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A Pathological Study from Humayma

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By

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Abstract

This paper looks at a sample of faunal remains from the 2012 season of Humayma in southwestern Jordan. The study identifies and analyzes the paleopathologies present on bone. In this thesis I discuss the frequency of different pathological lesions, their causes, and how the diet and care of these animals may have affected their overall health.

Acknowledgments

This thesis would not have been possible without the help and support of several people. First I give my heartfelt thanks to my thesis advisor Dr. Tiffany Rawlings. She has been involved in this process every step of the way. The bones used in this study came from a collection Dr. Rawlings works on and was more than willing to give me access to. Not only that but she has put up with my untold number of questions and concerns and was the reason I became interested in faunal remains in the first place. To my mother who not only gave me the emotional supported needed but has been more than willing to proof read my paper again and again. I also want to thank the rest of my family and friends for supporting me and for putting up with me when I had problems.

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Introduction:

Archaeologists and Historians have studied the Roman Empire for well over a century. While there is quite a bit known about the Empire, both in Italy and its provinces, more is always being learned. The Empire was vast, and at its height it controlled land from as far west as modern day Portugal, as far north as modern day Britain, as far east as modern day Iraq, and as far south as Egypt. The great diversity within the Roman Empire can be attributed to how many different lands were a part of it. Each province kept their own identity while under the rule of the Empire. We can see evidence of this in Humayma. It was a Roman fort that would have been run by Romans, including a general and senior officers, but many of the people living there would have been locals. One way we can study the Roman Empire is through archaeology.

Archaeology is the study of the past using the material culture left behind by ancient peoples. One type of material culture that is frequently left behind are the bones of animals and humans, though faunal remains are far more common. The fauna can tell us a lot about the people in the past, especially about their diet. Animal paleopathology has often been overlooked by archaeologists, but can be instrumental in better understanding different cultures. Archaeologists have overlooked animal paleopathology due to the numerous problems that can arise from trying to study the remains. One of the keys to fixing these problems and creating a successful study of animal paleopathology is to move away from descriptive studies of novel diseases and take a more general and all-encompassing view of the remains instead. (Vann 2008)

This study aims to understand and reconstruct the over-all health and treatment of domestic animals at Humayma through the results of a study of animal paleopathology. The study is a general overview of a sample of remains from the 2012 dig season of Humayma, with particular attention to which bones show pathological lesions and what pathologies are present. This study illustrates how animal paleopathology enriches our understanding of past cultures.

Research Design:

The remains used in this analysis are curated in The SUNY College at Brockport Anthropology Lab. The remains come from the site of Humayma and are being analyzed as a part of an on-going project, the Humayma Excavation Project led by B. Reeves of Queen's University. I took a sample of approximately 50% of the 2012 assembly for the thesis. This was done to make the sample size more appropriate for the time frame of an honors thesis, while still being large enough to yield significant results. The remains are typical of any zooarchaeological assemblage and the primary focus of analysis is identification of taxa. While Humayma was occupied for hundreds of years by at least four distinct cultures, this thesis focuses only on the occupation of the Roman Fort. The goal of this thesis is to identify evidence of disease and what it can tell us about the care and health of the animals.

There are several expectations in this study. First, I expect to find evidence of disease or at least pathological lesions, specifically periostitis and osteomyelitis. Secondly, evidence of disease on bone should be well preserved due to dry desert condition. The caprinae remains are expected to show high levels of disease due to the fact that they are completely dependent on what grows in the environment for sustenance and the area itself has little natural vegetation.

Questions that will be addressed:

- Which animals show evidence of pathologies and what are those pathologies?
- What was the frequency of the different pathologies in the assemblage?
- What is the frequency of each pathology present by species?
- What frequency of animals show signs of disease?
- What can the assemblage tell us about the culture and diet of Humayma?
- What can the evidence of disease tell us about the lives of both humans and animals?

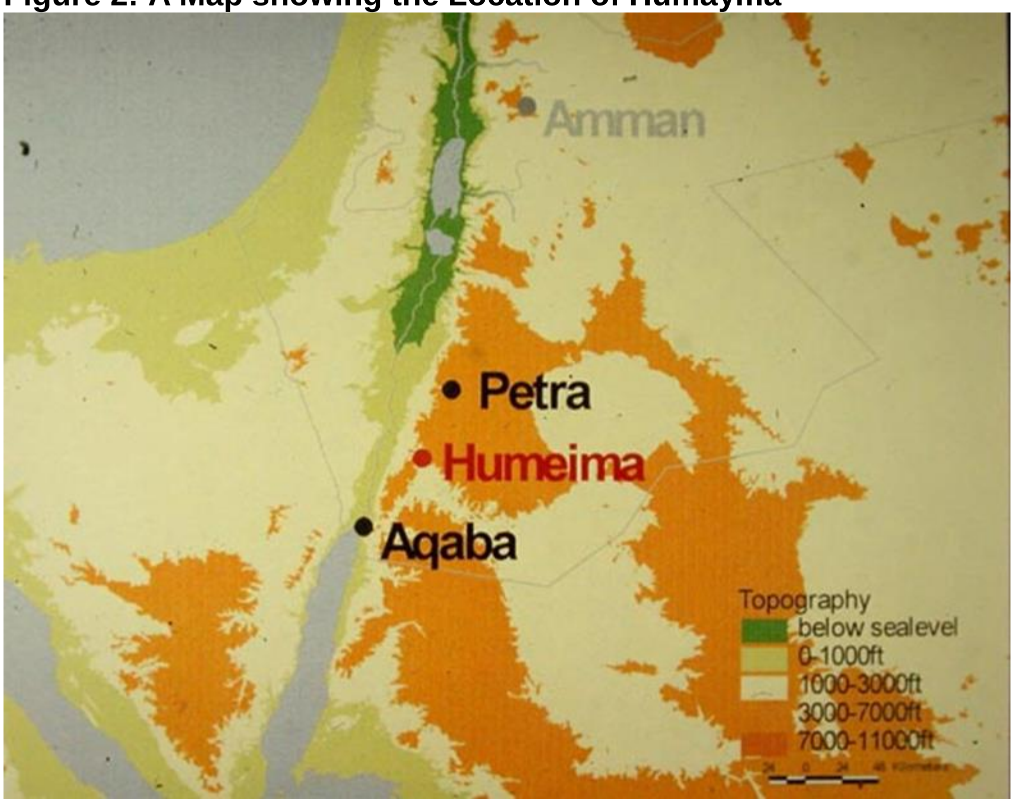
Background:

Humayma is located in southwestern Jordan, north of Aqaba and a couple of hours south of Petra (Figures 1 and 2). Humayma, also known as Ancient Auara or Hawara, has a long history of occupation from the Nabataeans to the Byzantines and then the Muslims. During the Roman period, it was situated in the province of the Roman Empire known as Roman Arabia. Roman Arabia stretched from the southern part of Anatolia or modern day Turkey to the Sinai Peninsula in the south and the northern portion of Modern day Saudi Arabia. (Fisher 2004) The site of Humayma was originally built in the late Nabatean period around 80 BCE, not long before the Romans took control of the Nabataean empire in the mid first century BCE. At that time, the former Nabataean Empire became a client kingdom of the Roman Empire. This meant that they were allowed to rule themselves, but only under the purview of the Roman Empire. They had their own king, but as in many cases, the king would have been placed there by the Roman Empire who would have not concerned themselves with the kingdom unless there was a problem. In the late first century CE, the entire area was annexed and became a part of the Roman Empire. While the starting date of Roman occupation is not known, it was probably sometime around when the area was annexed as a province of the Roman Empire instead of simply being a client Kingdom, which was between 106 CE and 111 CE. According to some sources, the annexation of the former Nabataean Empire started in 106 CE and ended in 111 CE, while others think it ended in 106 CE. Roman Arabia seems to have had a larger presence of troops, specifically the areas towards the border of Roman Arabia, due to the presence of the Persians. As

Figure 1: A Map of Jordan

(Lonely Planet 2016)

Figure 2: A Map showing the Location of Humayma



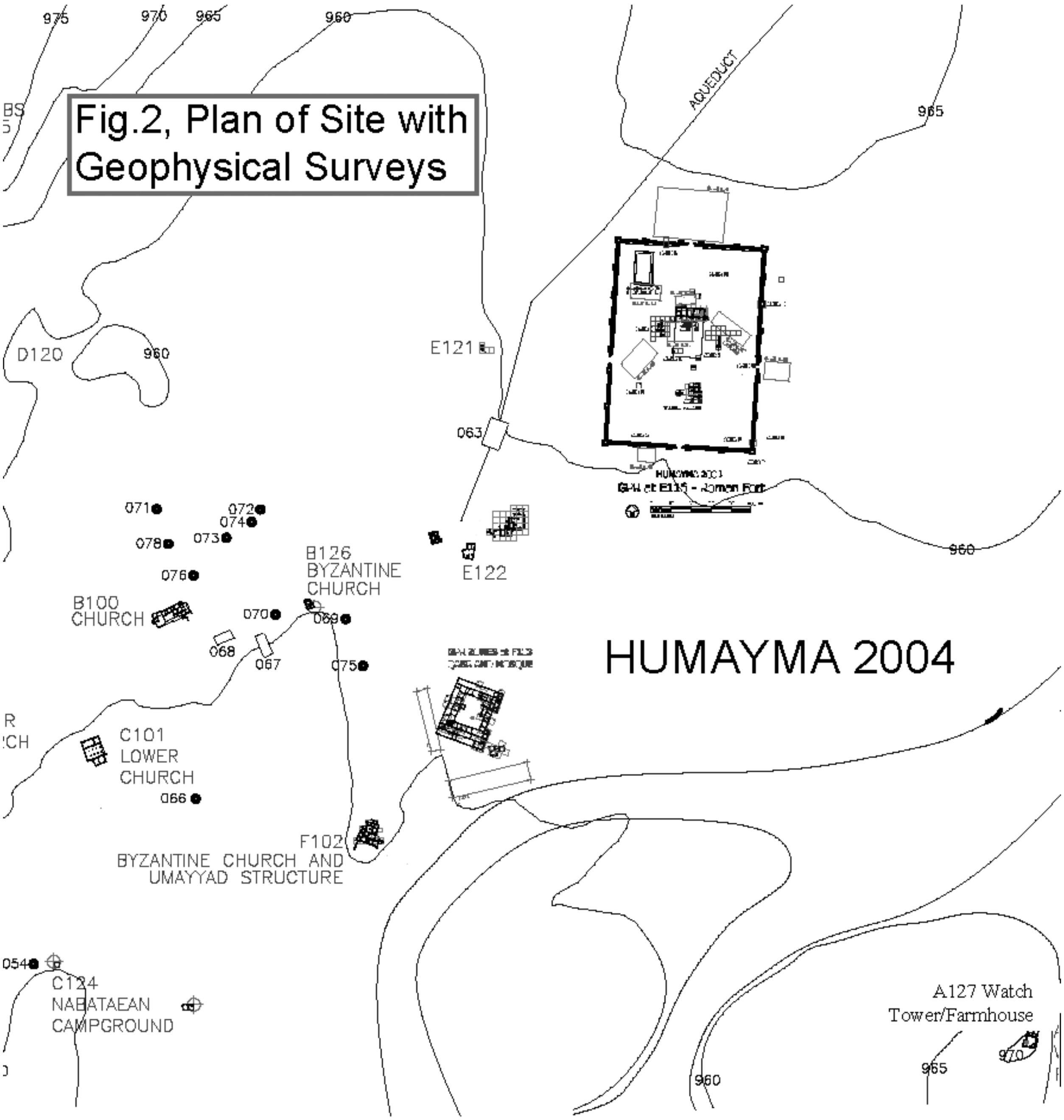
(Oleson J, 2001)

such, the area surrounding Humayma would have been very important for the Romans to protect from the Persians. (Fisher 2004) This is due to the fact that the Romans and the Persians were enemies and the Persians would have taken any advantage to try to wrest control of the area from the Romans. This would have given the Persians a foothold much closer to Rome and would have possibly enabled them to start attacking Rome itself.

The Fort:

The Roman Empire had forts throughout the provinces and Humayma was no different than any other fort in the province. While the area around the forts would have changed, the structure of the forts remained for the most part the same, though each fort had certain aspects that differentiated it from others, mainly due to the area in which it was located. The major change seems to be the orientation of the fort, while the set-up of the camps remains the same. (Richardson 2005) In Humayma, the fort is situated in the northeastern area of the site and is on a higher elevation than much of the rest of the site (see figure 3). All forts had a *principia,* a *horreum,* a set of barracks for the soldiers, and a major road or *via* that the fort was oriented along. It seems that for the most part, the *horreum*, or granaries, are placed near the *principia*, or the officer's quarters. (Bidwell et al. 2012) Not only that, but there seems to be only one *horreum* per fort, which would store the food for the entire fort. So the size of the *horreum* was directly related to the size of the fort. (Richardson 2004) While all of this is true, according to Sherwood et al (2008), the horreum in the Humayma fort, while near the principia (see Figure 4, pg.11), had a slightly different structure when compared to those in Britain and Germany. The main differences seem to be in the floor structure, but there may also be differences in the roofing structure. Almost nothing of the roof structure has been found, so it is difficult to tell.

Figure 3: Site Plan of Humayma



(Sherwood et al 2008 Part I, 120)

Local and Roman Subsistence:

The Roman Empire was extremely diverse in culture and in food. There would have been certain food sources, such as cattle, that would have been common regardless of where in the Empire you were, but others would have been dependent on where in the Empire you were living. According to Henry (1985), prior to the presence of the Romans, and even prior to the Nabataean Empire, certain animals were commonly eaten in Southern Jordan. The most common of these were domesticated sheep and goats; the second most common was domesticated cattle. There is also some evidence of domestic pig being eaten prior to Roman control, but others have suggested that it is in fact wild boar that they were eating. During the Roman period in other parts of Roman Arabia, we see clear evidence of them having domestic pig. (Horwitz et al. 1990) For the most part, the Romans living in the provinces ate foods typical of the area. However, there seems to be certain foods that are present in the Roman diet regardless of where in the Empire they are living. The main one is a fish sauce called *garum* that was very popular in Rome at the time. The sauce was made by taking fish heads, mascerating them in salt, and allowing them to ferment in the sun until the fish was liquefied. Once the fish was liquefied the liquid was drained off the top and used as an early version of modern ketchup. (Keenleyside 2009)The Jordanian diet prior to Roman control during the Nabataean Empire was mainly sheep, goat, cattle, and a collection of wild birds and game. There is little doubt that the Nabataeans had domesticated sheep/goats and cattle, just as the people that came before them. However, due to the fact that the Nabataeans were for the most part a nomadic people, it is hard to tell exactly what they ate. (Erickson-Gini 2012) While they did have some cities, such as Petra, they tended to travel, and so would have small villages or campgrounds where they could stop for a time. This makes it highly questionable that they had certain domesticated animals (chickens and pigs) as they are not made for a significant amount of movement in a hot, arid climate. This could mean that such animals would have entered as a domesticated breed with the Romans when cities and settlements became more popular. Doves and pigeons also seem to be more of a Roman food. While present in areas of Roman Arabia, it seems to be especially popular during the Roman period. Whether they ate it before the Romans is hard to say, but there has thus far been no evidence that they had done so. (Horwitz et al 1990)

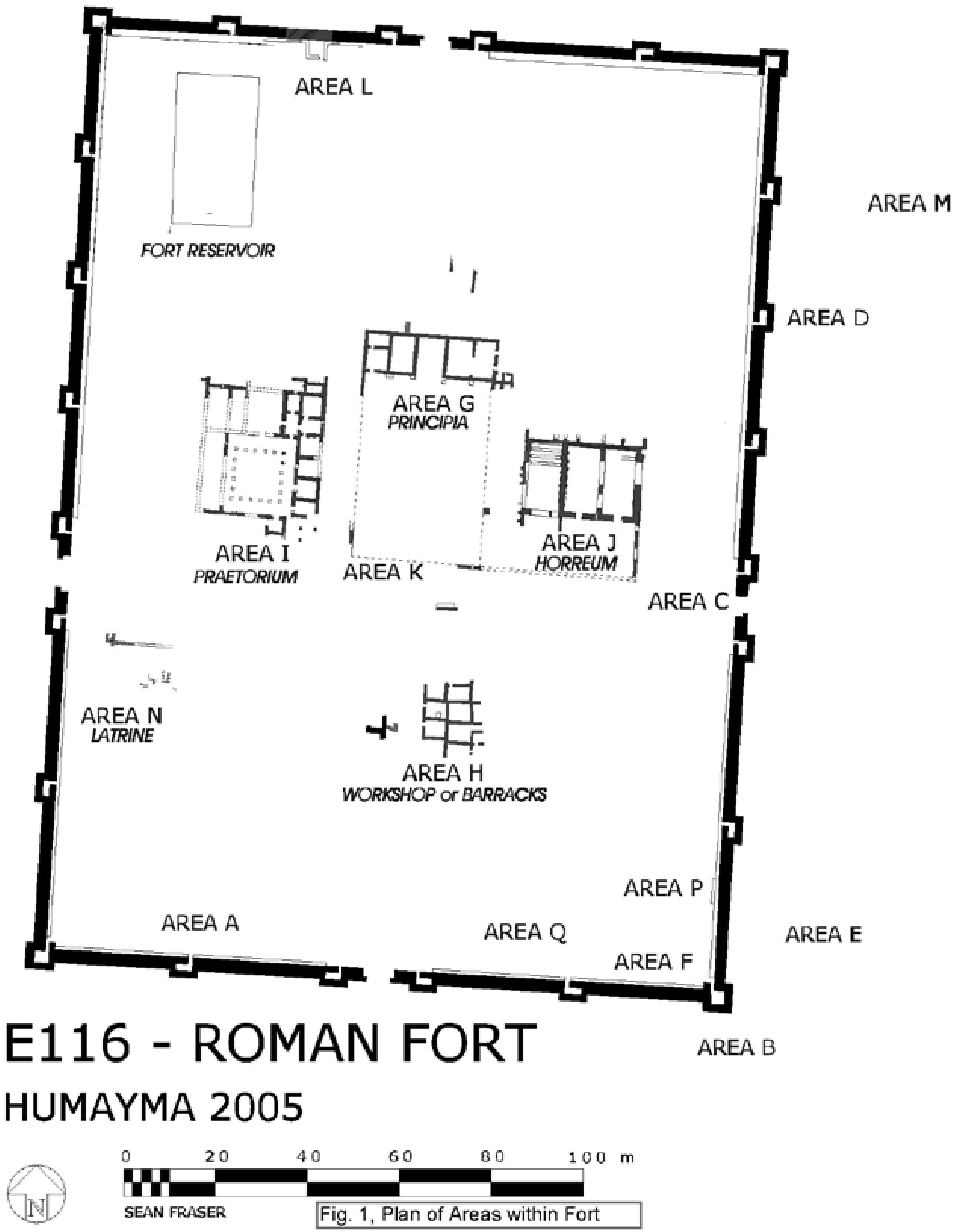
Environment and Geography:

The area that Humayma is situated in is extremely dry. According to Eadie and Oleson (1985), the site lies within a catchment area, known as the Humayma Catchment. To the northeast lies the al-Shera escarpment, to the west lie steep wadis that lead to the 'Araba, to the east lie Wadi el 'Amghar and Wadi Qalkha and there is a slight elevation to the southwest that falls off as it reaches the ‘Araba. Average regional rainfall is around 95mm, but there can be up to 150mm in a wet year and as little as 40mm in a dry year. As there is so little water on average, the area has no perennially occurring natural surface water. Much of the water seems to have come from the Wadi system on the outskirts of the catchment area that would have filled with water during the rainy season. There have also been suggestions that there may have once been a small spring about a kilometer southwest of the site in the sandstone hills. There is a natural basin formed in the rock, and even if it was not a spring it would have been an excellent source of water in antiquity. This would have been what allowed the people of Humayma to survive and thrive.

The Site:

The site of Humayma has had periods of occupation from the Nabataean to the Byzantine. According to Eadie and Oleson (1986), the site was not looked at until the 1980's. This was due to the fact that the site itself was largely unknown except for a few mentions in historical texts from the Roman period, and the features from the Nabataean period were uninspiring. Archaeologists who were interested in the Nabataean period ignored Humayma in favor of the much more impressive site of Petra. Therefore, any knowledge of the site prior to the 1980's comes from the observations of travelers and explorers. 1983 was the first time Humayma was actually excavated. The early years of the excavation focused on Nabataean and Roman occupations, but more recently they have focused more on the Roman period. Figure 3 shows all of these cultural occupations. The features of the site include everything from a Nabataean campground to the Roman fort, a Byzantine Church and a historic Bedouin camp within some of the ruins. This study focuses on the Roman fort, as that is the area where the faunal remains were excavated. The 2012 faunal remains come from Area J, which has been identified as the horreum or granary (see Figure 4). While it is called a granary, it would not just have stored grain. It would have also stored meat, fish, and other plant based material. Because there is typically only one granary, the food in the granary would have been for all the people living in the fort. (Richardson 2004) Therefore, the food would not only have been for the officers living nearby, but also for the locals living and working in the fort.

Figure 4: Map of Field E116



(Sherwood et al. 2008 Part II, 160)

Methodology:

The materials used for this study are a sample of remains that comes from a larger assemblage from Humayma that is under the purview of Dr. Tiffany Rawlings. The remains are being analyzed by Dr. Rawlings the osteoarchaeologist for the project. The process of analysis is based upon Driver (1999) (Also see Appendix A). In the case of sheep and goat, the bone morphology is too similar to tell the difference between species, unless you have the first and second vertebrae or the majority of the crania. In the case of dove and pigeon, the only thing that differentiates the bones from other bird bones is the size, and doves and pigeons have basically the same size bones. Unfortunately, a good portion of the faunal remains were too fragmented to identify.

This study is an observational study that looked at previously identified bones in order to determine whether the bones showed evidence of pathologies. Identification was performed using Ortner (2003). While Ortner focuses on the human skeleton, bone reacts the same to disease regardless of whether it is human or animal. If a pathology was determined to be present, the following information was hand-written; context (which bag and the locus the bone came from), taxa, element, the pathology, and area (see Appendix A). While it is possible that there were more unidentified bone that in actuality had pathology evidence on the bone, much of the unidentified bone was in such poor condition it was difficult to tell if it was pathology or if it was just the bone in really poor condition.

Quantification:

The study was observational looking at the presence and absence of pathologies within the sample. Therefore NISP (or the number of identified specimens) was established to define the sample set. Once this as established, the NISP of pathological bone was determined as well as the frequency of each pathological change and the frequency of the affected species. This helps to better understand the patterning of disease within the assemblage. By understanding the pattern of disease we can better understand what caused the disease and what it meant for the health and care of the animals affected.

Potential Problems:

There are several potential problems encountered while analyzing the faunal remains. First, the assemblage is very fragmentary due to taphonomic damage. Therefore, much of the collection cannot be identified to species. Furthermore, evidence of any pathological lesions may be damaged beyond recognition. Unidentifiable bone will be analyzed when possible. Another problem is that the sample may not be representative due to its small size. However, this study still has potential to be valuable due to the fact that there are so few studies like this. While there are studies that look at pathologies present in animal bone, this is one of the few for the area of Roman Arabia. This means that there is a large potential for study in this area.

Results:

The Humayma Faunal Sample:

In total the study looked at 10,850 specimens from Humayma. Of those 10,850 specimens, 7,148 specimens were unidentifiable. Of the remaining 3,702 that were identifiable 1,593 of the bones studied were from medium mammal (see table 1). The rest of the bone was made up of many different species; caprinae accounted for 5.03% of the bones, suidae for 2.09%, Gallus gallus for 3.01%, medium bird for 4.74%, columbiformes for 1.33%, fish for 3.48%, and the rest came from a vast variety of species (see table 1). While there were a number of different species present within the sample, only a few species showed evidence of pathological lesions. The species with the highest percent of remains that showed pathological lesion was large mammal at 12.5%, then suidae at 3.52%, caprinae at 3.48%, Gallus gallus at 1.53%, medium mammal at 1.32%, and the unidentifiable was only .098%. In total there were 63 bones that were determined to have pathologies, about .58% of the total bones studied.

Table 1: NISP of Sample

Order	Taxon	Common Name	NISP	% frequency
Mammal	Caprinae	sheep/goat	546	5.03%
	Suidae	pig family	227	2.09%
	Medium Mammal		1593	14.68%
	Cervidae	deer family	5	0.05%
	Large Mammal		24	0.22%
	Equus Asinus africanus	donkey	5	0.05%
	Small Mammal		35	0.32%
	Lagomorpha	Rabbits and hares	10	0.09%
	Capra aegagrus	Domestic goat	5	0.05%
	Felidae	cats	1	0.01%
	Equidae	horse family	1	0.01%
	Carnivora	Carnivores	3	0.03%
	Rodentia	Rodents	6	0.06%
	Lepus	hare	4	0.04%
	Canis familiaris	dog	5	0.05%
	Felis sp.	wild cats	1	0.01%
	Canidae	dogs and wolves	1	0.01%
	Camelus dromedarius	camel	1	0.01%
Bird	Gallus gallus	chicken	327	3.01%
	Medium Bird		514	4.74%
	Columbiformes	dove/pigeon	144	1.33%
	Small Bird		27	0.25%
	Large Bird		37	0.34%
	Struthio Camelus	Ostrich	2	0.02%
	Columba	pigeon	2	0.02%
	Anserinae	goose/swan	1	0.01%
	Streptopelia	dove	1	0.01%
Fish	Fish		378	3.48%
	Scarus	parrot fish	1	0.01%
Amphibian	Amphibia	Amphibian	2	0.02%
Mollusca	Gastropods	snails/slugs	3	0.03%
Total Identified Taxa			3702	37.12%
Total Unidentified Taxa			7148	65.88%

Identified Pathologies:

The two most common lesions were periostitis and enthesophyte with the main lesion being periostitis, though there is a single case of porotic hyperostosis (see Table 2 and figure 5). Periostitis was present in 77.87% of those bones showing pathological lesions, enthesophyte was another 20.63% and Porotic hyperostosis, which was a single case, was 1.58%. The bones that show evidence of having pathology seem to be mainly long bones. 55.56% of the bones were long bones, with some cranial fragments, rib fragments, and a few mandibles (see Table 3 and Figure 6).

Table 2: The Frequency of the Pathologies Present

Disease	Percent
Periostitis	77.78%
Enthesophyte	20.63%
Porotic Hyperostosis	1.58%

Figure 5: The Frequency of the Pathologies Present

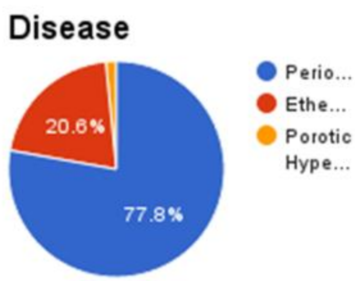
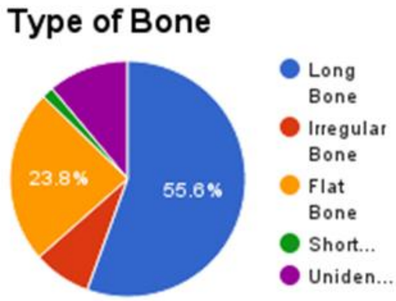


Table 3: Frequency of affected bone

Type of Bone	Percent
Long Bone	55.56%
Irregular Bone	7.94%
Flat Bone	23.81%
Short Bone	1.59%
Unidentified	11.11%

Figure 6: Frequency of affected bone pie chart



*Short Bone refers to bones that are as wide as they are long. These include the bones of the wrist and ankle.

Taxa affected by Pathologies:

The main animal was medium mammal at 33.33%, meaning that the bone was too fragmented to tell where it was from, but not fragmented enough to be unable to tell what bone it was or if it was a bone such as the ribs or the vertebrae, where it is very difficult to tell the difference in species other than just a simple size difference. The second most common animal was sheep/goat at 30.16% (See Table 4 and diagram 7). The other two major groups of animals were the suidae, or pig, and the Gallus gallus, or domestic chicken. There were also some bones from a larger mammal and a few unidentified bones. In the sample, the most common mammal species were sheep/goat and pig, the most common bird species were chicken and dove/pigeon, and there was also quite a bit of fish head bone. This takes into account only the bone that was not only able to be identified, but also placed in a species. Within the different species there was a mix of diseases. All of the species, except for the large mammal, had both periostitis and enthesophyte evidence on the bones (see Table 5 and diagram 8).

Table 4: The Frequency of Species with a Pathology Present

Species	Percent
Caprinae	30.16%
Suidae	12.70%
Medium Mammal	33.33%
Large Mammal	4.76%
Gallus gallus	7.94%
Unidentified	11.11%

Figure 7: The Frequency of Species with a Pathology Present

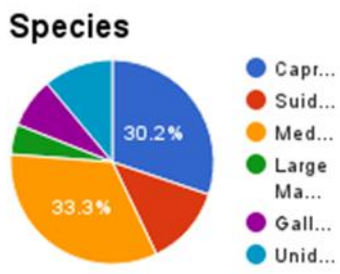
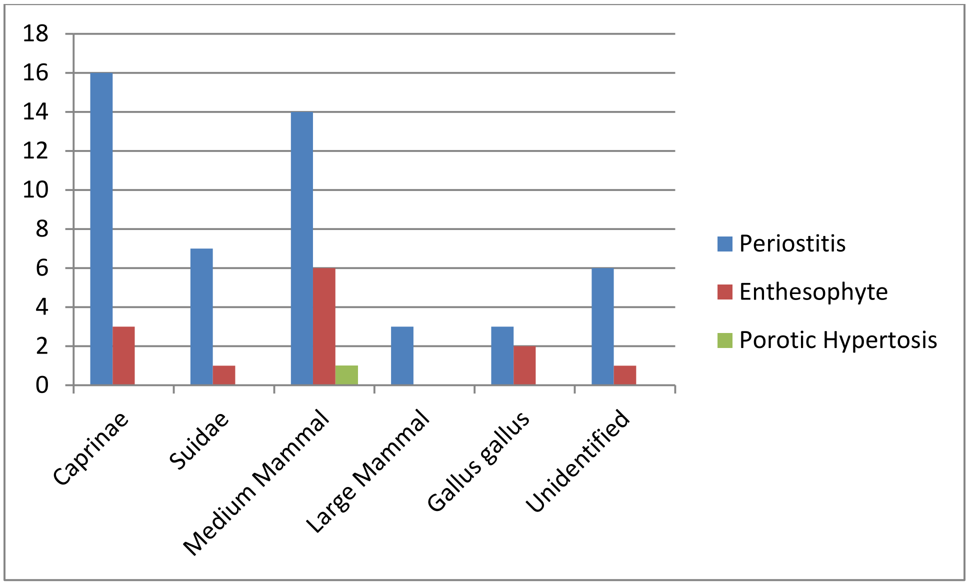


Table 5: The NISP of lesions per Species

Species	Disease	Number
Caprinae	Periostitis	16
Caprinae	Enthesophyte	3
Suidae	Periostitis	7
Suidae	Enthesophyte	1
Medium Mammal	Periostitis	14
Medium Mammal	Enthesophyte	6
Medium Mammal	Porotic Hyperostosis	1
Large Mammal	Periostitis	3
Gallus gallus	Periostitis	3
Gallus gallus	Enthesophyte	2
Unidentified	Periostitis	6
Unidentified	Enthesophyte	1
Total Number of specimens with pathological lesions		63

Figure 8: The NISP of lesions per Species



Discussion:

Unfortunately, the data is a sample from one area in one site; therefore any conclusions made are neither extensive nor exhaustive. First, the fact that there are fish bone at all means that there had to be some form of trade with a place on a coastline, because the area in which Humayma is has no naturally occurring surface water, meaning there would be no place for the fish to live. (Eadie and Oleson 1986) The fish bone, which is mainly fish head bone, probably comes from the fish sauce that was so popular with the Roman people (Keenleyside et al 2009), and so would have been imported for the officers from Rome. The evidence of the dove/pigeon bone also seems to be mainly for those from Rome, as it was a typical meat in Rome but not in Roman Arabia prior to the Romans taking over. (Horowitz et al 1990) As for the pig and chicken, it is hard to tell if the domesticated breed came before the Romans or not. While there seems to be little evidence for them prior to the Romans, it also seems as if the appearance of them was more likely due to the people of Roman Arabia settling down into long term settlements than that the Romans brought them. In contrast, the sheep/goat seem to be native to Roman Arabia and thus would have been a local food from the local culture. This shows that the food at Humayma was at least a blend between local and Roman cultures, not simply one or the other. This is important because it was to be expected that it would reflect the mixing of the two cultures instead of the Roman culture simply taking over.

Periostitis:

The pathologies present on the bone can also tell us a lot about the animals specifically. The most common pathology found was periostitis and it was found in all the animals that had pathologies present. Periostitis is reactive bone that can be caused by multiple infections and metabolic diseases. The most common causes are non-specific bone infection and nutritional deficiency. While all the animals that showed pathologies had periostitis, the only animals that had evidence of any sort of pathology were domesticated.

The dove/pigeon had none at all, though they were likely domesticated. Romans kept the doves and pigeons in what is known as a dovecote. They would have been fed grain and leftover bread so would have been easy to keep and the diet adequate for maintaining health. Due to the number of elements with periostitis present, it was likely caused by nutritional deficiencies (but bone infection cannot be ruled out completely). There are likely several reasons for the nutritional deficiencies unique to each animal. For the chickens, they were either not getting enough food or not getting the right kinds of foods, even though they would have been fed with grains and food scraps. It could have also been due to infection, since chickens would have been allow to range in a set area so that they could feed themselves.

It is surprising to see evidence of periostitis in pigs- since they were fed with food scraps. It is possible that any shortages in human food could have carried over to affect the pigs. However, the very fact that pigs would have had a better diet, explains why there are so few (only seven bones in total) that=at had evidence of periostitis. Sheep and goat are both herd animals, they are left to eat the plants and vegetation that naturally occur on the landscape. It is not surprising therefore, that there are a significant number of bones that have evidence of periostitis. Living in an area that has so little water would naturally mean that there would be a lack of natural vegetation, with there only being an abundance of food during the wet season in a wet year. Because of this, the animals that depend on such vegetation for sustenance would have had to go through periods with not enough food, leading to the periostitis seen.

Enthesophyte:

The second most common pathology was enthesophyte, also known as a bone spur, which is a bony growth at a muscle attachment site. What happens is the tendon, where it attaches to the bone, starts to ossify, leaving a bony growth behind. Unfortunately, even with modern medicine there is no concrete reason for this growth to occur. The results show that any evidence of enthesophyte occurs on the long bones at muscle attachment sites, which may suggest a stress on the bone or muscle that has caused the bone to react. The cause of the stress is unknown, but may be from carrying something or getting too heavy for the bones and muscles to handle.

Porotic Hyperostosis/ cribra orbitalia:

The last disease is perhaps the most intriguing. It is a single bone from the eye orbit of a juvenile medium sized mammal, probably sheep/goat, with porotic hyperostosis. Porotic hyperostosis is the increase in the diploe in the crania. This increase leads to a porosity of bone. There are two possible causes for this to appear on the eye orbit- specifically called cribra orbitalia. The first is an iron deficiency, which is the more common cause, and the other is an infection. The reason it is so intriguing is due to the fact that the animal was a juvenile, meaning it would have had to have been a significant iron deficiency or a major infection to leave such obvious evidence behind in a juvenile bone.

Causes for Pathological Change on Bone:

The reason the evidence of pathologies is important is because it tells us a lot about the animals the bone came from. Just from a basic study of the bones for pathologies, it appears as if the domesticated animals were either not given enough food or had nutritionally poor diets. With the exception of domesticated pigeon and dove, non-domesticated animals were the ones that showed no evidence of pathological lesions. This suggests that domestication may have had a small adverse effect for domesticated animals. However, this is by no means consistent even within the same species. These lesions may have been caused by a poor nutritional diet or even not enough food, which may then have affected the human population. Animals that are not growing the way they should or are not getting enough food are not going to have the same amount of meat on their bones as animals that are healthy, meaning the humans are not going to get as much meat, and depending on how drastic it is, it could be a significant loss of meat.

While this will probably not revolutionize the field of archaeology, it is another way to gain information on different cultures, information we did not have. Humans and animals, especially domesticated animals, are co-dependent. If the animals are sick, the humans are not going to get the meat they need and if humans are not getting enough food then it is expected those that depend on them are not either.

Conclusion:

This thesis analyzed faunal bones for the presence of pathological changes. Of the 10,850 specimens observed, 0.58% showed evidence of skeletal changes. Periostitis was the most common lesion and may either indicate dietary deficiency during growth, or non-specific infection. The frequency if enthesophytes hints at muscular or mechanical stress, but cannot be interpreted for specific injuries or conditions. The most interesting changes note were porotic hyperostosis and cribra orbitalia on the frontal bone of what is likely a juvenile sheep/goat. While the exact causes are unknown, these diseases are typically associated with iron deficiency and may have indicated either dietary anemia or a nasty parasitic infection.

Animal bone can give a fascinating look into the cultures of the past. The most important information we can learn from animal bone is the diet of that culture. However, looking at the bones in the context of pathologies can also tell us a lot about the way the animals lived. Having a significant amount of disease means that the animals were not living at optimal health and that therefore it is feasible that the humans were not either. People, even archaeologists sometimes overlook how dependent we are on the animals we raise, and that without them, we would not have made it to where we are today.

Resources:

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Appendix A

Humayma Excavation Project

A Manual for the Description of Faunal Remains

(Driver 1999)

Taxon

Identification of bone fragments can be a complex process. While different analysts approach identification differently, it is important to follow certain rules.

1. Only bones in which the “element” is recognizable are “identifiable”. If the element cannot be identified, then the bone must be recorded as UNI or (unidentifiable). No identification to any taxonomic level will be allowed unless the element is identified. Only the elements listed in the “Element Codes” may be used. Non-specific terms like “long bone” or “axis” are not appropriate elemental identifications and do not qualify as element descriptions.
2. It is important to define a “universe” of species from which the faunal remains are assumed to derive. All Zooarchaeological identification presupposes that certain animals are more likely to be represented at certain times and locations. Thus, we will assume that only species native to the Hisma Desert and the Old World will be present, while New World species will not. The species that are extant and are known historically for this region are those from which are specimens are drawn.
3. Identification is to be made to standard zoological classifications, including species, genus, family, et cetera. Less specific categories may also be used to describe fragments when specific taxon cannot be identified (such as, “medium mammal”, “artiodactyls”, “large bird”, etc).
4. You must be able to justify your choice of taxon. This is done by comparing your specimen with taxa from your “faunal universe”. Mostly, this is done very quickly because of your general knowledge of anatomy, which allows you to eliminate most taxa from consideration. If you are unsure of a specific species, but are confident to the level of genus, then you would identify the specimen to the level

of genus. If you are confident in the family, but unsure of the genus, then you would identify the specimen to the level of family.

5. Each bone, or fragment should be identified on its merits. For example, if a burial of a dog were excavated, some would be referred to species while others (e.g., the ribs and vertebrae) would be referable only to the genus or family level. You can use the comments section to note the presence of articulating specimens.
6. Finally, you should remember that you might not be able to identify every bone fragment to the species level. Most species are defined by a number of characteristics that do not preserve in the skeleton. It is best err on the side of caution than to be over confident and end up being "wrong".

Element

Element refers to the whole bone of which you may find either a complete specimen or a fragment. Most bones have standardized names (with the exception of fish). While, you should be able to identify most elements exactly this isn't always possible. You may be able to identify the proximal phalanx of a deer, but not be able to determine if it is digit III or IV. Cranial fragments are often problematic because the cranium is made up of multiple bones. When you are coding cranial fragments, use the name of the individual bones if the majority of the fragment is made up of a particular bone; otherwise, use the general code for cranial fragment.

Description

The description refers to what type of disease is present of the individual bone. For the purposes of this study, three diseases were found. The first is periostitis which is an infection of the bone. This is shown on the bone by the presence of reactive bone. The second is enthesophyte which is a bony growth. This is shown at muscle attachment sites, where the cortex of the bones is thickened and often uneven. The third is porotic hyperostosis which is a swelling of the spongy bone on the cranial vault. This is shown by an area of spongy or porous bone on the cranial or orbit area.

Area

Area refers to where on the bone the pathology is located. The place of the pathology is described using anatomical or location terminology.

1. Proximal is mainly used when describing limbs and refers to the area of the limb or bone that is closer to the axial skeleton.
2. Distal is mainly used when describing limbs and refers to the area of the limb or bone that is farther away from the axial skeleton.
3. Medial refers to being close to the mid-line of the body. It may refer to a side of the bone when in anatomical position.
4. Lateral refers to being away from the mid-line. It also refers to a side of the bone when in anatomical position.
5. Anterior refers to being towards the front of the body.
6. Superior is used when describing if a bone or fragment is more towards the top of the body.
7. Diaphysis is the shaft part of the long bone.
8. Buccal refers to the cheek side of the mouth or bone.
9. Mid-shaft is the portion of the rib that is not an end.

Appendix B

Table 6: Results of Pathological Study

Humayma 2012 Pathology Study									
Bag #	Bucket	Field	Rm	Locus	Taxon	Element	Description	Area	Comments
	120314	E116	J	1203	Caprinae	Tibia	Periostitis	distal/medial	
					Caprinae	Humerus	Enthesophyte	Proximal/ lateral	
					Unidentified		Periostitis		
					Unidentified		Enthesophyte		
					Unidentified		Periostitis		
					Unidentified		Periostitis		
					Unidentified		Periostitis		
					Unidentified		Periostitis		
	120315	E116	J	1204	Medium Mammal	Tibia	Periostitis	Distal/ lateral	
					Unidentified		Periostitis		
					Caprinae	Orbit	Periostitis	Upper orbit	
					Suidae	Mandible	Periostitis	Anterior Portion	
					Gallus gallus	Rib	Periostitis	distal end	
					Medium Mammal	Calcaneus	Enthesophyte	Distal End	
					Medium Mammal	Rib	Periostitis	mid-shaft	
	120314	E116	J	1203	Medium Mammal	Mandible	Periostitis	Interior Cortex	
					Medium Mammal	Rib	Periostitis	Distal End	
					Caprinae	Mandible	Periostitis	Molar section	
					Suidae	Tibia	Periostitis	distal/medial	
	120310	Ell6	$_{10}$Rm J		Medium Mammal	Metapodial	Enthesophyte	Distal/Front	

					Medium Mammal	Innominate	Enthesophyte	Anterior Portion	
					Gallus gallus	Metatarsus	Enthesophyte	Diaphysis	
	120315	E116	J	1204	Medium Mammal	Tibia	Enthesophyte	distal/medial	
					Medium Mammal	Metapodial	Enthesophyte	proximal/ medial	
					Caprinae	Mandible	Periostitis	Buccal side	
					Gallus gallus	Femur	Enthesophyte	Proximal/ lateral	
2 of 6	120315	E116	J	1204	Medium Mammal	Rib	Periostitis	mid-shaft	
					Medium Mammal	Rib	Periostitis	distal end	
					Caprinae	Femur	Enthesophyte	distal/ anterior	
3 of 6	120315	E116	J	1204	Caprinae	Tibia	Periostitis	Distal	
					Caprinae	Tibia	Periostitis	Distal end	Looks similar to scurvy
					Suidae	Proximal Phalange	Enthesophyte	lateral side	
					Medium Mammal	Rib	Periostitis	distal end	
					Medium Mammal	Rib	Periostitis	Proximal shaft	
					Medium Mammal	Rib	Periostitis	mid-shaft	
	120318	E116	J	1206	Caprinae	Tibia	Periostitis	distal end	
					Caprinae	Tibia	Periostitis	Distal edge	
2 of 7	120318	E116	J	1206	Caprinae	Tibia	Periostitis	Distal end	
5 of 7	120318	E116	J	1206	Gallus gallus	Femur	Periostitis	Distal and proximal ends	
					Large mammal	metapodial	Periostitis	Distal end	
					Large mammal	Metapodial	Periostitis	distal end	

					Large mammal	Metapodial	Periostitis	Distal end	
					Caprinae	Metapodial	Periostitis	distal end	
					Caprinae	Metapodial	Periostitis	Distal End	
					Medium Mammal	Phalange	Enthesophyte	Distal/ lateral	
					Medium Mammal	Orbit Fragment	Porotic Hyperostosis	inner, upper orbit	Juvenile
					Medium Mammal	Humerus	Periostitis	Distal End	
					Medium Mammal	Tibia	Periostitis	Proximal end	
	120319	E116	J	1206	Medium Mammal	Cranial	Periostitis	Superior side	
4 of 6	120319	E116	J	1206	Suidae	Metapodial	Periostitis	distal end	
					Caprinae	Humerus	Periostitis	Distal end	
					Caprinae	Tibia	Periostitis	Distal end	
2 of 6	120319	E116	J	1206	Gallus gallus	Metatarsus	Periostitis	Proximal end	
					Suidae	Tibia	Periostitis	Proximal end	
5 of 10	120319	E116	J	1206	Suidae	Tibia	Periostitis	distal end	
					Caprinae	Phalange	Enthesophyte	Distal end	
					Caprinae	Orbit Fragment	Periostitis	Anterior Portion	
					Caprinae	Metapodial	Periostitis	Distal End	
3 of 7	120318	E116	J	1206	Suidae	Mandible	Periostitis	Bottom of Ascending Ramus	
					Medium Mammal	Cranial	Periostitis	Anterior Fragment	
					Medium Mammal	Cranial	Periostitis	Anterior Fragment	
1 of 2	120317	E116	J	1204	Suidae	Tibia	Periostitis	Distal End	
6 of 7	120318	E116	J	1206	Caprinae	Tibia	Periostitis	Distal End	