete, or less than 1/4 complete. This information provides an approximation for the analyst of the amount of bone being recorded

Fusing

Fusion is recorded to assist in aging of bones. If either the distal or proximal end of the bone was present, it was simple to identify epiphyseal fusion. There are several stages of bone fusing, but only three were identified in this assemblage: fused, unfused, and fusing. These stages of fusing can indicate approximate age at death. It is important to identify the fusing condition at either the proximal or distal end because the fusing process of each of these ends takes place at varying times of maturation.

Age

Age at death was determined by using the data collected on epiphyseal fusion of the distal and proximal ends of the bone or tooth eruption and/or tooth wear. Figuring the age at death is important when trying to identify animal husbandry practices. This varies from species to species, but generally, meat is at its best quality if the animal is slaughtered in the first to second year. It is also most cost effective to butcher animals such as pigs at approximately one year of age. Many bones are still unfused at this point in an animal's life. One thing to be aware of is that there are variables that can affect epiphyseal fusion rather than age. These are malnutrition and selective breeding for early maturation (Hamilton 2008: 40).

Bone Modification

Bone modification refers to any evidence of post-mortem modifications of humans (worked, burned, or butchered) or animals (rodent or carnivore gnawed).

Butchering Marks

Butchering marks identify specific butchering methods used on bones such as cut, sawn, chopped, unidentified, or a combination of a few of these. This is important for identifying technology and other butchering processes that might deal with the culture of the specified people. Identifying this can also identify specific retail meat cuts were made and how that might correlate with food and culture.

Retail Meat Cut

Retail meat cuts were from the data both from the butchering marks and the bone element. The meat cut categories in this assemblage were either beef or pork. Retail meat cuts were then assigned a quality rank according to the *Analytical Coding System for Historic Period Artifacts* (Louis Berger & Associates, Inc. 1996:238, 254). The only medium mammals that were assigned retail meat cuts were pig. If the medium mammal faunal remains could not be identified to species, retail meat cut was not assigned since the cuts differ from pig to sheep/goat.

Cross Articulation

Occasionally, pieces of bone would cross mend to other pieces of bone bagged elsewhere in the assemblage. These were noted to later help with MNI counts and they are useful for understanding site formation processes. Also noted were the epiphyses that articulated with unfused ends of bones and the few other bones that articulated with others.

Analysis of Faunal Remains

Further analysis of the faunal remains includes three different measures. These are Number of Identified Specimens (NISP), Minimum Number of Individuals (MNI) and Biomass.

NISP and MNI

NISP is the count of the all bone fragments in the assemblage, while MNI is the least possible number of animals represented by the various element counts. MNI is usually figured by taking the most abundant faunal element and either counting how many left or right bones there are of that side. The size and age of the fragment also needs to be considered when taking this measure. It is meant to be a conservative measurement.

Both measurements work together to break down the data and complement each other to compensate for the disadvantages of each. For example, NISP totals can exaggerate the prevalence of a certain species. The measure of MNI would help balance this with its conservative measurement. MNI, on the other hand can have limitations in historical contexts. The rationale is that MNI implies whole animal presence on a site, but in reality, that is not particularly common in historical contexts. More common is the acquisition of portions of an animal for consumption. Simply put, in most historical contexts people only acquire a small portion of the cow for consumption – not the entire cow. The use of NISP compensates for the problem that MNI may not accurately reflect contemporary consumer habits of acquiring small portions of meat rather than the entire animal. At the same time MNIs tend to correct for the problem of over-representation of species due to the fragmentation of the assemblage.

Biomass

A third item of analysis is calculating biomass. Biomass is an estimate of meat weight relative to the bone weight. Biomass is based on the assumption that there is a relatively constant

relationship between skeletal weight and body size and that this relationship can be used through allometry to derive and estimate of the amount of meat represented by the amount of bone present (Reitz and Wing 1999: 224-228).

One main weakness of biomass information is that the meat weight could be skewed from the bone weight because the bones are usually fragmented from post-depositional factors, influencing the accuracy of the biomass (Reitz and Wing 1999: 225). Again, it is not a perfect analytical tool, but it does help to convey a sense of the volume of what was being consumed.

McDevitt Meat Market Ledgers

The McDevitt Meat Market ledgers were transcribed from scans received from the Idaho City Historical Society. The pages contained records of meat purchases from the McDevitt butcher shop in Placerville. The ledger recorded meat purchases by the Chinese from 1875 to about 1879. Each page recorded the individual's name, what they purchased and how much they paid for it. The data was entered first into Microsoft Excel and then later imported into Microsoft Access for ease of analysis. After the transfer into Access, some of the transcribed text was revised for analytical purposes; such as the variations of "Pigs feet", "Hogs feet", "Pig foot", and others were modified into a uniform "Pig Feet" entry.

Results

BS-780 Faunal Assemblage

The faunal assemblage consisted of 424 bones with the total weight of the assemblage being 5.7565 kilograms. Four species were identified in the assemblage cow, bison, pig, and chicken. A minimum of 9 individuals were identified. Most of these remains can be associated with mammalian meat consumption. Table 1 summarizes the faunal remains. Pig and medium mammals were the most frequently identified animals by bone count while large mammals were the most commonly represented animals based on bone weights. The only medium mammal bones identified to species were pigs. Seventy-seven pig bones were identified representing a minimum of five individuals. Large mammals consisted of both cow and (unexpectedly) bison with a total MNI of two. The NISP totals were: Cow = 2, Bison = 8, Lg. Mammal = 94. Overall, mammalian bones comprised approximately 97 percent of the assemblage. Further, almost 50 percent of the assemblage (NISP = 208) showed evidence of various forms of butchering such as being chopped or sawn.

Species	NISP	%NISP	MNI	Weight (g)	Biomass (kg)	%Biomass
Cow	2	0%	1	32	0.595	1%
Pig	77	18%	5	989.8	13.061	18%
Chicken	7	2%	2	5.1	0.114	0%
Bison	8	2%	1	1403.8	17.889	24%
Unidentified Large Mammal	94	22%		2594.9	31.096	42%
Unidentified Medium Mammal	131	31%		548.2	7.674	10%
Unidentified Bird	6	1%		2.4	0.058	0%
Unidentifiable Mammal	99	23%		180.3	2.821	4%
Total	424	100%	9	5756.5	73.308	100%

Table 1: Summary of species identified at BS-780

Mammal Remains

There were only two bones that could specifically be identified to cow, that collectively, have a weight of 32 grams (see table 1). The two cow bones identified were an intermedial carpal and an ulnar carpal that articulate, indicating it was the same individual.

Eight bison bones were identified, adding a rather interesting piece of data. Two of the bone fragments were identified as a single left radius that was chopped mid shaft, most likely for marrow extraction (figure 3).

Figure 3: Chopped Bison radius

Two other bison bones were identified in the assemblage that articulated; a right tibia and astragalus. The astragalus had several deep cut marks on it indicating joint disarticulation (see figure 4).

Figure 4: Articulating Bison tibia and astragalus

There were 77 pig bones identified in this assemblage collectively weighing 989.8 grams (see table 1) with an approximate meat weight of 13.061 kg. The pig element distribution was quite diverse. In addition to bones such as femurs and scapulas which are the byproducts of common meat cuts the assemblage also contains a surprising number of, head, teeth and jaw fragments (n=30). Finally, 31 of the 77 bones showed evidence of butchering.

Unidentified large mammal bone lacked diagnostic features for species identification but did provide enough information to identify specific elements in most cases. There were many cases that the nondiagnostic bones were those that had been butchered into small meat cuts and, therefore, were too small and lacked any identifying characteristics. There are 94 unidentified large mammal bones in the assemblage, making up 22% of the total bone count (see table 1). Twenty of these bones are ribs and ten of them are scapulae. Long bone fragments were also extremely common. Thirteen were identified as femurs, but as mentioned before, most were sawn into what appears to be steak cuts such as bones from the shaft of the femur that are both quite small and have no distinctive identifying features. The same can apply to the humeri; many have been butchered to small fragments. Noteworthy are the bone fragments from the pelvis: 8 innominate, 3 ilia and 1 ischium. Many of these were also butchered into smaller meat cuts.

Element	NISP	Weight (g)
Axial		
Sacrum	1	12
Innominate	8	272.3
Ilium	3	110.8
Ischium	1	51
Lumbar Vertebrae	1	14.3
Thoracic Vertebrae	1	28.9
Scapula	10	397.5
Rib	20	256.2
Atlas	1	29.6
Total	46	1172.6
Forelimb		
Humerus	4	368.5
Radius	7	719.9
Ulna	3	98.1
Total	14	1186.5
Hind Limb		
Femur	13	671.1
Tibia	3	413.4
Metatarsal 3 and 4	1	52.2
Total	17	1136.7
Fore Feet		
Ulnar Carpal	1	16.8
Intermedial Carpal	2	35
Total	3	51.8
Hind Feet		
Astragalus	1	125.8
Total	1	125.8
Toes		
Second Phalange	1	30.5
Total	1	30.5
Unidentified		
Unidentifiable Vertebrae	2	16.4
Unidentifiable Long Bone	9	150.4
Unidentifiable	13	160.2
Total	24	327

Table 2: Large Mammal Element Distribution

Bones categorized as unidentified medium mammal lacked diagnostic features for species identification but provided enough information to identify the element. The most common nondiagnostic bones were ribs and vertebrae. Many bones were highly fragmented past the point of leaving any diagnostic features available on the bones. There are 131 unidentified medium mammal bones. Sixty-seven bones were butchered with most of the butchered bones being ribs (n=31) and unidentified long bones (n=16).

Element	NISP	Weight (g)
Head and Neck		
Atlas	2	6.8
Cervical Vertebrae	3	6.5
Cranium	4	29.9
Mandible with Teeth	5	126.6
Mandible without Teeth	2	7.4
Maxilla with Teeth	7	72.7
Occipital	4	24
Tooth	21	43.6
Total	48	317.5
Axial		
Caudal Vertebrae	1	1
Illium	2	28
Innominate	3	34.8
Ischium	6	59.9
Lumbar Vertebrae	2	6.1
Rib	31	43
Sacrum	1	3.4
Scapula	14	146.8
Thoracic Vertebra	7	21.4
Total	163	979.4
Forelimb		
Humerus	9	175.1
Radius	4	29.5
Ulna	1	13.6
Total	14	218.2
Hind Limb		
Femur	19	512
Tibia	8	82.1
Fibula	3	5.3
Astragalus	1	1.7
Calcaneous	2	9.9
Metatarsal 2	1	0.9
Metatarsal 3	1	1.7
Unknown Metatarsal	1	0.8
Total	36	614.4
Toes		
First Phalange	1	1.7
Second Phalange	4	7.1
Total	5	8.8

Unidentified		
Unidentified Metapodial	1	1.9
Unidentified Long Bone	16	102.1
Unidentified Vertebra	8	12.3
Unidentified	13	22.8
Total	38	139.1

Table 3: Medium Mammal Element Distribution

Avian Remains

There is a total of 13 bird bones in the assemblage (see table 1). Seven bones were identified as chicken. The other six lacked diagnostic features placing them as unidentified bird bones. There was very little evidence of butchering of any of these bones. All the bird bones were limb bones except for one that was part of a bird pelvis.

Meat Cuts

Zooarchaeologists identify and study particular cuts of meat/butchering techniques to evaluate meat consumption patterns and potentially economic status. As discussed above, scholars study butchery to determine how animals were processed, such as how an animal was disarticulated or how it was cut up for consumption. In historical contexts animals were commonly butchered and sold in small amounts, such as meat for an individual meal. The significance of attempting to identify specific cuts of meat is that there is typically considerable price differences particular meat cuts providing the analyst some insight into the finances of the household. The system used in this work is based on a relative value of meat cuts instead of absolute values as those are too difficult to calculate with any reliability. The relative rankings are derived from average meat prices for pork and beef. Basically, the higher ranked meat cuts will be more expensive per pound than the lower ranking meat cuts. A faunal assemblage consisting of more high-ranking meat cuts than low ones could suggest that the consumers had more resources at their disposal to purchase better-quality meats. Generally, the higher-ranking meat cuts come from the loin/pelvis area of the animal, because the meat here is tenderer than from other parts of the body. The further from this area the cuts come from, the lower rank of the meat cut. The lowest quality, in turn, would come from the head and the feet of the animal.

Something to be mindful of when trying to interpret economic status from meat consumption patterns is that the purchasing patterns of meat are not always consistent with

status. For example, households with limited resources may celebrate special occasions with fancy meals. Food is an extremely important symbol that many do not like to compromise, even in desperate times. Thus, food remains may indicate that people lived a fairly comfortable life, while their actual economic situation said otherwise. Alternatively, sometimes cultural preferences lean more toward cheaper meat cuts. Finally, it should be acknowledged that these faunal remains are not entirely representative of all the meat that was consumed at this location. Boneless meat cuts or other items such as sausage and lard would not be evident in the assemblage. As with any archaeological data there are limitations—however the data also presents the past in ways that textual sources cannot. As will be demonstrated patterns in meat consumption will be identified that sheds some light on overall the economic status of Chinese in Idaho.

The approach to finding these patterns has been to identify cuts of meat based some form of economic scaling associated with the meat cuts as well as a more general assessment of how animals were processed. In many cases, the ways in which an animal is butchered depends on the way the animal is built, but there are also individual and cultural variations. This assemblage provided some evidence both on Chinese butchered animals and what they consumed that either differ from or align with Euro-American-occupied sites.

The main categories the butchered bones fell under were cut, sawn, and chopped. Some were identified as possibly one of those three and some showed signs of butchering, but the specific butchery was unidentified and selected as unidentified butchery. Some were even identified as a combination of different butchering styles such as cut and chop. Overall 49% of the assemblage had some evidence of butchering as seen in table 4.

Species	Chop	Cut	Cut and Chop	Cut and Poss. Chop	Cut and Sawn	Possible Butcher	Possible Chop	Possible Cut and Sawn	Possible Sawn	Sawn	Sawn and Poss Chop	Sawn and Chop	Unident. Butcher and Cut	Unident. Butchery	Totals
Bison	2		1							2					5
Pig	9	4	2		1	4	1		1	4			1	4	31
Unident. Lg. Mammal	7	2	1		1		4	1	1	53	1	1		6	78
Unident. Med. Mammal	6	4	1	1	1	7	3		4	27	1			16	71
Unident. Mammal	1					8	1		1	9				5	25
Total	25	10	5	1	3	19	9	1	7	95	2	1	1	31	**210**

Table 4: Types of Butchering

Table 5 shows the general meat cut categories of the identified pig elements in the assemblage. Thirty-one pig bones were identified that could be associated with a particular meat cut. There was a range of meat cuts identified in the assemblage; however; 45% of the identified meat cuts were butt hams which is the most expensive meat cut of the pig. The second most common meat cut was boston butt at 29%. Noteworthy is that 13% of the meat cuts come from the head or the foot, which were the most inexpensive parts of the animal to acquire.

Meat Cut	NISP	%NISP	Weight (g)	Biomass (kg)
Boston Butt	9	29%	82.7	1.4
Butt Ham	13	42%	295.9	4.4
Head	1	3%	44.1	0.8
Hock	3	10%	10.8	0.22
Loin End	1	3%	14.1	0.29
Picnic Ham	1	3%	18.1	0.36
Shank Ham	3	10%	27.6	0.52
Total	31	100%	493.3	7.99

Table 5: Pig Meat Cuts

Seventy-one medium mammal bones were identified that could be associated with a particular meat cut. Seven percent of the identified medium mammal cuts were from the loin which would be the most expensive cut (see table 6). However, 35% of the medium mammal meat cuts were from a leg bone and 30% were from the rib area. Finally, head, neck and foot cuts comprised 8% of the identified medium mammal cuts.

Meat Cut	NISP	%NISP	Weight (g)	Biomass (kg)
Head and Foot	6	8%	72.2	1.24
Loin	5	7%	397.4	5.75
Rib	21	30%	25.7	0.49
Leg	25	35%	307.3	4.56
Shoulder	2	3%	129.2	2.09
Unidentified	12	17%	19.2	0.38
Total	71	100%	951	14.51

Table 6: Medium Mammal Meat Cuts

65 large mammal bones were identified that had some evidence of butchering. Meat cuts identified ranged from the most expensive cuts (loin cuts) to the most inexpensive (head, feet.)

The most commonly identified meat cut was rib, representing 25% of the identified meat cuts. Table 7 summarizes the identified large mammal meat cuts and their associated rank.

Meat Cut	NISP	%NISP	Weight (g)	Biomass (kg)
Arm (6)	1	2%	24.3	0.46
Chuck (blade) (5)	10	15%	397.5	5.75
Foot (10)	1	2%	52.2	0.92
Loin (1)	1	2%	14.3	0.29
Neck (8)	1	2%	29.6	0.55
Rib (2)	16	25%	225.5	3.45
Round (3)	10	15%	359.2	5.24
Rump (4)	4	6%	134.1	2.16
Shank (9)	14	22%	1580.3	19.9
Sirloin (2)	7	11%	243	3.69
Total	65	100%	3060	42.41

Table 7: Large Mammal Meat Cuts

Other Modifications

There was no evidence of rodent or carnivore gnawing on any bones. This suggests that they were likely disposed of quite quickly after consumption rather than being exposed to scavenging.

A total of 14 bones representing 3% of the entire assemblage had evidence of burning. This could reinforce the assumption that the remains were being quickly buried for disposal, rather than burning and processed other ways.

There was one bone that was probably human worked into a tool such as possibly a toothbrush.

McDevitt Meat Market Ledgers Results

Another data source for this project were the McDevitt Meat Market Ledger. The 332-page ledger recorded Chinese meat purchases in Idaho City during the years 1875-1878. The ledgers show that pork was purchased in higher quantities than beef and it was purchased more regularly. A crucial point drawn from the ledger is the fact that pork consistently cost much more than beef. Overall beef was sold at $0.13 cents per pound while pork sold at $0.25 cents per pound. This data shows that, despite this dramatic difference of price, pork was purchased in

greater amounts than beef. Over the three years of records 35120.2 pounds of pork and 28006.54 pounds of beef was recorded as being sold (see table 8). This further emphasizes that these cheaper cuts have cultural importance to these Chinese, rather than just an economic value considering the great consumption of the pork.

Items Purchased	Weight*	% Weight	Price	% Price	Overall % Price
Bacon	756.367	1%	$ 226.91	2%	1%
Beef	28006.54	39%	$ 3,640.85	26%	22%
Cat			$ 4.40	0.03%	0.03%
Dog			$ 13.46	0.1%	0.08%
Head Cheese	11.25	0.02%	$ 3.94	0.03%	0.02%
Heart	28	0.04%	$ 7.00	0.05%	0.04%
Hog	2984.5	4%	$ 565.84	4%	3%
Kidney	2	0.003%	$ 0.25	0.002%	0.001%
Lard	360	0%	$ 145.81	1%	1%
Lung	6.5	0.01%	$ 4.97	0.04%	0.03%
Mutton	3.46	0.00%	$ 6.92	0.05%	0.04%
Oxtail			$ 1.88	0.01%	0.01%
Pig Feet	842.77	1%	$ 109.56	1%	1%
Hog Head	540.23	0.7%	$ 70.23	0.5%	0.4%
Pork	35120.2	49%	$ 8,780.05	62%	52%
Sausage	54.7	0.1%	$ 16.43	0.1%	0.1%
Shank	13	0.02%	$ 24.51	0.2%	0.1%
Steak	2974.87	4%	$ 446.23	3%	3%
Tongue	5	0.01%	$ 2.13	0.02%	0.01%
Veal	439.7	0.6%	$ 87.94	1%	1%
Total	72149.09	100%	$ 14,159.31	100%	84%
Overall Total	73118.1	99%	$ 16,847.72	84%	

Table 8: Items purchased at the McDevitt Meat Market and their total weights and money spent

* Numbers were based calculated with average price per pound if unit price could be determined

Non-typical parts of the pig parts such as pigs' heads and feet were also purchased with some regularity as well as occasional purchases of cat, dog, mutton, lung, heart, liver, head cheese, oxtail, kidneys, and various others (see table 8).

Small, yet significant details that surfaced were those of company names often written off to the side of the customer name showing affiliation. Other times the word "company" was written with the name indicating that these individuals were likely buying meat supplies to share amongst their companies, or households, that the Chinese miners usually lived in. Whether these individuals were buying supplies for the miners or buying these meats to cook for the entire company is not known.

Discussion

With the notable exception of bison, the species represented is fairly typical of late nineteenth century meat consumption namely cow, pig, and chicken. The bison remains are quite exceptional. They represent both the acquisition of food through hunting and private butchery. The bone marrow extraction seen with the radius is fairly atypical. It shows a non-professional was butchering these bones for their private use as it would not be something sold through a market.

In terms of overall numbers, pork dominated, a fact that is potentially significant given a cultural preference for pork amongst Chinese, something that will further be elaborated on later. The evidence of both the assemblage and the ledgers shows a broad use of the animal, namely pig, as seen with the body part representations and the purchasing of pigs' heads and feet.

Chinese Meat Choices

To better understand Chinese meat consumption, additional research was undertaken on traditional Chinese foodways. The intent was to explore the symbolism of some foods among within these communities.

Chinese traditional cultural beliefs include a theory of opposing natural forces in the world: yin and yang. This is incorporated into most aspects of their lives -- including architecture, colors, health, and food – to create harmony. Many Chinese believe that food is

more than merely sustenance, it can help prevent and treat diseases. The thinking is that there are five elements or evolving phases (fire, earth, metal, water, and wood) that correspond with many other aspects of the world including the seasons and even flavors. These five flavors are acid, salt, sweet, bitter, and pungent (Kittler and Sucher 2001: 259). This belief is believed to originate from a chef-minister, I Yin, of an emperor of the Shan Dynasty, ca. 1600 b.c. He was the first to talk about the "harmonious blending of food" consisting of these five flavors (Newman 2004b: 31). After the body processes food, it becomes energy or Qi. Food must be properly thought out in order to maintain a healthy and harmonious body (Newman 2004a: 233).

Therefore, disease and sickness are caused by the imbalance of either yin or yang. Too much yin in the body can result in sicknesses such as colds, flus, nausea, weight loss and something the Chinese call weak blood; treatment would be to consume yang foods such as certain herbs and protein rich soups. These soups often include ingredients such as "chicken, pork liver, eggs, pig's feet, or oxtail" (Kittler and Sucher, 2001: 270). Rattlesnake and dog meat are also included in that mix of yang foods promoting health. Too much yang in the body can result in sicknesses such as acne, hemorrhoids, constipation, fever, sore throat, hangovers and others. To treat these, yin foods are used for remedies, which are usually bland and cold (260).

In China, the most popular meat consumed was pork (Newman 2004: 235, Anderson 1988: 68, Anderson and Anderson 1977: 336). When Chinese immigrated to America, the most abundant meat was beef, resulting in many immigrants making adjustments to their food choices (Warner et al 2014). What is intriguing about the Idaho city archaeological data is that it demonstrates the continuing significance of pork. Despite costing twice as much as beef, pork was purchased in significant amounts based on the ledger data. The consumption of all this pork also says something about both the cultural and economic status of the miners in Idaho.

Going back to the ledgers, they indicate the residents clearly had the finances available to afford what was apparently their first choice in meat. Also interesting is that there were a significant amount of purchases including those of pigs' heads and feet. The faunal remains also display this complexity in meat consumption. These elements are the least expensive meat cuts on the animal. They cost approximately $0.13 per pound, half that of the other pork cut. Taking this data into consideration led me to believe that the consumption of the cheapest meat cuts was not due to low economic flexibility, but were rather significant to them in some other way, such as what was mentioned above.

There are a few bones from the 10BO357 assemblage showing evidence of the processing of pigs' heads and feet. Figure 5 is a photograph of a sawn pig calcaneous, an ankle bone, and figure 6 is a photo of a sawn mandible. One possible explanation is that the presence of these elements indicates some secondary butchering of animals on site. There were entries in the ledger indicating purchases of half a hog and whole hogs; what the mandible and calcaneous may indicate is a two-stage butchering process. The first stage done at the meat market, and the second stage done on site.

Figure 5: Sawn pig calcaneous

Figure 6: Sawn pig mandible

The Story of Meat in the Boise Basin

Beef and pork were the most important sources of meat to the Chinese in the Boise Basin of Idaho, with a surprising discovery of several processed Bison bones. Chinese miners maintained many of their traditional food practices such as their preference for pork and the use of cleavers in butchery of the animals. Evidence shown in this study suggests that there was still a significant amount of beef being consumed, likely due to the higher availability of beef in the food supply systems of the area. This suggests that these miners were likely purchasing meat cuts according to their preferences rather than price, because of the higher percentages of higher quality meat cuts of both pork and beef, which has something to say about possible socioeconomic status of the people of this Chinese mining camp. At the same time, there was a surprisingly high percentage of pig heads and feet being represented in both the assemblage and the ledgers, but this is likely a preference for traditional Chinese food patterns, providing further evidence that their purchases were more preference-driven, albeit a convenient preference. The

same could be argued about the amount of more obscure meat purchases such as cat and dog, and animal organs such as heart, lung and head cheese.

However, the amount of beef in the assemblage adds an element of complexity. Figure 7 is based on the weight measurements from both the ledgers and the bones. From the bone assemblage data, there are 208 pig and medium mammal bone fragments, while there are 102 cow and large mammal bone fragments identified. This is a large contrast in the overall count of the cow and pig remains. But, the interesting part is that the beef biomass – or meat weight – is vastly greater than that of pork (pork at 13 kg; beef at 32 kg), demonstrating that there was a greater quantity of beef present overall as shown in figure 7. So we can see that the proportions of cow and pig in the ledgers is quite different than in the bone assemblage, especially that of pig.

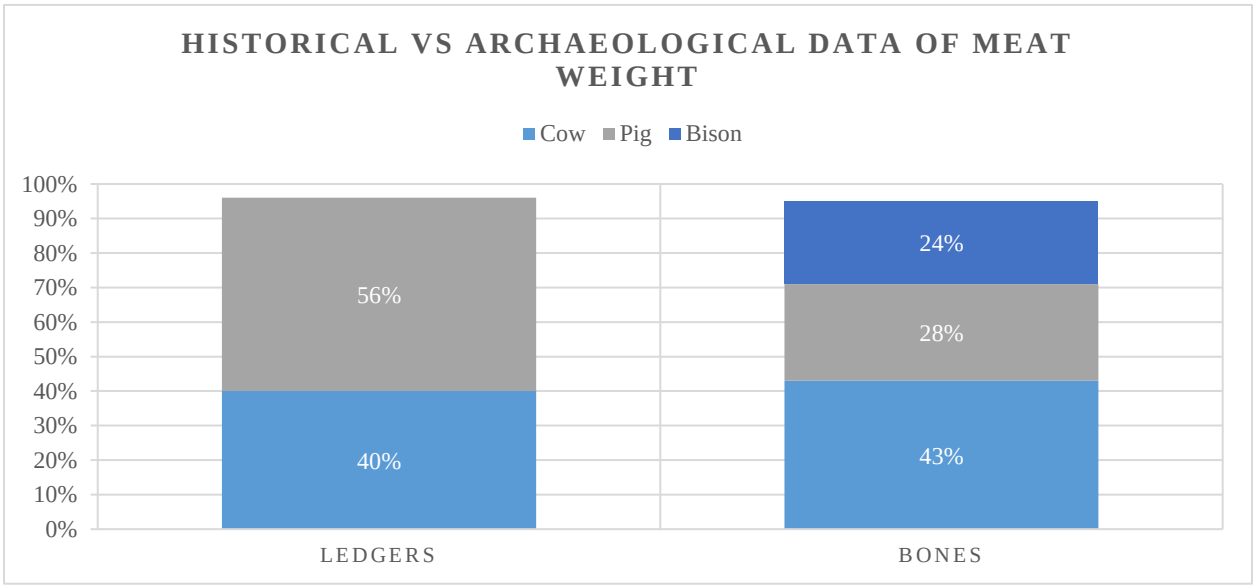

Figure 7: Comparison of faunal assemblage and meat market ledger meat market

A shocking surprise in the assemblage was the identification of several bison bones (discussed earlier). There were only eight bones identified as bison, but these eight bones represent 24% of the meat weight of the entire assemblage. Whereas, the cow and large mammal meat weight had 43% and pig and medium mammal meat weight characterized 28%. These statistics conflict with the data obtained from the meat market ledgers. Regardless, I would argue that pork was consumed more regularly than beef.

To discuss the bison bones further, I would first note that they all seem to come from a single individual, based on the evidence that several of the bones both mend and articulate. There is the distal end of a right tibia (see figure 4) that articulates with an astragalus (an ankle bone), both of which were obviously butchered; the tibia was sawn and the astragalus was heavily chopped. The multiple chop marks at the joint suggest a non-expert's attempt at joint disarticulation. There are also two fragments of a bison radius (see figure 3) that mend after being chopped in half. Again, this butchering is almost certainly done by a non-professional and its purpose was likely to extract the marrow from within.

These articulating bones not only suggest that these elements come from the same individual animal, it also means that the 24% of the meat represented in this assemblage was obtained at one single point in time. The other large bison bones that do not mend or articulate (not shown here) come from other parts of the body but considering their size in comparison to the other bones, I would like to suggest that they also come from the same individual.

But why is there any bison present in the assemblage at all? And why is it so interesting? There were bison present in this region, but it suggests that there was some wild game hunting going on, either by these Chinese in the community or others in the surrounding area. Not only was there hunting of this wild game, but also consumption by the Chinese mining community, though obviously not obtained through a local meat market as seen with the ledgers.

The pork, on the other hand, was likely obtained over a period of time evident in that there is a higher MNI count and a higher NISP of pig and medium mammal bones. This proposes a more regular pattern of pork consumption over time, considering little articulation and mending was identified among these bones. Figure 8 further demonstrates the idea that there may have been secondary butchering at the site by a non-professional considering the chop marks.

Figure 8: Butchered pig femurs

A few other artifacts found at the site besides bones were also a meat hook, a Chinese meat cleaver, and a fragment of a large wok (see figure x). The wok was probably an extremely large one used for cooking massive amounts of food at once. I think these items may corroborate the point that the miners were acquiring and processing meat in a variety of ways as the cleaver indicates an on-site need for butchery.

Figure 9: Chinese cleaver, wok fragment, and meat hook

Conclusion

Many scholars have noted the importance of food to group identity and the Chinese were no exception. Food may have been even more important to the Chinese who immigrated to the U.S. because of the status as outsiders.

Ethnographic and historical sources repeatedly have identified the preference of pork among Chinese. Both the archaeological and ledger data agree with these sources in that many Chinese miners maintained many of their traditional food practices. The ledger data provides additional evidence about how important the pork was to the miners, but they also indicate that pork was much costlier than beef. However, it was clearly the preferred meat indirectly indicating how important pork was.

Figure 10 is photographic evidence of much of was has been discussed. It shows the use of a large wok for cooking a whole pig, suggesting a broad use of all parts of the animal. It also suggests that there was an on-site need for butchery for easier consumption of parts of the pig.

Figure 10: Chinese Festival in Idaho City; copyright Idaho State Historical Society

The faunal assemblage also suggests that these miners were purchasing meat cuts according to their preferences rather than price, shown in the greater percentages of higher quality meat cuts of both pork and beef. At the same time, there was a surprisingly high percentage of pig heads and feet being represented in both the assemblage and the ledgers, but

this is likely a preference for traditional Chinese food patterns, providing further evidence that their purchases were more preference-driven, although it being a convenient preference. Further, body part representation as identified archaeologically indicates non-typical consumption of feet and heads, possibly associated with Chinese health and traditional cultural beliefs.

Bison findings are particularly unexpected. Between the species being present and the disarticulation marks and long bone splitting, it is evidently suggesting meat acquisition outside of local markets and suggesting most likely private provisioning.

The evidence shown in this study suggests that there was an element of dietary complexity that is not always visible in historical sources. This demonstrates that having either history or archaeology standing alone is not always enough to understand human behavior.

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