Anatolian-Assyrian Exchange and Bronze Age Animal Economies at Kaman-Kalehöyük, 2000-1700 BC

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ABSTRACT

Cross-cultural contact is a recurring phenomenon of hierarchical societies that has significant political, economic, and social impacts on all involved. In the first three centuries of the 2nd millennium BC two distinctly different groups of people intensified their participation in a long-distance exchange network that covered more than 1500 kilometers, from northern Mesopotamia to central Anatolia. To date, understanding of this period has relied primarily upon philological study of some 20,000 cuneiform texts, mostly recovered from the Anatolian site of Kültepe-Kanesh, though written in Mesopotamian script.

In this zooarchaeological study, fauna drawn from local contexts at Kaman-Kalehöyük were evaluated to determine whether intensified interactions between Anatolians and Mesopotamians in the 2nd millennium BC coincided with changes in the degrees of economic specialization and social inequality exhibited at the site.

While a comparison of Kaman-Kalehöyük's Early and Middle Bronze Age faunal data hinted at some differences between the periods, a more holistic evaluation of archaeological remains suggested rising degrees of economic specialization and social inequality at the site over time.

SIGNATURE PAGE

Patricia Wattenmaker (Chair) ______________________________

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DEDICATION

This manuscript is dedicated to my daughters:

Neana, Casey, and Alex

In honor and memory of:

Prince H.I.H. Takahito Mikasa

and

Drs. Tahsin and Nimet Özgüç

With many thanks to my committee:

Profs. Patricia Wattenmaker, George Mentore, Stephen Plog, and Tyler Jo Smith

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Map courtesy of Sagona and Zimansky (2009: 177); N.B. Kaman-Kalehöyük is #14 and Kültepe Karahöyük is #23 (heretofore referred to as Kültepe-Kanesh).

CHAPTER 1: INTRODUCTION

This zooarchaeological study focuses on the impact of the relationship between the indigenous rural populations of central Anatolia and the Old Assyrians from northern Mesopotamia through a study of Anatolian settlements during the Middle Bronze Age (MBA), circa 2000 to 1700 BC. Ever since Bedrich Hrozny's 1925 discovery of cuneiform texts in Old Assyrian script, the writing system used in Mesopotamia, but found at the central Anatolian site of Kültepe-Kanesh, the nature and impact of the interactions between societies in these regions has been of considerable interest to scholars working in southwest Asia (Barjamovic and Yoffee 2020; Erol 2019; Garelli 1963; Heffron 2021; Larsen 1976, 1987, 2015; Matessi and Giusfredi 2023; Michel 2011, 2022; Oppenheim 1954, 1960, 1963; Palmisano 2018; Polanyi 1957; Veenhof and Eidem 2008). This study of zooarchaeological remains from Kaman-Kalehöyük, a smaller rural local Anatolian site, aims to document findings related to the local animal economy and to ask how it changed with the establishment of more formal long-distance interaction systems with Mesopotamia.

On a foundational level, this inquiry seeks to understand whether the 2nd millennium BC archaeological recovery of northern Mesopotamian cylinder seal technology and textual remains on the central Anatolian plateau coincided with a change in Kaman-Kalehöyük faunal patterns. Current evidence for the physical presence of Assyrians at Kaman-Kalehöyük is inconclusive, although the recovery of cuneiform tablet fragments raise that possibility. In this study I consider whether new foreigner-based knowledge, peoples or preferences, local population increases, or the rise in interactions across great(er) distances with culturally distinct peoples impacted preexisting supply and demand paradigms at locations in the countryside, like Kaman-Kalehöyük.

More specifically, I evaluated two hypotheses concerning the degrees of economic specialization and social inequality present at Kaman-Kalehöyük in the Early Bronze Age (EBA), and whether the site became more specialized and/or increasingly hierarchic in the MBA as central Anatolians intensified their participation in the Old Assyrian exchange network. My first hypothesis, focused on the production side of Kaman's economy, relates to the relative degree of economic specialization at the site in the Middle Bronze Age when compared to the preceding occupation in the Early Bronze Age. The second hypothesis I evaluated was concentrated on the consumption side of the Kaman economy, and the relative degrees of social inequality that may have existed in each period. Together, I focused on these hypotheses to provide a balanced view of the politico-economic and social implications resulting from the intensification of long-distance interactions between Anatolians and the northern Mesopotamian Assyrians in the 2nd millennium BC.

The remainder of this manuscript is organized into nine main sections. The next part of this chapter includes a description of the area, time periods, and open questions associated with my study. Chapter 2 outlines the hypotheses that I test in more detail and what I should find in my analyses of the faunal remains to accept or reject each hypothesis. Chapter 3 sets the broader context of this study by reviewing what we know archaeologically and philologically of the Early and Middle Bronze Ages both within Anatolia and in areas likely interacting with Anatolians. Chapter 4 provides more specific context related to my study site, Kaman-Kalehöyük, and the archaeological deposits analyzed in this research inquiry. Chapter 5 is an overview of previous EBA and MBA faunal research conducted at Kaman-Kalehöyük. Chapter 6 is a discussion of how zooarchaeological remains inform our understanding of specialized economies and social inequalities. Chapter 7 provides a detailed overview of my key findings from the Kaman-Kalehöyük faunal remains I evaluated in this study. Chapter 8 is a discussion of how these key faunal findings support or refute my two hypotheses. Chapter 9 is a more holistic evaluation of my hypotheses and is comprised of three main sections. First, I include a discussion of archaeological and textual evidence for economic specialization and social inequality from across the Anatolian plateau and from Kaman-Kalehöyük. Second, I place my findings in a broader discussion related to current interpretive paradigms of the period and the impact that intensified interactions between the Anatolians and Assyrians had on rural economies at places like Kaman-Kalehöyük. I end with some considerations for future inquiry.

Context, Current Challenges, and Open Questions

The Old Assyrian cuneiform texts and, to a much lesser degree, non-local style material remains found outside of the Mesopotamian heartland, have demonstrated that in the first three centuries of the 2nd millennium BC, two distinctly different cultures participated in an organized, large scale inter-regional exchange system, facilitated by powerful entrepreneurial families located in the Assyrian capital, Aššur (Barjamovic and Yoffee 2020; Garelli 1963; Larsen 1976, 1987, 2015; Michel 2011, 2022; Palmisano 2018; Veenhof and Eidem 2008). Tablet translations provide evidence that these northern Mesopotamians spent substantial periods of time at Kültepe-Kanesh and in its central Anatolian environs, effectively intensifying and possibly also extending the reach of their interaction and exchange network.

Philologists have cited the Assyrian establishment of "merchant districts" *(karu)* and "trade outposts" *(wabaratum)* in Anatolia, some supposedly more than 1500 kilometers away from their homeland, as evidence for economically-motivated Mesopotamian entrepreneurship that stimulated this intensification of cross-cultural interactions and long-distance exchange activity (Larsen 1976 and 2015; Veenhof 2010; Veenhof and Eidem 2008). Noteworthy, is that the establishment of merchant districts and trade outposts, outside the immediate vicinity of their northern Mesopotamian capital, Aššur, according to Stein, is "an extremely unusual…strategy in Mesopotamian states before the Hellenistic period" (2005: 144). Interestingly, given decades of philological scholarship by a small group of erudite Assyriologists related to why Anatolians might have agreed to host Mesopotamians at their settlements for extended periods of time, complementary anthropological archaeology studies focused on how this long-distance interaction and exchange activity impacted local, and especially rural, politico-economic and social dynamics are relatively scarce (Larsen 2015: 7).

The Middle Bronze Age (hereafter MBA) represents a key phase of urbanization on the Anatolian plateau and is important not only because of more far-reaching interaction spheres, but also because it coincided with other meaningful changes in the archaeological record. In addition to the first appearance of writing in central Anatolia, during the MBA there is an increase in the archaeological recovery of both local and non-local styles of cylinder seals, clay sealings, and bullae. Cuneiform texts, along with this increase in the range and volume of other accounting devices, suggests not only that substantial change took place at the local level but also that an increasingly hierarchical and structured political system emerged that was able to keep track of the flow of goods and information on the plateau. For instance, texts provide evidence for the existence of Anatolian kingdoms (*mātu*) that were headed by leaders (*ruba'um*) who exercised broad control over the smaller communities within their respective territories (Bryce 1998: 25-26). Additionally, building upon the social foundation of the preceding Early Bronze Age (EBA), scholars have noted an increase at the local level in the mixture of local and non-local peoples, greater degrees of labor specialization, expanding social inequality, and regular politico-economic change (Bonacci 2020; Erol 2019; Laessoe

1963: 147-8; Larsen 1976: 85-287 and 2015: 133-158, 201-222, 243-265, 279-280; Michel 2011: 313-336; Stein 2005: 156-170; Palmisano 2018; Veenhof and Eidem 2008: 76-121, 147-167, 219-233). Some scholars also have suggested that the activities taking place on the plateau during the MBA laid the foundation for the first central Anatolian empires to emerge just a few hundred years later (Steadman 2011: 229).

Researchers have tended to divide local MBA sites of the resource-rich plateau into two categories: those that have Old Assyrian cuneiform tablets, and those that do not (Larsen 2015; Michel 2011: 319). Based on the Old Assyrian texts and relatively limited archaeological data, researchers have posited that northern Mesopotamians took residence in around forty Anatolian settlements and, at times, commingled with local cultures in Anatolia to obtain silver and gold in exchange for tin and textiles (Atici, et. al. 2014: 2; Barjamovic 2011: 2, 5; Larsen 1976: 86; Lehner 2014: 135; Veenhof 2010: 39). Scholars also have suggested that Mesopotamians had achieved a level of politico-economic organization that was significantly more hierarchic and specialized than those of their contemporaries in central Anatolia (Adams 1974: 246; Algaze 2008: 21; Barjamovic 2011: 2, 6, 7; Larsen 2015: 133-168, 245, 249).

Some scholars have assumed that this intensification in exchange activity was set into motion by the presumably more hierarchic northern Mesopotamian city-state at Aŝŝur, the capital of the Old Assyrian state. However, this assumption has not been fully explored, and evidence for hierarchic societies in Anatolia before this time raises the possibility that the Anatolians either initiated or were equal partners in the trade. In short, the undertone of past scholarship is that intensified interactions with the Assyrians served as a catalyst to change preexisting local Anatolian politico-economic and social structures. Evaluation of this “Out of Mesopotamia” perspective is, however, somewhat incomplete (Iserlis, Rotem, and Davidovic 2023: 2; Matessi and Giusfredi 2023; Heffron 2021; Schlüter 2020). This study highlights some of the evaluative gaps driving this deterministic perception.

To date, research of this time period has been subject to several textual and archaeological challenges, assumptions, and biases. First, prevailing interpretations of the 2nd millennium BC on the plateau have been subject to a reliance on Mesopotamian philological material, which has overwhelmingly superseded local Anatolian archaeological inquiry. This imbalance in evidence has limited our ability to challenge the textually-driven assumption that northern Mesopotamia was the dominant force in the intensification of exchange activity.

Second, the Mesopotamian written remains used to develop interpretations of the period have been primarily drawn from one site, Kültepe-Kanesh, which is located in Anatolia. Despite finding these cuneiform tablets in Anatolia, the tablets represent only a Mesopotamian perspective and are limited temporally, as well as in both volume and scope. Both Barjamovic (2011: 2-3, 11) and Larsen (2015: 202) remind us that the bulk of the Kültepe-Kanesh archives are from a single generation of the Assyrian merchants, dated from circa 1889 to 1859 BC. Additionally, with respect to volume, Larsen (2015:

190) shares that “The Old Assyrian Text Project” contains about 10,000 electronic texts, half of which are unpublished; and, that there are 13,000 more texts located in museum drawers at the Ankara Museum of Anatolian Civilizations, yet to be studied. For perspective, Larsen (2015: 8) compares the volume of Kültepe-Kanesh texts to the archives of Renaissance Italy, where over 120,000 letters are attributable to a single merchant. Lastly, the majority of texts are related to economic transactions between Anatolians and Assyrians, and therefore leave a void in our understanding of broader sociopolitical organization and associated activities that were present at this time (Larsen 1976: 22).

Third, philological interpretations of the period are laden with more modern western economic terminology like “joint-stock ownership”, “taxes”, and “profit” (Erol 2019; Hatunoğlu 2021; Larsen 1976 and 2015; Michel 2023). This anachronistic terminology poses problems for at least two reasons. First, these more contemporary economic concepts are applied to texts from a 2nd millennium BC territorial city-state socio-political system that may not have yet conceived those concepts and implied behaviors as we know them today (Gosden 2004: 17; Larsen 2015: 9, 202). And second, use of this terminology suggests that 2nd millennium BC northern Mesopotamia had an economy that was more “modern” than their Anatolian counterparts.

Fourth, given the absence of textual remains associated with local Anatolian families and lineages, and the paucity of textual evidence from the northern Mesopotamian capital at Aššur, scholars have only been able to focus on the texts they have, which provide insight into Assyrian family structures and genealogies. As a result, based on inherently biased textual evidence written by a limited sociopolitical group of people, research has yielded a corpus of interpretations that are preoccupied with reconstructing the rise to economic power of enterprising northern Mesopotamian families residing at Aššur, despite recognizing the danger in doing so (Larsen 1976: 22; Veenhof and Eidem 2008: 148). In short, the types of information that may be gleaned from the textual remains of the period are limited in scope so it's not surprising that we have large gaps in our understanding of the MBA Anatolian sociopolitical landscape.

Fifth, given the limited range and scope of evidence recovered and evaluated to date, characterizations of the long-distance exchange interactions between Anatolians and Assyrians often have focused only on economic profiteering by a limited social group. This narrow perspective not only reduces composite human motivation(s) to an overly simplified archetype, but also does not fully consider alternative ethnographic analogues or other contributing stimuli for long-distance travel or intensified interactions and exchange activity. In particular, possible social, political, and religious aspects of the exchange have been divorced from economic activity.

From an anthropological archaeology perspective, there are at least five more reasons to challenge current interpretations. First, beyond cuneiform tablets and a non-elite "district" in the lower town at Kültepe-Kanesh, archaeological analysis has yet to produce clear evidence for the "presence" of Old Assyrian people on the central Anatolian plateau (Heffron 2021; Köroğlu, Erol, and Kulakoğlu 2023), though future isotopic analyses of human remains eventually may provide some proof. While the Assyrian written remains are a magnificent and powerful evidentiary resource, we must not lose sight of the fact that the presence of foreign people in a foreign context should be detectable archaeologically, particularly if foreigners took up more permanent residences and introduced new technologies, styles, or foodways in local host communities. The challenge we face as anthropological archaeologists is that the presence of non-local peoples in host communities is spatio-temporally variable and can take many forms, ranging from "…sharp architectural and artifactual discontinuities with earlier occupations" (Stein 2005: 15) to more subtle shifts in "culinary encounters" such as those found in interethnic households where new food recipes may be prepared in locally made pots (Dietler 2010: 253). As a result, understanding the nature and type of the Assyrian presence on the central Anatolian plateau in the 2nd millennium BC requires more case studies that cover a broader range of site sizes and occupation types, more data, and careful site-specific material studies focused on evaluating change over time.

Second, prevailing interpretive frameworks have characterized what occurred in central Anatolia at this time as a colonial encounter where northern Mesopotamians established a number of implanted settlements within preexisting local Anatolian communities (Barjamovic 2011: 2, 5; Larsen 1976: 86 and 2015: 158, 249; Lehner 2014: 135; Veenhof 2010: 39; et. al.). This viewpoint was popularized in philological and archaeological circles, beginning with Larsen's 1976 volume "The Old Assyrian City State and its Colonies," and sustained by Larsen's 2015 tome "Ancient Kültepe-Kanesh: A

Merchant Colony in Bronze Age Anatolia". Without a doubt, Larsen's pioneering work on the Old Assyrian textual remains of the MBA laid the foundation for countless scholarly inquiries, but the corpus leans toward more deterministic and hegemonic models couched in Wallerstein's World Systems Theory (1974), which places primacy on Mesopotamian influence over local models of development (Heffron 2021; Schlüter 2020). For example, some scholars still contend that the Assyrian presence in Anatolia "…must have had a profound impact on Anatolian society…" since the exchange system in Anatolia was "…constituted by the elaborate and efficient institutions built by the Assyrians themselves" (Larsen 2015: 158). Sharing striking similarities to Algaze's highly debated "Uruk World System" (1993; see Chapter 3) of the 4th millennium BC, which examines the intensified interactions between southeast Anatolia and southern Mesopotamia, 2nd millennium BC central Anatolian and northern Mesopotamian interaction studies would likely benefit from a review of the post-colonial perspectives of southeast Anatolian scholars (e.g., see Stein 2005: 143).

Post-colonial theory reminds us that the nature of inter-cultural and inter-regional interactions is rarely simple since the agendas and motivations of those engaged in long-distance exchange activity are complex and spatio-temporally specific (Dietler 2010; Lightfoot 2005). Post-colonial theory also embraces the dynamic effects and variations of socioeconomic and/or politically charged interactions, celebrating both the cumulative and transformational effects that inter-cultural "encounters" have upon both foreign and host communities, while placing greater emphasis on the degree of local agency (Alcock 2005; Gasco 2005; Lightfoot 2005). But interpretations of the 2nd millennium BC central Anatolia have included relatively little discussion of multiple, evolving, or non-economic-based Anatolian or Assyrian agendas associated with their intensified interactions (Schlüter 2020). And, there has been still less discussion of the degree of Anatolian influence on Assyrians, despite textual translations, which suggest that these two distinct cultures were living side by side on Anatolian ground, that local Anatolian workers were hired as workers in Assyrian household settings[1], that interethnic marriages took place between Anatolians and Assyrians, and that Assyrians traveled extensively throughout Anatolia[2] (Larsen 1976: 82).

Third, and perhaps even more surprising, is that there are relatively few archaeological studies that carefully examine material remains diachronically from the EBA to the MBA, analyses which are critical to identifying changes in the meanings or values of objects or the clashing and constitution of new cultural logics or cosmologies (Rogers 2005: 349-350). Though some research has taken on more of a post-colonial flavor related to changes in the political and socio-economic structures from the EBA to the MBA (e.g., Lassen 2010), some scholars continue to propagate a colonial agenda, even if sometimes in subtle ways, such as referring to this Anatolian time period with a

[1] Şuhāru were "servants" or employees (Larsen 1976: 101 n65).

[2] We know that Aššur-nada traveled extensively in Anatolia, to such cities as Uršu, Mamma, Kunanamet, Purušhaddum, Nihrija, Durhumit, and Tišmurna (Larsen 1976: 99). While we do not know the precise location for all of these sites, we can surmise that Aššur -nada was not the only Assyrian to travel the Anatolian countryside, nor that these locations were the limits of his travels. As a result, we may assume over time that many local communities were aware of, if not influenced or involved in, the trade network, whose hub was Kültepe-Kanesh.

Mesopotamian moniker. For example, this period still is often referred to as the "Assyrian Colony Period" (Albason 2020; Atici, et. al. 2014: 1; Erol 2019; Hatunoğlu 2021; Köroğlu, Erol, Kulakoğlu 2023; Oktay 2018). Yet our understanding of the dynamics at play during this period would benefit from an infusion of more locally focused studies with a post-colonial perspective. This decolonized posture would place more weight on the degree of local agency (Dietler 2010; Given 2004; Gosden 2004; Lightfoot 2005; Loren 2008; Lyons and Papadopoulos 2002) and thereby provide a counterbalance to the "Out of Mesopotamia" interpretations which have permeated decades of scholarship in this area (Heffron 2021; Greenberg and Hamilakis 2022; Lemos 2023; Matić 2023).

The final two challenges reside in the archaeological limitations in both the EBA and MBA since there are gaps in the number and types of central Anatolian sites excavated in each period (see Chapter 3). With regard to the EBA (challenge four), despite the identification of hundreds of sites during archaeological survey work conducted in the 1990s and 2000s (see Omura 1996: 135-192, Omura 2006: 63-102, Omura 2008: 45-92), until recently excavations in the north central region were rare, and published accounts were almost non-existent when compared to other Anatolian sub-regions like the southeast. Also, the two sites, Alişar and Alacahöyük, which have been used as "type sites" for the region, were excavated from the 1920s to 1940s. Outdated recovery techniques and limited documentation present interpretive challenges at these two sites. Part of the challenge is that deposits often are severely damaged, buried deeply under later occupations, or have taken a back seat to studies focused on the MBA (Schoop 2011: 166). Scholars have characterized the EBA on the north central plateau where Kaman-Kalehöyük is situated with phrases like: "significant challenge to the researcher," since "excavated sites are few in number", and existing data "presents as many problems as it solves" (Steadman 2011: 242). Today there still are many gaps in our archaeological understanding of the social and politico-economic organizational structures that predated the intensification of interactions between the Old Assyrians and central Anatolians in the MBA (Larsen 2015: 9). However, in the past five years more sites on the plateau have received attention from researchers. While ongoing excavations and studies at Kaman-Kalehöyük and Kültepe-Kanesh continue to produce published works (e.g., Nurcan 2023 and Strupler 2021), complementary archaeological research recently has gained momentum. Published works are now available from other central Anatolian sites such as Uşaklı Höyük (Mazzoni, D'Agostino, and Orsi 2019), Çadır Höyük (Steadman, Hackley, et. al. 2019), Resuloğlu (Dardeniz and Yıldırım 2022), Aşıklı Höyük (Stiner, Özbasaharn, and Duru 2022), and Büklükale (Matsumura 2020). At these and other sites throughout the Mediterranean new studies have added depth to our understanding of the plateau and the EBA in terms of long-distance interaction networks (Carter, et. al. 2023; Eddisford 2022; Greenfield, Greenfield, et. al. 2020), the origins of exchange goods (Iserlis, et. al. 2023; Yahalom, et. al. 2023), production specialization and provisioning (Gaastra, Greenfield, and

Greenfield 2020; Price, Makarewicz, and Chesson 2018), and social inequalities (Albasan 2020; Grossman and Paulette 2020; Pawlowska 2020).

While archaeological limitations have rendered a relatively perfunctory evaluation of the EBA landscape when compared to other Anatolian regions, early MBA research is also relatively sparse and is skewed toward larger, presumably more hierarchic, sites and contexts (challenge five). Of the seven Anatolian sites that have received the most attention during the MBA, four are located in the central region, two are in the southwest of the peninsula, and one is on the Black Sea coast to the north (Sagona and Zimansky 2009: 226). Overall, early sequence MBA excavations are relatively few in number mostly due to many excavations having been more focused on later MBA Hittite occupations (e.g., see Matsumura 2020). In terms of size, the sites excavated in the central region all have citadels greater than 28 hectares, and all of them possess sprawling lower towns. A more balanced archaeological focus on larger more urban consuming sites and smaller more rural producing sites will help us form a more complete picture of how different communities and individuals may have altered their decision-making as interactions and exchange activities intensified with northern Mesopotamia (Veenhof and Eidem 2008: 147-148).

When taken together, these many challenges, assumptions, and biases have not only overshadowed local agency and daily life in rural central Anatolia, but also have discounted the possibility that Anatolian polities on the plateau already had hierarchical systems driving specialized economies of their own, independent of, and/or preceding any interactions with the Old Assyrians. Or perhaps they were coeval and the interaction between the areas transformed social, political and economic structure in both areas. Until recently, few studies have focused on characterizing the EBA's degrees of specialization or social inequality which underscores the importance of this zooarchaeological inquiry. Kaman-Kalehöyük EBA and MBA data have presented a great opportunity to more fully evaluate the impact that intensified 2nd millennium BC Anatolian-Assyrian interactions had on preexisting local economic and social structures.

It is not surprising, given the cache of celebrated cuneiform tablets, which were found at Kültepe-Kanesh, that most central Anatolian scholarship since the 1950s has focused primarily on translating and interpreting the thousands of Old Assyrian tablets from the site, as well as excavating its "merchant" district (Zimansky 2005: 321). This focus, however, has resulted in a philologically biased and archaeologically untested set of interpretations related to: a) the impact northern Mesopotamians may have had on Anatolians during the 2nd millennium BC as interactions between the two groups increased; and, b) the relative degrees of specialization and social inequality which may have existed on the plateau prior to the intensification of the interactions between the Anatolians and Assyrians.

The Opportunity

Over the past few decades archaeological survey work has identified a wide range of sites with MBA strata that may help better balance our understanding of the period (e.g., see S. Omura 1996: 135-192). Also, as mentioned above, in the past five years sites on the central plateau have received more scholarly attention and as a result new sources of published data and thematic studies now are available. At Kaman-Kalehöyük, broad horizontal MBA exposures and rare undamaged deposits from the preceding EBA have been excavated, making critical material available for study. The Kaman-Kalehöyük strata temporally coinciding with the proposed seasonal presence of the Old Assyrians on the plateau and the more intensified interactions between the two societies suggest that substantial local change took place at the site during this time. Evidence for local change at Kaman-Kalehöyük during the MBA includes: the recovery of rare cuneiform tablet fragments[3] (Yoshida 2002; Michel 2011; Larsen 2015); an increase in the stylistic variation and number of cylinder seals (M. Omura 1996); the first appearance of bronze implements of warfare at the site (Akanuma 2007); the emergence of public architecture (S. Omura 2011); potential changes in botanical remains (Fairbairn 2002); and a shift from hand-made to wheel-made ceramics (Michel

[3] Tablets have only been found at the following sites: Boğazköy (72 tablets), Alişar (63 tablets), Kaman-Kalehöyük and Kayalıpınar (fragments), (Michel 2011: 319).

2011; S. Omura 2011). Interestingly, corroborating diachronic faunal studies do not exist. Previous faunal studies focused on synchronic deposits in the EBA (Atici 2003, 2005), and a diachronic study included an EBA sample which was too small (n = 187) to draw conclusions (Hongo 1996).

By augmenting these published studies with new zooarchaeological data, the Kaman-Kalehöyük artifactual and ecofactual remains provided an excellent opportunity to evaluate: a) the impact that intensified interactions with the Old Assyrians from northern Mesopotamia may have had on the more rural central Anatolian economic organization in the MBA; b) whether the politico-economic and social influence of the Old Assyrians on local structures during this period was as profound as the published cuneiform studies suggest; and, c) if there were any differences in (non-human) animal exploitation strategies in more rural communities before and after the intensification of long-distance exchange activity between these two culturally distinct societies. Specifically, via faunal remains, my case study establishes baseline data related to animal herding strategies and evaluates hypotheses concerning the degree of specialization and social inequality which existed at Kaman-Kalehöyük during the EBA, and whether Kaman-Kalehöyük became more specialized and/or hierarchic in the MBA as central Anatolians intensified their exchange interactions with northern Mesopotamia. Based on prior analyses, I argue that local Anatolian production strategies intensified in the MBA to accommodate a burgeoning segment of the population that was less focused on food production, but that preexisting strategies were not fundamentally altered. I also argue that the degree of social inequality increased over time, at least in part due to intensified MBA interactions and exchange activity.

Overall, this study contains dimensions of five broad anthropological topics pertaining to intercultural interactions; namely, long-distance travel, economic exchange models, production specialization, social inequality, and foodways. Evaluation of colonial models, hybridization, trade diasporas, and creolization frameworks are not the intent of this study since I am not suggesting that Assyrians were present at Kaman-Kalehöyük, though this topic remains a candidate for future inquiry (see Schlüter 2020 for an overview of these explanatory models). Rather, here, I am concerned with the impact that the infusion of foreign populations, whose presence at certain larger or other sites in proximity to Kaman-Kalehöyük might have been seasonal or more permanent, had upon the herding strategies in rural milieus that may have been supplying food or animal byproducts to more administrative or urban localities.

In summary, the rich archives of the period and decades of excavations at Kültepe-Kanesh, coupled with more recent textual and archaeological studies (e.g., Atici 2014; Erol 2019; Lassen 2010, Michel 2022), and available material at smaller, more rural sites, like Kaman-Kalehöyük, together presented a unique opportunity to investigate how local concepts of specialization and social inequality may have changed in response to an expanding inter-regional, and long-distance, interaction sphere.

Complementing the abundance of philological thematic research conducted to date on the MBA, and studies which have focused on enumerating the volumes of, and potential “profits” associated with exchanging metals and textiles, this diachronic study of EBA and MBA faunal remains enhances our knowledge of the 2^{nd} millennium BC central Anatolian countryside, and of those locations and people that produced the staple crops, meats, and animal by-products that supported those less focused on producing food for themselves (Veenhof and Eidem 2008: 148).

CHAPTER 2: TWO HYPOTHESES AND ZOOARCHAEOLOGICAL EXPECTATIONS

"*Our knowledge of the [2nd millennium BC central Anatolian rural] economy is restricted, because most records reflect the commercial interests of the Assyrians [with]…the elite of Anatolian businessmen, officials and the palaces" (Veenhof and Eidem 2008: 147).*

The opening quote suggests that the Old Assyrians had little direct interaction with local Anatolian populations in the countryside who were more focused on food-producing activities. While this may be true, Anatolians living in more rural locations, like Kaman-Kalehöyük, may have indirectly been pulled into the production side of the Anatolian-Old Assyrian exchange network. Any changes in the production system in terms of types or amount of food or secondary products in response to the demands of the Old Assyrians would impact existing supply chain activity regardless of whether contact with Assyrians was direct or indirect (Crabtree 1990, 1991; DeFrance 2009). I expect that the arrival of new people, who may have had different food preferences, on the central Anatolian plateau in the 2nd millennium BC, caused a change in local food production. I also expect that while these new people were spending extended periods of time in the area, they also created an increased demand for certain secondary products. Any stress on the preexisting agropastoral economy likely had an impact on those members of society who owned and managed the herds that provided meat, dairy products and other non-edible secondary products. The result of any stresses on local rural herd management systems is likely reflected in the decisions made by herd owners regarding which animals to raise, the proportions of different species they chose to raise, and their decisions related to kill-off strategies (see Chapter 6). In this study, I evaluated faunal patterns over time to see whether or not intensified interactions with foreign long-distance sojourners on the central Anatolian plateau in the 2nd millennium BC impacted the food production economy at Kaman-Kalehöyük, a small site in the central Anatolian countryside. Changes observed in faunal assemblages during the period of intensified interactions between Anatolians and these northern Mesopotamian denizens sheds light on some of the ways that local non-elite populations in more rural areas may have reorganized their economies in order to participate in this exchange system. In the sections which follow I discuss each of my two hypotheses in greater detail.

Hypothesis One: Intensification of Production and Increasing Economic Specialization

My first hypothesis was that the intensification of interactions and exchange activity in the 2nd millennium BC between central Anatolians and the northern Mesopotamian Old Assyrians stimulated an increase in the degree of economic specialization at Kaman-Kalehöyük. Previous research on this topic has yielded an incomplete view of the impact of intensified activity between local Anatolians and the Assyrian denizens. While a great deal of philological and archaeological evidence suggest a significant modification in the degree of production specialization in the MBA on the central plateau when compared to the earlier EBA, corroborating faunal evidence has yet to be found (for additional detail, see Chapter 5). I found this gap between non-faunal archaeological remains and faunal patterns important to our understanding of each period for two reasons.

First, scholars have demonstrated that various forms of specialization, or "degrees" of specialization, are common in hierarchical societies (see Costin 1991: 1-56 and 2007: 273-328; Wattenmaker 1991: 4, and discussion in Chapter 6). Specialized activity can take place at the individual, household, community, or regional levels. And second, if intensified interactions between Anatolians and Assyrians prompted a reconstitution of the local economy, changes in faunal patterns over time related to production and/or consumption would provide strong evidence to assess the impact of the modifications which may have taken place. Given the pervasive nature of degrees of specialization in hierarchic societies, and the critical nature of faunal patterns to interpreting economic change at Kaman-Kalehöyük, a brief review of previous animal bone analyses sheds light on the importance of this study.

Three faunal studies conducted at Kaman-Kalehöyük form the corpus of research related to the site's EBA and MBA animal economy. In the earliest analysis, Hongo observed minimal change in the range or proportions of non-human animals at Kaman-Kalehöyük from the 3rd to 2nd millennium BC (Hongo 1996). This observation, however, was made by comparing a very small EBA sample (n = 187 fragments) to a much larger MBA sample (n = 2423 fragments). Hongo, recognizing the limitations of the EBA sample, specifically mentioned the need for future faunal studies focused on these early deposits (1996: 161). Atici built upon Hongo's work with two synchronic studies of EBA fauna (2003; 2005). Emphasizing that data was preliminary in nature, Atici's descriptive 2003 study sought to establish "…the basic structure of animal bone assemblages from EBA layers of the site…" and to begin "…building a foundation for a better understanding of central Anatolian Bronze Age subsistence economies" (2003: 99). In this study of fauna from three pits, two exterior deposits, and one room fill context from Sector III, the only notable pattern Atici identified was a lower proportion of pig remains in the EBA relative to expectations (2003: 101). In a later, more detailed synchronic faunal study of EBA room fill excavated from Sector III, Atici found no evidence for specialization at Kaman-Kalehöyük in the EBA and characterized Kaman-Kalehöyük "…as a small town or village with an unregulated, decentralized, and self-sufficient economy" (Atici 2005: 126). Atici concluded that Kaman-Kalehöyük's animal economy was "generalized" versus "specialized" (Ibid.: 123), and that animal procurement took place at the household level (Ibid.: 126). In sum, previous faunal studies provide important baseline data related to the range and relative representation of species, and the nature of household level production at Kaman-Kalehöyük during the EBA (Atici 2003, 2005) and MBA (Hongo 1996).

My project is focused on comparing the animal economy in the EBA to the subsequent MBA period in order to identify changes in the degree of specialization present in each period. By combining data from these previous studies with new data from both the earlier and later periods, I leverage a larger sample size to fill the void in our understanding of the magnitude of diachronic change in the Kaman-Kalehöyük economy from the EBA to the MBA.

Philological material, and non-faunal archaeological patterns, provide additional evidence for the expansion of specialized economic activity in the MBA compared to the earlier period. In terms of written evidence, Old Assyrian textual translations from the MBA indicated that a highly specialized local economy existed throughout the central Anatolian plateau during the 2nd millennium BC, where smaller sites were subject to regional seats of power. The texts attest to a regional structure of Anatolian kingdoms (*mātu*) and specifically mention larger central Anatolian sites such as Hatti, Kültepe-Kanesh, Purušhattum, and Wahšusana as the bellwethers (Bryce 1998: 24). These same texts showed that each *mātu* was led by a *ruba*ʾ*um* (leader, mayor, king) who exercised broad control over the smaller communities within his/her *mātu*. In addition, Garelli (1963: 205-239) noted that Assyrian texts demonstrated that larger Anatolian urban settlements, which housed local seats of political power, served as the administrative and economic centers of their respective regions. Translations provided information about specialized Anatolian jobs attached to these political hierarchies such as: "…the chief shepherd, the chief of the horses, of goats, of the gardeners, of the legumes, and of the mills" (Larsen 1976: 155). Overall, these texts provide strong evidence for the existence of regional politico-economic integration and highly specialized social roles in the 2nd millennium BC, at least in more urban locations. Unfortunately, we lack written documents from the preceding prehistoric Anatolian landscape of the late 3rd millennium BC, and the later 2nd millennium BC texts do not inform us about the rural economies in the Anatolian countryside.

Archaeologically, large non-residential ("palatial") structures at the southwest-central Anatolian site, the urban center of Acemhöyük, coupled with findings from the southeast-central Anatolian capital of Kültepe-Kanesh (where Assyrians resided while in Anatolia), also pointed toward intensified specialization of labor in Anatolia in the early stages of the MBA. For example, Lehner found a high degree of specialized metal production at Kültepe-Kanesh in the MBA, and suggested that demand for metals reflected an "…intensification of earlier economic strategies…" which developed during the previous two millennia (2014: 149). Similar conclusions were found in archaeological studies conducted at Kültepe-Kanesh related to the storage and specialized manipulation of copper, obsidian, rock crystal, ivory, and wool (Çukur and Kunç 1990: 33; Lassen 2010: 167; Özguç 1986: 50). Lastly, in an archaeobotanical study of materials from Kültepe-Kanesh, Fairbairn found consistent use of glume wheat (edible but harder to control due to tougher rachis, lower yield) and barley (often used as feed for herd animals) from the EBA to the MBA, but an increase in the proportion of bread wheat (easier to control due to weaker rachis, greater yield, and feed for humans) from the EBA to the MBA (2014: 191). This increase, if it proves true with a larger sample size, would be consistent with a shift in focus from pastoral to agricultural activity, possibly as a result of needing to create bread surpluses for an increasing number of people who were less focused on food production.

Even at the smaller rural site of Kaman-Kalehöyük, a wide range of archaeological evidence from the MBA suggests significant change from the earlier period and the emergence of greater degrees of specialization. For instance, MBA strata at Kaman-Kalehöyük yielded the site's earliest expressions of administrative technology in the forms of cylinder seals, bullae, and cuneiform tablet fragments. Seals, often containing elaborate motifs signifying their owners, were used to seal containers or doors in ancient southwest Asia. For example, the top of a container would be closed with unbaked clay, then a cylinder seal, frequently made of stone, was rolled onto the clay as a "signature" of the person who was sealing or sending a package to another. The clay was then baked and the "signature" was captured. Bullae were also used in economic exchanges in ancient southwest Asia. Often round and hollow, cylinder seals were sometimes rolled onto the outside of them, and inside they might include pebbles signifying how much of a good was being sent from one person to another. Both cylinder seals and bullae often contained motifs that were tied to regional traditions (see Chapter 4). These economic recording devices were used by both administrators and non-state actors and are consistent with more specialized or formalized exchange activity, or increasing levels of bureaucracy. These recording devices also likely coincided with the emergence of certain new roles at Kaman-Kalehöyük that were relatively removed from food production, such as exchange specialists, "accountants", seal artisans, sealing specialists, and/or those who harnessed the esoteric knowledge of literary technology.

Additional evidence of increased degrees of specialization of labor at Kaman-Kalehöyük in the MBA are also present. The MBA at Kaman-Kalehöyük saw the disappearance of hand-made ceramics and the corresponding emergence of wheel-made pottery, reflective of more specialized production, production for use beyond the household level, and specialists who focused on generating large quantities of homogeneous wares. Coinciding with the shift to wheel-made ceramics, the Kaman-Kalehöyük MBA wares include more decoration than in the previous period, a wider range of styles, and larger vessels, many containing grain residues. The new ceramic designs may indicate: new social influences, emulative schemes whereby some cohorts of people sought to socially distance themselves from others, or a simple difference in preferences. The wheel technology suggests certain artisans focused more time on ceramic production to generate larger quantities for use beyond their individual households. Larger wares were likely used for storage and their increased prevalence in the MBA suggests a need to store, transport, control or export food surpluses. If true, these larger wares also serve as evidence for more intensified production of certain foods, the generation of larger surpluses, and the need to develop new storage strategies. In sum, the emergence of larger wares with grain residues is consistent with the intensification of production, the storage or movement of surpluses, and increasing levels of specialization in the economy. The grain stored in these new larger wares might have been controlled by local elites for redistribution, as a hedge strategy at Kaman-Kalehöyük during times of food shortage, used as tributary payments to a new local or regional elite class, or to support the actors who spent most of their time engaged in exchange activity.

Also, in contrast to the highly localized pottery forms found in the EBA, these new wares and decorative patterns were widespread throughout the plateau in the MBA, spanning its expanse from Kültepe-Kanesh in the south to Alişar in the north (110-150 km by land). The increased degree of ceramic uniformity across the plateau suggests one of several phenomena: the widespread emergence of new techniques or technologies, that various settlements shared similar preferences, that ceramics were obtained from a narrower field of pottery specialists, or that smaller more rural sites were attached to a new MBA regional polity. The emergence of regional ceramic homogeneity in the MBA could also indicate more intensified, focused, and coordinated production (unless the ceramics were produced by numerous independent potters trained on a similar technique). For example, if a new regional center emerged in the MBA and smaller sites in its environs were attached to it, the increased consistency of ceramic types and decorations may possibly indicate more regional politico-economic integration, centralization, or inter-site dependencies.

Other quantities and qualities of small finds, and archaeobotanical remains, from the MBA at Kaman-Kalehöyük also suggest higher degrees of specialization when compared to the EBA. In the MBA, spindle whorls were found in larger quantities at the site along with the emergence of geometric patterns with convex bottoms which stand out relative to the undecorated flat bottom styles from the earlier period. The higher density of spindles may be associated with more spinning and weaving activity, or may simply be a result of the disparity in horizontal exposures of the MBA versus the earlier period. But, the more stylized spindles of the MBA suggest more personalized decoration of the implements required for the production of textiles, which in turn may be reflective of more time spent by certain individuals on the activity. Similarly, jewelry and other ornaments were found in greater quantities and of finer quality when compared to the earlier period. In the MBA, more finely worked bone and gold filigree items were found in addition to the simpler styles also found in the EBA. These finds suggest artisans in the MBA continued to craft some “traditional” adornments and also created newer styles. Together, spindles and ornaments from MBA contexts at Kaman-Kalehöyük suggest not only the introduction of new technologies or ways of working raw materials but also more personalized production, increasing degrees of specialization, and more time dedicated by artisans on certain types of production activities. In addition, the MBA at Kaman-Kalehöyük also saw the emergence of large quantities of bronze weaponry and agricultural tools. While weapons point to more militaristic activities and the possible emergence of a segment of society focused on protecting people or items of value, the latter signals a shift toward greater focus on farming and surplus production. An archaeobotanical study provided corroborating evidence consistent with a shift toward more intense agricultural activity and surplus production. Consistent with findings at Kültepe-Kanesh, Fairbairn found a possible change in focus from barley to bread wheat when comparing samples from the Kaman-

Kalehöyük EBA to the MBA (Fairbairn 2002: 207). This is an important piece of the puzzle because barley is often used to feed domesticated cattle, sheep, and goats, while bread wheat is typically grown for human consumption. If this shift holds true with a greater sample size, then it's possible that the residents of Kaman-Kalehöyük and Kültepe-Kanesh may possibly have begun to focus more intensely on planting and cultivating fields of wheat to feed a burgeoning population, with a portion of the population less focused on food production. Overall, these finds from Kaman-Kalehöyük's MBA provide important evidence for the emergence of more specialized professions and focused production activities associated with certain segments of the population.

A great deal of philological and archaeological evidence points to increasing degrees of specialized production activity in the MBA both on the plateau and at Kaman-Kalehöyük when compared to the previous period, with the exception of animal bone studies conducted to date. Given the small sample sizes and scope of previous faunal studies, questions remain that require a more comprehensive and careful examination leveraging a larger sample size. We do not have a clear picture as to how specialized Kaman-Kalehöyük's agropastoral economy was in the EBA, prior to the arrival of the Assyrians on the plateau. Depending upon whether a similar type and degree of economic specialization existed in the EBA prior to the arrival of the Assyrians, or if a new configuration emerged coinciding with their arrival in Anatolia, reevaluation may be required regarding current interpretations of the MBA that suggest that the arrival of Assyrians on the Anatolian plateau caused local economies to change their production schemas.

Excavated material from EBA contexts throughout the Anatolian peninsula have demonstrated that in certain locations multi-tiered socio-political hierarchies and specialized production were already in full swing (for a more detailed discussion, see Chapter 3). For example, in central Anatolia, large occupations, in excess of 30 hectares, have been found at Acemhöyük, Alacahöyük, Alişar, and Kültepe-Kanesh. At these sites, burial goods and patterns, metallurgical sophistication, and ceramics provide evidence for the existence of long-distance interaction and exchange networks, social differentiation, and local specialization of labor (e.g., Sagona and Zimansky 2009: 172-177; von der Osten 1937: 230-247; Yener and Vandiver 1993: 207-238; Yener 1994, 2000). In addition, at these locations, scholars have cited fortification walls and clearly defined residential, industrial, and administrative sectors, suggesting not only specialized activity, but also hierarchical structures both within and across their respective regions and sites (Yakar 2011: 69).

Given these data points, if the relative degree of economic specialization from MBA deposits at Kaman-Kalehöyük was much greater than that of the EBA, as other philological and archaeological data suggest, then our perspective may change about how greatly countryside sites were impacted by the intensification of interactions between Anatolians and Assyrians. Also, since these archaeological patterns signal specialization in the EBA, a related question is whether or not such specialization extended into the hinterland at smaller sites, like Kaman-Kalehöyük, or if higher degrees of production specialization only characterized larger, more center-based, palace economies. We may see a highly specialized economy in the EBA if residents of smaller rural sites, like Kaman-Kalehöyük, were already supporting a local class of people relatively removed from food production, possibly those who may have participated in a more centralized or regionally based economy.

The faunal remains from Kaman-Kalehöyük will potentially indicate whether or not there is evidence for surplus production at the site in the EBA. If, in fact, evidence of surplus production is detected, it would be a strong indicator of a specialized economy and would help gauge the relative intensity of that specialization. For example, a distribution of the ages of death skewed toward older sheep and goats in the assemblage may indicate the specialized production of large-scale wool surpluses, and this can signify the involvement of a site in a larger interaction or exchange network. We may also find the surplus production of prime aged animals, often represented by sheep/goats 1-2 years of age and a high sheep to goat ratio, which may reflect participation in a tributary economy or with the supply of meat in an exchange system. Or, we may find data which suggests a combination of strategies where herders were focused on both surplus wool and meat production. Furthermore, in any given society, there might be several different types of people who were less focused on food production but who relied on food produced by others to augment the food they themselves produced. The identification of contexts with concentrations (or stark absences) of certain animals, animal body parts, or ages can also represent specialized activities. For example, an over-representation of low meat yield bones such as crania and foot bones can represent a specialized butchering location where carcasses were processed. Conversely, an over-representation of high meat yielding elements, such as upper limb bones, coupled with an absence of low meat yield bones suggests the supply of meat from specialists. Or, if a household raised, processed, and consumed its own animals, we should find a full complement of body parts in expected proportions (Zeder 1991). If a household was more focused on craft than food production, however, we may see a narrower range of animals, animal age groups, or body parts (Wattenmaker 1987, 1994, 1998).

In terms of expectations, if the herd owners at Kaman-Kalehöyük made different decisions in response to new demands that were placed on the preexisting agropastoral economy in the MBA, one, or a combination of, several faunal patterns may emerge[4].

- If new regimes of value emerged in the MBA, and local Anatolian elites or Assyrians who resided on the plateau preferred the meat from certain animals or specific body parts different from what was already locally produced, changes to herding patterns might have occurred in response to these new desires and/or demands.

[4] See discussion on equifinality, where multiple pathways or herding strategies may lead to the same pattern of skeletal remains in the archaeological record.

- Or, if the central plateau's population suddenly increased in the 2nd millennium BC, or there was a large increase in the proportion of people who were themselves less focused on food production and thus dependent upon local food sources provided by other people, then we may also see a change in herding decisions focused more on the volume of meat yields.
- Alternatively, a shift toward the surplus production of prime aged animals could indicate Kaman-Kalehöyük's participation in a tributary economy. A large reduction or absence of prime-aged animals coupled with low species diversity, and a high concentration of older animals, may suggest that younger animals were being offered as a form of tributary payment to another location.
- Correspondingly, the presence of animals spanning all age categories suggests that a site consumed its own animals, rather than supplying other locations with prime aged stock, especially in the case of sheep and goats (Wattenmaker and Stein 1986).
- Changes in demand for other non-edible animal products may also cause shifts in herd compositions. For instance, if in the 2nd millennium BC at Kaman-Kalehöyük, wool production was intensified for export or exchange, we may see an increase in the proportion of sheep relative to goats, a higher ratio of female to male sheep, and a skewing toward an older herd composition.

In summary, philological and archaeological data suggest that smaller local communities may have reorganized their economies in the MBA to supply the more intensified Anatolian-Assyrian exchange system, and a study of the animal economy provides a means of doing that. Estimating the degree of economic specialization via the current sample of faunal remains at Kaman-Kalehöyük in the EBA will help clarify the magnitude of change which may have taken place in the MBA, and provide a solid foundation from which to better understand how and why a change might have occurred. Evaluating this hypothesis also will shed light on how much impact intensified interactions between the Anatolians and Assyrians had on small rural communities, if at all, and whether local agropastoral economies broadly were re-organized to meet new local or Mesopotamian demand.

Hypothesis Two: Consumption Changes and Increasing Social Inequality

A related hypothesis evaluates observed faunal patterns at Kaman-Kalehöyük from a different point of view. Does differential access to, and consumption of, certain animal species, ages, types of meat, or other animal products, suggest increasing social differentiation. My second hypothesis thus poses that the degree of social differentiation and social inequality at Kaman-Kalehöyük increased from the Early Bronze Age to the Middle Bronze Age as interactions between Anatolians and Old Assyrians in the 2nd millennium BC intensified. In terms of the current case study, if for example, an established, more elite class of people inhabited Kaman-Kalehöyük in either the EBA or MBA, or if a new class emerged in the later period, by careful study of body part and age distributions of primary protein sources (sheep/goat, cattle, pigs), we may see evidence that indicates differential access to prime-cuts of meat. If this was the case, we may see the absence of larger meat-bearing elements or prime aged animals in non-elite domestic contexts, a higher prevalence of higher meat yield elements or prime-aged animals in more elite contexts, or a narrower range of preferred species. For example, elites might have gotten prime or the highest "valued" cuts of meat or younger animals or from more desired species, while others, such as workers attached to elite complexes, might have received regular cuts of meat from animals of prime-age or slightly older, and slaves might have received less desirable cuts of meat, or no meat at all. In sum, highly spatio-temporally distinct distributions of animals, ages, or body parts can serve as markers of differential access and social inequity among different members of a given society.

A defining characteristic of hierarchical societies, such as the territorial city-states present on the central Anatolian plateau at the onset of the 2nd millennium BC, is socioeconomic inequality. For decades, archaeologists have studied the interrelated factors that coincide with changes in the degree of social inequality in ancient contexts (D'Altroy and Earle 1985; Earle 1991; Plog 1995; Johnson and Earle 2000; Kohler, Smith, and Feinman 2018). These scholars have demonstrated how the "financing of social inequality" and the accumulation of wealth took place through several interrelated factors, including: intensified exchange, restricted access to or control of highly valued goods, internal/external conflict, the attraction and attachment of people to certain leaders or social groups, increased agricultural activity, and higher levels of surplus generation. A review of the philological and archaeological evidence from central Anatolian sites and Kaman-Kalehöyük provides an opportunity to further clarify changes in the degrees of social inequality in the early 2nd millennium BC when compared to the preceding period. Written and material remains show that many of the factors that scholars have identified as affecting degrees of social inequality in past societies were at play during this time. My evaluation of this hypothesis is intended to shed light where current interpretations are unclear or incomplete.

First, it is widely known that Old Assyrian textual translations detail increasingly intensified exchange activity between Anatolians and northern Mesopotamians in the 2nd millennium BC (Larsen 1976: 86). As mentioned in hypothesis one, during the 2nd millennium BC, in addition to the first appearance of writing in central Anatolia, an increase is seen in the archaeological expression of both local and non-local styles of cylinder seals, clay sealings, and bullae (Strupler 2021). The cuneiform texts, along with this broader range and volume of accounting and administrative devices, suggest substantial change took place at the local level and is consistent with the existence of an increasingly hierarchical and structured political system, one that was able to keep track of, and control, an areas' population. The small numbers of these accounting and administrative devices recovered at Kaman-Kalehöyük provide evidence for differential access to certain goods, knowledge, or the skills to create or use those goods. In addition, access to the cuneiform tablets, or the restricted knowledge of understanding them, creating them, or possessing the ability to make them “speak”, very possibly created social distance between the segments of society who held this knowledge and those who did not.

Second, textual evidence coupled with the expansion in variation in the size and diversity of geographically strategic site locations in the MBA demonstrate that Anatolians controlled the flow of resources throughout the peninsula at increasing levels, including the flow of those goods considered of higher economic or social value. Other small finds suggest differential access to certain goods as well. In terms of documentation, cuneiform translations demonstrated that Anatolians not only exacted taxes on Assyrian exchange specialists passing through their lands (Postgate 1995: 213; Garelli 1966: 112-13; Larsen 2002), but also that the Anatolians controlled the movement of copper (Larsen 1976: 91-92) and restricted exchange activity associated with highly valued goods such as *husârum* and *amûtum* to only certain local exchange actors (Ibid: 130-131). The requirement of “tax payments” for traversing geographies suggests at least differential access to land and the ability of certain members of society to enforce the collection of taxes. And, the ability to control exchange activity and stipulate limited access to certain goods signals not only multi-tiered economic hierarchies, but also high degrees of relative social power and social inequality.

With regard to settlement location, the increasing number of MBA sites, including Kaman-Kalehöyük, relative to the earlier EBA period, shows increasing diversity. MBA settlements dot the central Anatolian landscape on well-established overland and riverine exchange routes that reach in all four cardinal directions. These sites, as loci of, or in proximity to, critical nodes of communication or exchange, provided Anatolians with the ability to control the flow of both utilitarian and valued goods throughout their respective territories.

Still other cuneiform studies strongly suggest differential access to certain goods and contribute to our understanding of 2nd millennium BC social inequality. For example, translations of the Mari and Ebla archives mention restricted access to caches of imported raw materials, manufactured items including jewelry and "fashionable" textiles, meats that were reserved for royalty (ostrich meat; see Popova and Quillien 2021) and visiting dignitaries (cattle meat; see Allred 2006 for a review of food production in Ur III texts), and what types of rations were provided to the working class or prisoners (Biga and Steinkeller 2021: 10, 21, 31-46; Ellison 1984: 93; Postgate 1994: 58 ; Winters 2019: 321). Interpretations of Old Assyrian texts also suggest that Anatolians exchanged for, displayed, and emulated production of finer Mesopotamian textiles (Lassen 2010). And, Gökçek (2004) created a listing of cuneiform tablets which outlined relative exchange values for different types of sheep, based on origin, fleece, meat, body quality, and breed (Atici 2014: 205). Gökçek also found that cattle meat and cattle by-products were valued up to four times more than sheep/goats in the 2nd millennium BC, and that cattle were not only bought and sold, but also rented (Gökçek 2004: 69). If these interpretations are correct, then certain segments of the population were able to gain access to and display higher quality goods while others could not, and some members of Anatolian society had the wherewithal to “buy” while others had to “rent”, both suggesting social inequity and differential access to goods of value.

Archaeologically, at Kaman-Kalehöyük, new forms of tools and metallurgical sophistication emerged in the MBA. For example, concentrations of awls, blades, and sickles in certain loci suggest restricted access to certain technologies, and the ability to work more efficiently to generate and subsequently control grain. In terms of metallurgy, in addition to sustained expression of coarse round gold rings and earrings from the EBA to the MBA, new forms and filigree work emerged in the later period. The expression of these new forms of adornments in small numbers suggest that the more sophisticated adornments were the privilege of a select few Kaman-Kalehöyük residents.

Third, both an inscription found in the northern Mesopotamian Assyrian capital located at Aššur and tablet translations from Kültepe-Kanesh shed light on the attachment of certain followers to leaders in the MBA. Though it is well established that monarchs occupied seats of power in northern Mesopotamia, at Aššur, archaeologists found an interesting inscription calling for king Šalim-ahum to build a temple for the gods. The inscription said that the “…building of temples for the gods was the duty of all Mesopotamian kings” (Larsen 1976: 119). I found this inscription important to my evaluation of social inequality because the inscription implies that the king was able to mobilize labor and execute the construction of public works. Other philological evidence, from Kültepe-Kanesh in southeast-central Anatolia, suggested that there were four regional seats of centralized power in the MBA, all of which were run by local leaders who controlled smaller settlements; they presumably also controlled the people and the activities of the people, within their territories (Bryce 1998: 24-26). This finding speaks not only to the attachment of certain locations and people to more integrated regional hierarchies in the 2nd millennium BC but also to a highly stratified social structure with high degrees of social inequality and elites who were able to mobilize people for public projects. Still other translations of tablets from Kültepe-Kanesh stated that local Anatolians were hired as workers in Assyrian household settings. These translations are important because the word for these hired "workers" was *Şuhāru*, which means "servants" or employees (Larsen 1976: 101 n65). This evidence suggests the existence of multiple social classes and differences in material wealth between the Assyrians and at least certain segments of local Anatolian society.

Fourth, while we have little insight into internal conflicts within specific locations, we do know that in the MBA regional political alliances were fickle, and conflicts over land and resources between rival polities were common (Bang and Scheidel 2013: 125). Even at small rural sites like Kaman-Kalehöyük, Middle Bronze Age material remains are consistent with increasing levels of conflict and warfare. For example, in the MBA at Kaman-Kalehöyük, archaeologists found a possible fortification wall (1.5 meters wide and 3 meters high) at the site, which was presumably for defense purposes. No other walls of this size or construction were found in earlier contexts. Additionally, MBA small finds at Kaman-Kalehöyük included the first expression of large numbers of bronze daggers, blades, and spearheads (Akanuma 2007); and, mass burials containing contorted burned bodies of both adults and infants were found (Omura 2011). Together, these material remains provide solid evidence for conflict and the attachment of different peoples to different leaders or factions, and the likely emergence of new degrees of social differentiation in the form of a more formalized warrior class or segment of society.

Finally, in terms of agricultural intensification and increased surplus production in the MBA compared to the EBA, I found the evidence at Kaman-Kalehöyük to be incomplete. Large numbers of bronze sickles, awls, and blades, the first expressions of wheel-made and storage vessels in the ceramic assemblage, and a large granary[5] from a later period, all point toward the potential intensification of agriculture and generation of greater surpluses. Furthermore, the concentrations of these agricultural implements in certain loci suggest that only certain residents of Kaman-Kalehöyük had access to

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[5] Some scholars believe that the mid-2nd millennium remains at Kaman-Kalehöyük, including a large granary (7.5-10 meters in diameter and < 5 meters deep), along with a cache of Old Hittite clay bullae and sealing impressions (Weeden 2011: 611) suggest that Kaman-Kalehöyük served as an important collection and/or regional distribution point (Omura 2011: 1106). This architectural feature is both frustrating and intriguing because it cuts through a large area of earlier MBA layers, and potentially destroyed a similar earlier feature. What this feature does tell me, however, is either that the land surrounding Kaman-Kalehöyük was fertile enough to generate very large surpluses, that it was convenient for grain to be collected from other sites nearby, and/or that the site was strategically located at the crossroads of several exchange routes and may have served as a distribution point, way station, or exchange post.

tools with which to increase farming efficiency. But, as discussed earlier, previous faunal studies were focused on other topics, so three open questions remain. First, we don't know if faunal evidence is consistent with changing degrees of social inequality at Kaman-Kalehöyük when comparing the earlier and later period. Second, we don't know if there were any differences over time in terms of access to certain animals, animal age groups, cuts of meat, or products derived from them. And third, we do not have any faunal evidence which indicates an intensification of production over time, or if there were any changes in modes or focus of production when comparing the MBA to the EBA. In sum, while many lines of evidence point toward the increased probability of greater degrees of social inequality at Kaman-Kalehöyük in the MBA compared to the earlier period, a diachronic evaluation of faunal patterns is needed. Overall, the two questions I raised in the context of my first hypothesis also apply here, but with a different flavor. First, we do not have a clear picture as to how much social inequity existed at Kaman-Kalehöyük in the EBA, prior to the arrival of the Assyrians on the plateau. Second, we don't know whether the degrees of social inequality, which may have been found in larger centers of the MBA, extended into the hinterland at smaller sites, like Kaman-Kalehöyük.

In considering the whole, I found it fascinating that despite all of the factors that archaeologists have identified to bring to light the increasing degrees of social inequality present at Kaman-Kalehöyük in the MBA, we still don't know if there was a change in either the choices made by herd owners or consumers in terms of the range of animal species, ages, or products they desired. I also found our incomplete understanding of social inequity in either period intriguing because, in countless cases in both the Old and New Worlds, coinciding with politico-economic changes, certain segments of society have distinguished themselves from others via differential access to, consumption or use of, certain animals, ages of animals, parts of animals, and/or non-edible animal byproducts (Bray 2022; DeFrance 2009: 122; Fritz 2019; Grantham 2000; Kirch and O'Day 2003; Rossel 2004; Wattenmaker 1994; Zeder 1991).

In this study, I evaluate Kaman-Kalehöyük faunal data from the late EBA and early MBA to further gauge the relative degrees of social inequality in each period, and to see if patterns suggest any change(s) over time. By better understanding the relative degrees of specialization and social inequality within each period at Kaman-Kalehöyük, and over time, we can more fully assess the impact that intensified interactions between Anatolians and northern Mesopotamians had on local rural economies in the 2nd millennium BC.

Zooarchaeological Expectations: Production and Consumption

This zooarchaeological study, benefitting from more recently excavated faunal and non-faunal material remains, combines new faunal data with previously published data, leveraging a larger sample size to more fully understand the animal exploitation choices made by Kaman-Kalehöyük's residents in both the EBA and MBA. Given previous philological and archaeological scholarship, and having evaluated both previous archaeo-zoological work and Kaman-Kalehöyük non-faunal material remains, I was uncertain what outcomes I might see from my zooarchaeological analysis. Non-faunal research strongly suggests that substantial changes in the degrees of economic specialization and social inequality at Kaman-Kalehöyük took place over time, and this study is the first diachronic zooarchaeological evaluation comparing EBA to MBA patterns on the central plateau. Taking into account what we know to date, in this analysis I expected faunal patterns over time to be consistent with greater degrees of economic specialization and social inequality in the MBA at Kaman-Kalehöyük, and when compared to the preceding EBA period, one of four diachronic patterns would emerge. The first possibility was that there was no change in production strategy or consumption patterns, reflective of local continuity in economic practices and social structures. This scenario could prove true if residents of smaller sites, like Kaman-Kalehöyük, were already participating in a different, perhaps more localized economy in the EBA and continued to do so in the MBA. Alternatively, this outcome would be consistent with a relatively small increase in the population of people on the plateau who were less focused on food production when comparing the EBA to the MBA. This pattern may be the result if Assyrian impact on the daily lives of rural Anatolians communities was relatively insignificant, if the Assyrians played a small role in a much wider interaction or exchange system (Barjamovic 2011: 7), or if Anatolians simply chose to continue following preexisting herding and other cultural traditions.

Second, I thought it possible that we might see no change in production strategy, but a change in consumption patterns, due to the introduction of new foods, people, new social hierarchies or degrees of inequality, or technologies. This scenario might play out if local Anatolians learned new cooking techniques, if they developed or were introduced to new ways of butchering animals, or if certain members of the population emulated non-local practices. I also would not have been surprised to see a change in production strategy, but no change in consumption patterns. An inflection in production, but maintenance of local consumption traditions could occur due to more "Internal factors", such as the emergence of a new local elite class or reconfigured social hierarchies, and an associated economy geared toward producing food or other goods for them (Stein 1990, Wattenmaker 1990). This outcome may also coincide with the introduction of new value configurations for specific animal characteristics or yield, or "meat" maximization strategies, perhaps as a result of substantial demand increases of quality and/or quantity of certain animals and/or their by-products from those less focused on food production. For example, one strategy to support larger numbers of non-food specialists could be focused on increasing meat surpluses, or on raising other more "quick to market" animals like pigs[6], although those animals may still have been

[6] For example, Clason and Buitenhuis (1998:37) have suggested that the importance of pigs increased throughout Southwest Asia from the EBA to the Late Bronze Age.

consumed with local technologies and prepared using local techniques. Last, faunal patterns over time may demonstrate a change in both production strategy and a change in consumption patterns, which would be consistent with the adoption of new maximization strategies and the introduction of new technology, a large influx of new people, a change in regional leadership, increased levels of social differentiation, increased participation in an expanding exchange network, or demand for new foods that required new preparation procedures.

My hypotheses and expectations were tested following a five-step process. First, to leverage an increased sample size and reduce analytical bias, I aggregated published accounts with new data I had analyzed, and monitored these data for any diachronic or contextual variation. I then evaluate zooarchaeological evidence for the degrees of economic specialization and social inequality at Kaman-Kalehöyük in the late Early Bronze Age, preceding the arrival of the Assyrians on the central plateau. Next, I examine faunal evidence for the degrees of economic specialization and social inequality at Kaman-Kalehöyük during the Middle Bronze Age, after the arrival of Assyrians on the central plateau. These results will allow me to determine whether there were any diachronic changes in animal production strategies and/or consumption practices from the EBA to MBA occupations. I end by evaluating the Kaman-Kalehöyük zooarchaeological data more holistically by comparing patterns observed in faunal data to patterns in other artifactual remains from the site.

CHAPTER 3: SETTING THE BROADER CONTEXT: CULTURES OF THE EBA AND MBA

"One watches…an assemblage of interdependent enclaves, variously reacting upon each other, though effectively linked only by the great routes of passage for trade and migration which traverse the [Anatolian] peninsula from end to end" (Seton Lloyd 1967: 11).

To better understand the impact that exchange activities between Anatolians and Old Assyrians may have had on the degree of specialization and social inequality in local rural communities such as Kaman-Kalehöyük (#14 in Figure 1), reviewing what we know of the indigenous landscape before these interactions intensified is necessary. Understanding that "…created landscapes determine, reinforce, and compound each other…and their surrounding areas…" (Algaze 2008: 3), my goal in this chapter is to summarize what was happening at Kaman-Kalehöyük, and in its influencing environs, during both the EBA and MBA.

This contextual summarization is important for three main reasons. First, by assembling EBA and MBA data into one narrative, I leverage over 100 years of scholarship to establish a baseline understanding of what evidence we have from each period in terms of economic organization, social hierarchies, and long-distance interactions. This evidence helps ground us in the circumstances, conditions, relationships, factors, and/or trends surrounding the data evaluated in this study, thus allowing for a more comprehensive analysis and interpretation. Second, as I describe below, though fragmented, EBA data demonstrates that extensive interaction networks, specialized professions, surplus production, and local multi-tiered hierarchies existed in Anatolia prior to the Assyrians arriving on the central plateau during the 2nd millennium BC. EBA data thus provides an anchor from which to gauge the magnitude of change in each of these dimensions that took place from the EBA to the MBA. And third, since MBA data exists in both archaeological and written form, a review of what we know from each of line of evidence is needed to balance the inherent biases in each of these sources (after Lightfoot 2005). By taking a more holistic view of the MBA data, one can more adequately evaluate conventional interpretations of what occurred in each period.

For the EBA, I provide a brief synopsis of the macro trends in regions around the Mediterranean that likely were in contact with Anatolians. I follow that by discussing key Anatolian sites and emergent patterns in archaeological material across the peninsula, placing an additional emphasis on evidence for cross-cultural interaction spheres, and relating trends back to central Anatolia and Kaman-Kalehöyük. I then delve into specific Anatolian regions, noting key findings that are relevant to this study, and emphasizing the variability in the archaeological record. Lastly, I include a discussion of an archaeological analogue drawn from 4th millennium BC Anatolian scholarship to broaden some of the theoretical and interpretive frameworks applied to the Anatolian – Assyrian interactions of the 2nd millennium BC. For the MBA, I cover three main topics: First, I provide an introduction to the period including capsules related to changes in the broader southwest Asian Mediterranean world. Next, I summarize what we know of the northern Mesopotamian Old Assyrian capital at Aŝŝur.

Last, I provide a synthesis of key archaeological and textual findings from Kültepe-Kanesh, the Anatolian "exchange capital" of the period, situated in south central Turkey (#23 in Figure 1).

The Bronze Age, a period in cultural development when copper and tin were smelted into bronze, commenced in Anatolia (modern day Turkey) at the end of the Late Chalcolithic period (~4200 to 3000 BC) and is roughly divided into three main phases: Early (~3000 to 2000 BC), Middle (~2000 to 1700 BC), and Late (~1700 to 1200 BC) (after Yakar 2011: 68-80). Some scholars have further sub-divided these periods. Steadman, for example, suggests a tripartite EBA period based on shifts in material remains at four prominent sites (Troy, Beycesultan, Alişar, and Tarsus); she roughly divides the 3rd millennium into 300-year subphases, dubbed Early Bronze I, II, and III (2011: 230). This current study is primarily concerned with both the latter third of the Early Bronze Age (Steadman's EB-III, or 2300-2000 BC), as well as the Middle Bronze Age (2000-1700 BC).

The Early Bronze Age: 3000 to 2000 BC

In the 3rd millennium BC a wealth of archaeological evidence shows that large scale societies throughout the Mediterranean, including Anatolia, were increasingly interacting in interregional interaction spheres which stretched "…into the Aegean and southeastward to northern Mesopotamia and beyond" (Steadman 2011: 251). Long distance interactions and exchange, however, were hardly a new phenomenon in this part of the world. As early as the Pre-Pottery Neolithic B period (8800-6500 BC), central Anatolian-sourced obsidian was found in Cyprus, the Levant, and the Middle Zagros, the latter of which covered a distance of approximately 1,500 kilometers, or as far southeast as modern-day Baghdad (Carter, et. al. 2023: 11; Goring-Morris and Belfer-Cohen 2020: 6; Sagona and Zimansky 2009: 73). At the Neolithic site Çatal Höyük (#28 in Figure 1), cowrie shells from the Red Sea, some 1,000 kilometers away, were found in burials where they covered the eyes of the dead. By the late Neolithic (5300-4500 BC), obsidian from Anatolia and the Island of Melos found its way to Crete, as did pottery similar in form to Cyprus and Western Anatolia (Watrous 2021: 33, 35). And by 4000 BC, black burnished carinated vessels with fluted patterns were found at Alişar (#21 in Figure 1) in central Anatolia indicating long distance contact with the Vinča Culture, located in modern Serbia (Özdoğan 1993). By 3500 BC lapis lazuli sourced to modern day Afghanistan was found in modern day Iraq, and then in Egypt by the onset of the 3rd millennium BC (Collon 1990: 33; Hermann 1968; Huang 2018: 393). And, by 2500 BC caches of objects crafted in materials native to the Persian Gulf, Indus Valley, and Anatolia were found at multiple sites in Mesopotamia (Larsen 1987: 51; Postgate 1992: 209; Stein 2005: 149-151; Van De Mieroop 2007: 53).

Recent studies continue to focus on better understanding the intricacies related to ancient exchange activity in the 4th and 3rd millennia BC around the Mediterranean.

For example, isotopic analysis of copper weapons recovered from burials near the Judean foothills concluded that while weapons were local in style, the raw materials used to manufacture them originated in Anatolia (Mack, Avrutis, and Erel 2023: 119, 127). In another isotopic study, analysis of donkey and caprine remains dated between 2850 and 2550 BC from the southern Levant showed that donkeys born in Egypt were moved on the hoof to Canaan, confirming that animals were exchanged over long distances (Greenfield, et. al., 2020: 377). In still another isotopic study, researchers suggest that 3rd millennium copper and leads found at Tell Leilan (Khabur area of northeast Syria) were obtained from multiple ore sources, including Trabzon on the Black Sea coast (Johnson, Weiss, and Yener 2020: 273). And in a study of 12,000 diagnostic ceramics from 3rd millennium BC deposits at "Kalba 4" on the east coast of the modern United Arab Emirates, scholars posit that its residents were interacting with polities 2,000 kilometers away. Ceramics from southern Mesopotamia, the Indus Valley, southeast Iran, and Bahrain were identified (Eddisford 2022: 23).

Aside from Mesopotamia, which is discussed below, large-scale changes took place during the 3rd millennium BC in the southern, western, and eastern reaches of the Mediterranean. In Egypt we see the emergence of a god-king ruler, centralized administration with regional "governors", life-size sculpture, artwork depicting the afterlife, monumental architecture, and coordinated military campaigns (Grajetzki 2006; Shaw 2000). There was also expansion in the range of exchange goods recovered in the Nile Valley, including ebony, myrrh, frankincense, gold, copper, cedar, along with more extensive shipbuilding, and lavish jewelry, furniture, and vessels including Cilician wares from southern Anatolia (Manning 2013: 61-93).

In the Aegean, on the island of Crete, the EBA is characterized by a rapid increase in population, increases in displays of social differentiation via gold jewelry and non-local motifs, and more intense crafting of tools and weapons made of imported metals (Watrous 2021: 35). Knossos grew to 6.5 hectares, cemeteries were found, and regionally different burial types yielded varying amounts of cups, idols, bronze daggers, obsidian, Egyptian marble objects, and Cycladic metals and pottery. Egyptian, Babylonian, and Syrian influences were found in artwork, and exchange activity intensified. Imports included unfinished obsidian, gold, silver, copper, and ivory, as well as manufactured items (cylinder seals, vases) from Cyprus, Melus (modern Milos), the Greek mainland, Egypt, and the eastern Mediterranean (Watrous 2021: 52-76). Obsidian and metallurgical workshops at Heraklion and Chrysokaminos attest to increasing degrees of craft specialization (Ibid.: 47; Tomkins and Schoep 2012; Wilson 2021). And some Cretans even emulated Egyptian symbols or ideologies in jewelry; for example, amulet motifs from the EM-II period included the scarab beetle, monkey, and scorpion (Watrous 2021: 48). Collectively, archaeological evidence from Crete demonstrates that by the end of the 3rd millennium BC interactions networks existed across broad geographies and the communication of social differences via adornments were common.

In the eastern Mediterranean, in modern Syria, by 2500 BC the local landscape was dotted with fortified cities. Excavations at Ebla (modern Tell Mardikh), Habuba Kabira, and others have yielded public architecture, storage facilities, burials with varied volumes of foreign and highly stylized goods, abundant art, tablets with writing, and finely worked metals and artisanal crafts (Akkermans and Schwartz 2009: 227-228, 233). At Ebla, excavations of a palatial structure produced caches of lapis, other foreign materials, and 17,000 cuneiform tablets. The recovery of large amounts of lapis at Ebla is important because its source is eastern Afghanistan, almost 3,000 kilometers away. In addition, alabaster and a vessel with an inscription of King Pepi I indicate long-distance interactions with Egypt, while cylinder seals and other iconography demonstrated connectivity with Mesopotamia (Ibid.: 240-241). The Ebla tablets provide both details of how the site administratively functioned as well as evidence of royal wealth and labor specialization. The archives detail thousands of specialized professions, how food was rationed to various residents, and the importance of sheep, surplus wool, and textile production (Postgate 1994: 58). They mention imports from Egypt, Anatolia, and Babylon that included animals such as the “fat-tailed” sheep of Hassuwan, stone objects, jewelry, bronze and copper axes, gold, ivory, and fine textiles (Biga and Steinkeller 2021: 10, 21, 31-46; Winters 2019: 321). The tablets also provide insight into trade, tribute, and diplomatic relations among elites that presided over multiple locations throughout the Tigris and Euphrates. Similar to the Mari archives which mention the use of siege towers in battles, the Ebla tablets include references to battering rams, demonstrating that conflict and warfare were not uncommon in this period (Postgate 1994: 252). And, translations demonstrate that leaders at Ebla were interacting and coordinating exchange activity with other leaders across a large geographical area, including Nagar (Tell Brak) in the Khabur region (northeast), Mari and Carchemish on the Euphrates, and Aššur in the east (Van De Mieroop 2007: 54).

Early Bronze Age Anatolia

Late Chalcolithic period excavated material and associated analyses are very sparse in central Anatolia primarily due to academic emphases on other periods and deposits being buried under later sequences (Schoop 2011: 166). Even with this limited data, many researchers believe that state societies formed on the plateau during the 4th millennium BC, when "…clusters of sites emerged centered around larger settlements like Alişar and Çadır" (Sagona and Zimansky 2009: 170). Similar to other regions across the Anatolian peninsula, the first three hundred years of the 3rd millennium BC displayed a contraction in site size that remained relatively static until the middle of the period (Ibid.: 198; Gorny 2002: 109-136). Then, by about 2500 BC, "centers" re-emerged; ceramics, small finds, and building structures attest to cross-cultural interactions over long distances. In certain locations throughout the peninsula, new hierarchical socio-political structures, intensified craft specialization, and new metallurgical and stylistic technologies appeared (Ibid.: 199; Yener and Vandiver 1993: 207-238; Yener 1994, 2000). Given the relatively sparse data from the central region upon which only preliminary inferences may be drawn, it is essential to include other parts of Anatolia to more fully grasp the dynamics at play during the EBA.

Numerous sites across Anatolia date to the Early Bronze Age, and approximately fifty of them contribute, in varying degrees, to our understanding of the period (Figure 1). The landscape is variegated, and scholars have categorized sites in many different ways, often by sub-geography with some additional organizational criteria. For example, Çevik (2007) suggests, based on site distribution and size alone, that EBA Anatolia had three different types of socio-political structures concurrently operating: a) urban centers that controlled the hinterland through a well-developed administrative paradigm (southeast), b) centralized authority that had some measure of control over their peripheral areas (central and west), and c) rural landscapes possessing little or no hierarchical evidence (eastern highlands). Due to the intricacies and borders of social, symbolic, and physical landscapes, the late stages of the EBA in Anatolia are reviewed here by geographic clusters (after Yakar 2011: 56-93). That said, Kaman-Kalehöyük aligns within Çevik's paradigm b) above, as a rural and peripheral site likely attached in some fashion to a centralized authority that held some sway over Kaman-Kalehöyük and other surrounding locales. The following synopsis is dense due to the range of developments that took place throughout Anatolia at this time. The intent here is not an exhaustive site level review of the entire Anatolian peninsula, but rather a demonstration of the complexities under which Kaman-Kalehöyük operated, both in its more immediate environs in central Anatolia, and in adjacent regions that were likely interacting with Kaman-Kalehöyük and/or nearby sites.

Already by the 4th millennium BC, Local Late Chalcolithic (LLC) sites in southeast Anatolia showed a wide range of variability in terms of politico-economic organization compared to sites in north Syria and northern Iraq (such as Tell Brak, Tell el-Hawa, Hamoukar, Tell Barri, Tell Leilan, and Hammam-et-Turkman). While Syrian and Iraqi sites were very large, 15-50 hectares, relative to "centers" in southeast Anatolia, 2-4 hectares, the LLC in southeast Turkey has been characterized as having: a) two levels of site size, b) regional centers with attached satellite locations, c) monumental architecture, d) metallurgical skill using copper and silver, e) complex administrative technology displaying consistent animal motifs, and f) both mundane and more valued raw materials secured through long-distance exchange activity (Stein 2005: 165). Though these smaller Anatolian sites interacted with the much larger, and more urban southern Mesopotamian center at Uruk, as Algaze (1989b, 1993) has articulated, there is no evidence for militaristic or other coercive activity. Small southern sites in closer proximity to Uruk and Susa, however, did not enjoy the same balanced relationship with the southern centers (Stein 1995: 166-169). The lack of raw materials coupled with large upstream distance between southern Mesopotamia and southeast Anatolia – some 1200 kilometers – likely created a "leveling effect" (Ibid.), which contributed to creating a peaceful equilibrium between the two long-distance exchange partners. This "leveling effect", which counterbalanced any disparity in military or ideological power, was likely not only a contributing factor to maintaining peaceful relations between Anatolia and southern Mesopotamia in the 4th millennium BC, but also in later periods like the early stages of the 2nd millennium BC.

Throughout ancient Anatolia, during the later stages of the EBA, different sub-regions displayed diverse archaeological patterns in which change, iteration, and non-linear trajectories were constant. Depending on the location, evidence shows both contraction and expansion of site sizes; different settlement layouts; ceramic types and sequences that indicate movement of goods, if not people; heterogeneous socio-political and techno-economic development across the peninsula (e.g., wheel-made pottery appeared in West Anatolia around 2500 BC, though it was present a millennium earlier in the southeast); and the existence of well-established, long-distance interaction networks (Sagona and Zimansky 2009: 175-177).

By the 3rd millennium BC, archaeological evidence shows that large scale societies throughout Anatolia were increasingly interacting in interregional exchange spheres which stretched "…into the Aegean and southeastward to northern Mesopotamia and beyond" (Steadman 2011: 251). At this time, west Anatolian drinking cups, tankards, and spouted jugs were found in the East; and, Syrian bottles, wheel-made plates, and more exotic tableware found their way north of the Taurus Mountains (Sagona and Zimansky 2009: 177, 199).

In terms of site size, by the end of the 3rd millennium BC. on the central plateau, where Kaman-Kalehöyük is located, survey data suggests the emergence of centers across the landscape that reached over 10 hectares (e.g., see S. Omura 1996: 135-192). This is important because sites of this size were found in Egypt and Mesopotamia more than a millennium earlier, indicating that either larger sites in central Anatolia have yet to be uncovered or that they appeared later than in other locations. A few potential outliers are Acemhöyük, Alacahöyük, Alişar, and Kültepe-Kanesh (#18, #20, #21, and #23 in Figure 1, respectively) which grew to be 30+ hectares by EBA's end. Some scholars argue that these estimates require more study since their EBA sizes have been imputed based on later occupation levels (Çevik 2007). At these four locations, scholars have cited fortification walls and clearly defined residential, industrial, and administrative sectors, suggesting the blossoming of hierarchical structures both within and across regions and sites. By the end of the EBA, the emergence of these larger sites, along with substantial public architecture, all point toward the local development of differentiated rank, wealth, and social roles (Yakar 2011: 69).

Given the relatively limited range of excavated EBA material in the central region, evaluation of the EBA occupation at Kaman-Kalehöyük is valuable for multiple reasons. First, at a maximum expanse of 6 hectares, and potentially less than 6 hectares in the EBA, Kaman-Kalehöyük is smaller than all other sites that have driven our understanding of the EBA on the plateau. It thus will help us better understand settlement patterns. Second, Kaman-Kalehöyük's location is situated in a more rural area than the other sites; it's in the far western reaches of the Red River, thereby adding geographical diversity to our data. Third, Kaman-Kalehöyük is one of the few excavated *and* published mounds, which supports the existence of a multi-tiered site size hierarchy in the north central Anatolian EBA. Data from Kaman-Kalehöyük will add to our understanding of how sites in the region were connected, and how interaction networks were designed in the EBA. And fourth, Kaman-Kalehöyük will contribute critical data necessary to balance what we know from much larger, and presumably more urban sites that were likely comprised of fewer food producing residents.

In addition to much more hierarchical settlement patterns and expanding exchange spheres, during the EBA there was a substantial increase in the volume and finer stylistic complexity of metal objects, as Anatolians ramped up the exploitation of their mineral and ore- rich lands (Dardeniz G. and T. Yıldırım 2022; Yener 2000). Highly stylized objects were crafted not only in bronze, but also in silver, gold, and electrum, furthering practices already begun in the 4th millennium BC (Sagona and Zimansky 2009: 206). For example, during this period at sites such as Alacahöyük and Horoztepe (#20 in Figure 1) on the north central plateau, we find fine metal crafting, such as inlay work, closed castings, hammering, and filigree, as evidence of specialization of labor, which in turn suggests social differentiation (Ibid.). We also see a rise in the number of recovered bronze pins (presumably used to secure cloaks), which may indicate a change in clothing types or styles. And, the increased volume of spindle whorls and loom weights at Troy (#2 in Figure 1) suggests some measure of centralization and specialized production activity, in at least the West part of the peninsula (Ibid.: 211).

EBA caches of prestige items and differentiated mortuary patterns further substantiate that at least two-tiered social hierarchies in most, if not all, Anatolian regions existed. No fewer than five different types of burials have been identified in EBA Anatolia; they range from earthen pits (roofed and without roofs) to chambered tombs to ceramic pithoi (Rankin 1997; Sagona and Zimansky 2009: 212). In the West, extramural cemeteries are consistent across more than fifteen sites, with deliberate tomb positioning oriented on an east/west axis, with similar ceramic types, and occasional prestige goods. Perhaps a linked ideological tradition between west and central Anatolia is the ritual presence of oxen in human burials at Demircihöyük (#6 in Figure 1) and Alacahöyük (#20 in Figure 1), with the craniums of the human skeletons pointing eastward. Alacahöyük presented fourteen tombs (similar to the northwestern Caucasus Maikop culture, and discussed more below) which contained a range of some seven hundred goods, spanning metal, stones, pottery, bone, and textiles. Of note, four types of burials were identified at Alacahöyük: those primarily with tools, those with mace heads and weapons, those with only ceramics, and those with nothing (Gürsan-Salzman 1992: 91, 108-111, 150). This variation suggests distinction in labor activities, if not social hierarchies and social inequality. Further to the north in the Black Sea region, earthen pit burials are common, and contain various bronze items as well as luxury goods, all of which are unevenly distributed, also suggesting social inequality. At

Arslantepe (#46 in Figure 1) on the Malatya plain, a stone cist tomb containing more than seventy metal objects was dated to the EBA. This find is important because, in addition to the prestige goods that were found (jewelry, weapons, ceramics, tools, etc.), four adolescents were also identified, perhaps sacrificed as part of a death ceremony. Unfortunately, to date, no EBA burials have been uncovered at Kaman-Kalehöyük. What we do know, however, from this abbreviated compendium, is that in the areas surrounding Kaman-Kalehöyük, and likely interacting with Kaman-Kalehöyük or sites in close proximity to Kaman-Kalehöyük, a range of social structures, hierarchies, and ideologies were operating concurrently, presenting a complex sociopolitical landscape that likely influenced the trajectory of Kaman-Kalehöyük both directly and indirectly.

Early Bronze Age Anatolian Regional Summaries

In the southeast, after a contraction of site size in the first half of the 3rd millennium, centers and then cities began to emerge around 2500 BC; large sites like Samsat (10 hectares; #44 in Figure 1), Titriş (43 hectares; #42 in Figure 1), and Kazane (100 hectares; #41 in Figure 1) suggest a three-to-four-tiered hierarchy based on size alone (Algaze, Greenfield, et. al. 2021: 3-5). In the surrounding areas, other sites may be divided into three clusters: 5-15 hectares, 2-5 hectares, and less than 2 hectares. While these sites may have been drawn into the Akkadian Empire, still unknown is just how much outside influence impacted local change. Titriş, for example, is not only large, but possesses both an upper and lower town, with an extramural cemetery, terracing, wide streets, sewers, standard plan houses, a massive fortification wall, and large public buildings in both upper and lower areas (Algaze, Greenfield, et. al. 2021: 3-4, 13). Furthermore, houses in the inner town are larger than the outer town, and evidence of textile, wine, and Canaanean blade production all suggest social differentiation and labor specialization (Ibid.: 14-22; 28-33). Interestingly, recent comparisons of faunal remains from each "neighborhood" yielded potential differences in disposal patterns. Suggesting a correlation between social differences and different levels of cleanliness, researchers found that fauna in the inner (lower) town were rarely found in interior structures, but commonly recovered in outer town interior structures where cattle bones and domestic donkeys were disposed of in much higher proportions, and wild fauna (mostly rodents) were prevalent (Ibid.: 44-50). Lastly, during this time, regional ceramic assemblages included horizontal reserved slip, Karababa painted ware, and also metallic ware – all styles that were almost non-existent by the later stages of the EBA (Ibid.: 30; Algaze and Matney 2011: 1006). These trends are important to this study because they place more emphases on the likelihood of large-scale change at the local level by the onset of the 2nd millennium BC.

In the east, north of the Taurus Mountains, two different settlement patterns have presented themselves. The eastern highlands yielded small, 1-2-hectare sites, while EBA occupations in the upper Euphrates Valley, at both Norşuntepe (#49 in Figure

1) and Arslantepe reached about 3-4 hectares. Norşuntepe, on the Altinova Plain, reached its peak from 2500-2000 BC. During this time, three building levels associated with a "palace" complex were found on the top of the mound, although no ceremonial evidence was uncovered (Sagona and Zimansky 2009: 186). In Level 6, a seventy-meter-long storeroom was found across the site's apex, and the *in situ* storage jars found therein suggest not only economic importance of this structure and location, but also a more coordinated administration and specialization of labor. Still further east, into the highlands, at sites like Sos Höyük (#54 in Figure 1), while traditions of the Kura-Araxes culture continue, the site appears to be heavily influenced by the Trans-Caucasus. Multi-roomed houses, fine and incised ceramics, and the introduction of "kurgan" (Ibid.: 190) burials (those containing precious metals) characterize this area. Overall, the east displays a mixture of local development and influence from interactions with other societies, though evidence of interactions with Mesopotamia has not been uncovered.

To the west, sites like Troy and Karataş (#10 in Figure 1) reached 5-10 hectares, while Beycesultan (#8 in Figure 1) grew to be 30-40 hectares. For most of the EBA, there were no noteworthy changes in ceramic sequences that would indicate the introduction of new influences or substantial numbers of new people in this region. At Beycesultan, however, there was a shift from fine and small to heavy and large handmade ceramics, and excavators also noted the emergence of "shrines" in Levels XIX-VII (Sagona and Zimansky 2009: 197; Türkteki 2020a and 2020b). Additionally, at Karataş, around 2500 BC, a megaron-like structure appeared at the top of the mound overlooking the site; this likely represented local socio-economic differentiation and that at least a two-tiered social hierarchy existed. In the northwest, at Troy, in the Troy-II phase, roughly dating to 2600-2300 BC, reinforced and gated fortification walls were found, along with large public architecture (e.g., megaron buildings up to 40 meters long) at the center of the citadel, along with a lower town (Rose 2013; Sazcı 2005; Ünlüsoy 2006). The emergence of new wheel-made pottery types (Jablonka 2011: 719), hordes of objects made of gold, silver, electrum, carnelian, lapis, and bronze[7] (including "Priam's treasure") (Easton 1994), and evidence for metal-working (Tolstikow and Trejster 1996), all suggest a great deal of change took place at the site. In Troy III-V, approximately 2300-1750 BC, while poorly documented by Heinrich Schliemann and his excavation team in the 19th century (Jablonka 2011; Rose 2013), we learn of an increase in wheel-made pottery and red-slipped ware, and that houses seemed to be crammed together on the citadel, though with a different spatial orientation from earlier periods. By Troy V, after a period of contraction, it appears site growth was rekindled since residences were once again found in a lower town (Steadman 2011: 241). Of special note, coinciding with the end of the purported Old Assyrian presence in Anatolia, Troy VI represented a time of prosperity in terms of site size, replete with fortification walls, near-palace-sized structures, and a gated extramural cemetery approximately five hundred meters from the citadel (Jablonka 2011: 721-722). Overall, archaeological patterns in the northwest

[7] Although spread across a few periods at Troy, more than 10,000 ornamental items were identified, which included diadems, bracelets, hair rings, beads, earrings, and necklaces (Easton 1994).

part of Anatolia demonstrate the development of more localized styles. The evidence from this area is important to this study because it underscores the fact that sociopolitical trajectories in some locales align more to local models of development versus more interactional archetypes, the latter of which often place primacy on external influence.

Central Anatolia, where Kaman-Kalehöyük is located, is generally divided into northern and southern sub-regions based on whether a site is located either north or south of the Kızıl Irmak (also known as Halys, or Red River). While in the past five years more research has been conducted in the central plateau, compared to other Anatolian regions there are still relatively few comprehensive published accounts, thereby placing additional value on the descriptive archaeological value of this study (Steadman, McMahon, Arbuckle, et. al. 2019: 29-30). On the north central Anatolian plateau, the most well documented sites are Alişar, Alacahöyük, and Çadır Höyük. Alişar has long been used as the region's ceramic typological site, Alacahöyük is well-known for its "royal tombs", and Çadır Höyük (#22 in Figure 1) for its public architecture, evidence for specialized production, and its long-distance interactions with Transcaucasia and Arslantepe from the 4th millennium BC onward (Steadman, Hackley, Selover, et. al. 2019: 281 and Steadman, McMahon, Arbuckle, et. al. 2019: 29-30). In the south-central region, occupations at Tarsus (close to #16 in Figure 1) and Kültepe-Kanesh, along with work done at Kestel/Göltepe (#24-25 in Figure 1), form the foundation of our current understanding.

Alişar, approximately 150 kilometers to the east of Kaman-Kalehöyük, was excavated by Von der Osten in the 1920s and 1930s. Periods were labeled as Chalcolithic, a transitional Copper Age and Early Bronze Age, but the ceramic sequences associated with them were not quite as clear and were drawn from a limited excavation area. Nevertheless, in the later EBA stages, excavators found a three-meter-wide wall (fortification?) that included two towers that rose above a paved gateway area. This gateway area was preceded outside the wall by an angled pathway, rendering it impossible for anyone to easily or directly approach the gate. Ceramics were mostly handmade and of carinated bowl style (von der Osten 1937: 230-247); however, included in many of the later layers were finer styles that continued earlier traditions of geometric patterns (chevrons, zig-zags, and lozenges painted in purple-brown). Lastly, occasional Syrian “bottles” (Ibid.: 43) found there, at Kültepe and Tarsus – each a few hundred kilometers away – suggest Alişar’s participation in an EBA inter-regional interaction or exchange network. Von der Osten’s findings at Alişar are important to the study of Kaman-Kalehöyük for at least three reasons. First, some evidence suggests the existence of rival competing polities on the plateau. Second, small finds reflect some measure of long-distance contact with non-local groups. And third, in spite of the small finds found at the site, Alişar demonstrates continuity in local ceramics styles, suggesting deeply rooted local traditions.

Alacahöyük is widely known for its remarkable tombs, which most scholars now generally agree date to the later stages of the EBA (Gürsan-Salzmann 1992). Of the nineteen burials that have been uncovered, fourteen were dubbed elite because of their construction and associated artifacts (Yalçın and Yalçın 2013: 38-49). For example, several of the burials contained individual bodies, were stone lined, and then covered with wood. Atop the wood were disarticulated animal remains perhaps suggesting some type of sacrifice, feast, or ceremonial activity. Other artifacts found in the tombs included weapons, metal vessels mixed with ceramics, human figurines, standards with animal (bull and cervid) and geometric motifs, and jewelry (gold, silver, electrum, bone, iron, clay, stone, etc.), together suggesting the presence of at least a two-tiered social hierarchy. Other sites in the north central region, such as Horoztepe (#37 in Figure 1), Kalıncaya, and Koçumbeli-Ankara, among others, have yielded extramural cemeteries with “luxury” goods as well, further substantiating the presence of multi-tiered social hierarchies on the plateau in the EBA, and a clear elite class (Ayten and Atakuman 2023: 2, 9; Steadman 2011: 246-247). Lastly, more recent EBA excavations at Çadır Höyük (#22 in Figure 1) uncovered a large stone gateway associated with a one-meter-wide enclosure wall. In addition, the site has yielded: courtyards, non-domestic architecture such as the “Burnt House,” and sizable concentrations of spindle whorls, stone debitage, hearths, and scattered grains throughout the courtyards (Gorny 2002). Taken together, this evidence supports the existence of large local centers with substantial populations, specialized and local craft production on a much bigger scale, and a class of people that were unlikely to be directly engaged in food production.

The south-central region is unfortunately still less well understood than its northern counterpart. Tarsus, nearly four hundred kilometers south of Kaman-Kalehöyük (and 200 km south of Kültepe-Kanesh), between modern day Mersin and Adana close to the Mediterranean coast, is technically in classical Cilicia, but serves as a reference site. In addition, more limited information about the EBA in this region may be gleaned from Kestel/Göltepe as well as Kültepe-Kanesh.

The Cilician site of Tarsus serves as a critical link between Anatolian and Syro-Mesopotamian ceramic sequences. In the EB-I layers of the site, archaeologists found red, gritty, handmade Anatolian wares including beak-spouted pitchers; these types replaced the pale wheel-made Syro-Mesopotamian Amuq G ceramics as main household containers. In the EB-2, Tarsus expanded; we see mud-brick fortifications, neatly organized residential units positioned on streets, and the presence of tin bronze objects. Pottery during this time is varied, representative of interaction spheres that included multiple cultural traditions. For example, from Niğde and Konya (175 and 325 kilometers away, respectively) came buff-colored hand-made pitchers with rising spouts, handled jars, and bowls painted with purple designs (Sagona and Zimansky 2009: 199-200). Red and black streaked burnished containers in Cilicia reflect contact with Cyprus, which is at least 150 kilometers in maritime travel. Goblets and bottles from western Anatolia, and two-handled drinking cups, tankards, and red-slipped platters from Troy, demonstrate the movement of ceramic traditions over 1000 kilometers away. And, Cilician ware was found in Dynasty IV grave goods at Giza, which is almost 2000 kilometers by land, confirming contact with Egypt. In sum, these ceramic findings Illustrate that far-reaching interaction networks were already in full swing during the Early Bronze Age. As such, archaeological data strongly suggests that in the EBA – well before exchange activities between Anatolians and Assyrians were chronicled in cuneiform tablets – Kaman-Kalehöyük, or nearby sites that Kaman-Kalehöyük may have been attached to in some fashion, operated within a large interconnected world that was already communicating via established supra-regional and multi-cultural interaction networks.

At Kültepe-Kanesh, (#23 in Figure 1), levels 13-11 on the main mound date to the EBA, while level 10 coincides with Karum IV in the MBA, when interactions with Mesopotamia supposedly intensified. By the EBA late stages, ceramics suggest that Kültepe was in contact with Syria (~ 500 kilometers away), other parts of Anatolia, and Cilicia on the Mediterranean coast (Lloyd 1967: 40-41). In the latter stages of the 3rd millennium BC, or EB-III period, a new ceramic style was identified at Kültepe-Kanesh; excavators began to find a bright ornamental “Cappadocian” pottery with multi-colored designs among the more simple-designed burnished monochrome local types. Corrugated wheel-made cups from Syria were found, along with “Syrian bottles”; locally made imitation drinking cups painted with red stripes (hearkening Alişar ware from 170 kilometers north; #21 in Figure 1); as well as wheel-made cups similar to late Cilician styles (~300 kilometers south; #16 in Figure 1). In addition, we also see the development or adoption of the “megaron” architectural style; here, a large rectangular building with smaller rooms on both sides, containing a circular hearth in the center surrounded by four wooden posts. This architecture is similar to that found in the EBA layers at the southwestern Anatolian site of Beycesultan (#8 in Figure 1), about 500 kilometers west (level VIII). Last, the identification of Anatolian specific idols, including a seated goddess and more abstract disc-like bodied forms, began to appear in new grave types, indicating ceremonial activity, specialization of labor (minimally crafting and religious roles), and the existence of local ideological traditions. In combination, evidence from Kültepe is consistent with the existence of a locally inspired EBA hierarchical social structure, Anatolian ideological traditions, and a far-reaching inter-regional interaction network.

Yener’s (1994) work related to the Kestel mines and Göltepe, a site two kilometers from Kestel where she contends the Kestel miners lived and processed ores (#24-25 in Figure 1), focused on metallurgical advances that took place in the EBA. At Göltepe, Yener found furnaces, storage jars with metal nodules, pits with metalworking refuse, crucibles with tin residue, and powdered ore with tin content in measuring cups (Yener 2000: 104-105). At a minimum, the processing site of Göltepe demonstrates specialization of labor and large-scale centralized metallurgical activity, both further indicating the production of surpluses, and suggesting the existence of, and their participation in, a wider exchange network during the EBA. The size of Kestel is impressive; scholars have estimated that 4,500 cubic meters of ore were extracted from the mines which some posit could produce around 115 tons of tin (Sagona and Zimansky 2009: 201). Kestel tin was mined, most likely, throughout the Early Bronze Age until it was exhausted, thereby prompting Anatolians to seek tin elsewhere, hence, the potential desire to procure tin from the Old Assyrians in the early stages of the 2nd millennium BC. What is unknown and remains unproven, is whether Göltepe was influenced, controlled, or impacted by foreign populations that may have taken residence in Anatolia. Without supportive archaeological evidence, a conservative approach suggests locally focused decision-making, control, and any exchange activity associated with these resources.

During the EBA in Anatolia, and especially in its final 300 years, plentiful archaeological evidence in the form of site size, site layout, burial patterns, architectural, metallurgical, and ceramic changes is consistent with the existence of long-distance interaction and exchange networks, expansionist activity, fractionalized and fickle local political landscapes, indigenous social stratification, and specialized professions. While excavated remains demonstrate cross-cultural interactions with large scale societies across great geographical expanses, no indication exists that cross-cultural interactions alone were the catalyst for local sociopolitical or economic change. Rather, multiple lines of evidence, predating the expression of Assyrian cuneiform texts on the plateau, point toward a more focal model of development, whereby local polities, following their own agendas, continued their own trajectories toward still more hierarchic structures.

Early Bronze Age Mesopotamia: Oscillations and Analogue

Last, to more fully contextualize the Early Bronze Age in Anatolia, I provide an overview of the sociopolitical undulations that took place in both southern and northern Mesopotamia from the 6th to the 3rd millennium BC, where multiple pendulum swings transpired related to expansion/contraction of interaction spheres, and later, the consolidation/fragmentation of city-states. Also, as a thought-provoking analogue to the Anatolian-Assyrian interactions of the 2nd millennium BC, I include in this section additional discussion related to the archaeological considerations and interpretive challenges associated with the proposed Uruk expansion into southeastern Anatolia during the 4th millennium BC.

In northern Mesopotamia, the 6th millennium BC roughly coincides with the arrival of the Halaf pottery tradition found at “virtually all Early Chalcolithic sites in southeast Anatolia and beyond – into the Keban area, the Lake Van region, as well as the Cilician coast…[though higher concentrations were found at sites located in modern day]…northern Syria and Iraq” (Özbal 2011: 177-178). During this time, however, there were wide-ranging regional variations in ceramic assemblages (Ibid.), and site sizes that spanned from seasonal camps (Bernbeck and Pollock 2003) to large sites of 10-20 hectares (Algaze 1989; Bernbeck, Pollock, Coursey 1999; Campbell, et. al. 1999), all suggesting the coexistence of local autonomous groups and multi-tiered hierarchical locales.

In similar fashion, in the 5th millennium BC, a new ceramic influence from southern Mesopotamia, called the Ubaid, began to appear alongside Halaf ware, across northern Mesopotamia and into Anatolia. Ubaid ceramics have been found as far north as Kayseri in the central region of modern-day Turkey, as far west as Mersin on the Mediterranean coast of Turkey approximately at the east/west midline, and east of the Tigris, which runs through ancient Nineveh, or modern-day Mosul (for a multitude of references, see Özbal 2011: 183). Considerable debate continues as to how the Ubaid ceramic styles became so widespread among the presumed different cultures associated with the highly variable architectural types found across regions, and still greater debate regarding the extent of the Ubaid influence on the societies of northern Mesopotamia (Oates and Oates 2004; Gürdil 2005; Stein and Özbal 2007). Regardless, one fact pervades, Ubaid wares and/or the knowledge and ability to replicate them were moved or communicated by people who either physically or symbolically traversed a broad geographical area.

While the sixth and fifth millennia demonstrate the geographical expansion of ceramic styles, coupled with wide debate regarding the possible impact on groups of people outside of Mesopotamia, perhaps most germane to this study is the southern Mesopotamian phenomenon of the latter half of the 4th millennium BC, often referred to as the Uruk Intrusion (Akkermans and Schwartz 2009: 181), or the Uruk Expansion (Algaze 1989b and 2008: 68; Stein and Özbal 2007). Recognizing that the 4th millennium BC Uruk expansion involved a southern Mesopotamian prehistoric primary state with substantial archaeological evidence whereas the 2nd millennium Assyrian exchange expansion involved a northern Mesopotamian historic secondary state with substantial textual evidence, a review of the academic discourse surrounding the Uruk expansion adds value to this study for several reasons. First, along with the Old Assyrian Period in the MBA, the Uruk period is the only other time where some archaeological evidence suggests that Mesopotamian states may have established (seasonal) occupations "…in the midst of indigenous polities in Anatolia, Syria, and Iran" (Stein 2005: 154). Second, scholars have attempted to apply similar interpretive constructs to both the Uruk expansion and the interactions between the northern Mesopotamians and central Anatolians in the 2nd millennium BC (Ibid.: 143-171). Third, both periods present evidence for Mesopotamian long-distance travel from their respective metropoles to secure certain raw materials (Algaze 1993: 82-83; Larsen 1976: 86-89). Fourth, the archaeological issue of determining foreign "presence" versus "influence" or "expression" applies to both periods. Fifth, despite nearly a two-thousand -year gap, both periods in different ways exhibit the intensification of far reaching, large-scale, high-volume interaction networks between different societies with distinct languages and customs (Larsen 1976: 90; Stein 2005: 147). And finally, both periods of proposed expansionist activity seemed to have taken place within fraught political landscapes full of competing factions, perhaps indicating that, in the ancient world, more entrepreneurial exchange activity took place during times of fledgling allegiances, or lower levels of authoritative regional control and/or centralization. Overall, Stein (2005: 156) has suggested that the Old Assyrian textual accounts regarding the mechanics of long-distance resource procurement in the Middle Bronze Age are a valuable resource for explaining the Uruk expansion and its associated socio-political structure.

I suggest, however, a recursive relationship, where study of the Uruk expansion and its associated archaeological lines of evidence is valuable as a complement to, and test of, the pervasive primacy placed on philological interpretation of the Anatolian – Assyrian long-distance activity of the 2nd millennium BC (Heffron 2021; Schlüter 2020). Though the corpus of literature concerning Uruk expansion has grown immensely in the last three decades, some of the foundational issues and perspectives remain debatable and may help advance the theoretical discussion related to the 2nd millennium BC when texts suggest that exchange activity between the central Anatolians and Old Assyrians intensified.

Table 1. Hypothesized Anatolian Exports to Mesopotamia.

Category	Type	Evidence	References
Labor	POW/Slaves	None	Algaze 1993
Food	Herd animals	None	Bates and Lees 1977
Wood	Timber	None	Rowton 1967
Metals	Copper	Eanna IVa-III	Lenzen 1958
	Copper lumps	Warka	Heinrich 1938
	Silver	Riemchengebäude	Lenzen 1958
	Gold	White Temple	Heinrich 1937
Stone	Lapis lazuli	Susa & Warka	Hermann 1968
	Steatite/Chlorite	Warka vessels	Kohl 1978
	Carnelian/agate	Sammelfund/Warka	Steve and Gasche 1971
Other	Bitumen	Warka buildings	Heinrich 1937
	Flint	Riemchengebäude	Eichmann 1986

The expansion and system of interaction that subsequently developed, according to Algaze (1993: 82-83), was established to gain access to valuable raw materials and goods, and it was accomplished through the establishment of Uruk residences at various enclaves, stations, and outposts outside of the southern Mesopotamian heartland. In Algaze's estimation, an asymmetrical exchange system served as a catalyst for the development of Uruk city-states, Uruk expansion, and the origins of Mesopotamian "civilization". He concluded that: a) "gateway communities" were established only to control the flow of resources and communication, not to politically dominate others, b) resources were controlled by local communities that were willing to engage in exchange networks, and c) the goods sent to southern Mesopotamia along established exchange routes included essential unprocessed resources necessary for day to day operation of a hierarchic social organization, which lacked material for making both utilitarian and more elite items. Supporting hypotheses for the cross-cultural long-distance interactions and exchange that took place during this period, scholars such as Algaze (1993: 82-83) and Stein (2005: 145) have cited a wide range of exports that were sent from Anatolia to Mesopotamia, though evidence in Table 1 varies.

Clearly, the excavation of southern Mesopotamian archaeological remains at northern Anatolian sites demonstrated some sort of interaction (direct or indirect) between the alluvium and the highlands, but some scholars have argued that shared assemblages at sites with Uruk styles indicate foreign presence, and similar administrative and economic practices (Algaze 1993). However, rather than automatically assuming that non-indigenous material remains found outside of its homeland is indicative of the “presence” of a foreign population, we must also consider alternatives such as gift or commodity (barter) exchange; an indigenous system of centrally controlled exchange with some measure of southern collaboration; private entrepreneurship, where savvy individuals not necessarily attached to any “center” or city-state were exchanging goods between sites (Algaze 1989b); or various emulative schemes (Mesoamerican Oaxacans in Flannery and Marcus 1983) via import or imitation. Other possibilities for the expression of Mesopotamian artifacts at Anatolian sites may include extant southern refugee communities within local contexts. Notwithstanding decades of debate as to the true nature of why or how Mesopotamians ventured so far into the periphery of their axis mundi (Helms 1988: 4), evidence is consistent with the emergence of large-scale interaction and exchange networks around 3700 BC. What we don't know is whether these interactions, lasting until the onset of the 3rd millennium, were motivated by the development of the state and elite domination, the need for raw materials, the display of foreign goods as symbols of power, the result of enterprising actors of exchange or a combination of these factors. We have the same open questions related to the motivations of more intensified 2nd millennium BC interactions between the Anatolians and Assyrians.

By the end of the 4th millennium BC, Uruk sites and Mesopotamian expansionist activity, along with their proposed enclaves, stations, and outposts to the north were suddenly abandoned (Stein 2005: 147). A new sociopolitical landscape emerged, and in southern Mesopotamia, the Early Dynastic Period (2900-2350 BC), with its multiple independent city-states that initially formed in the 4th millennium BC, increased in size and number. This period also saw the further development of far-reaching exchange networks, the appearance of fortification walls, and shifting alliances (Postgate 1992: 45). Although southern Mesopotamia was well suited for agriculture and animal husbandry, it lacked raw materials such as stone, metals, and minerals. The presence of Dilmun beads (Persian Gulf area; see Postgate 1992: 209), Indus Valley seals, Anatolian obsidian, and lapis lazuli from Badakhshan (modern Afghanistan), as well as gold, silver, and chlorite, provide evidence of far-reaching inter-regional contact and exchange (Larsen 1987: 51; Stein 2005: 149-151). In addition, metal-working was highly developed (Aruz 2003), and the Royal Cemetery at Ur yielded musical instruments adorned with precious metals (Woolley 1933). During this period, the volume and stylistic variation of cylinder seals increased as well, suggesting more exchange activity inclusive of an increasingly broader spectrum of cultures.

With the end of the Early Dynastic Period, the Akkadian Empire (2350-2100 BC) and Ur III dynasty (2112 to 2004 BC) close out the 3rd millennium BC. The Akkadian Empire period represented a time of consolidation of multiple city-states, introduced realism into art (Frankfort 1970), produced poetry (Sjoberg 1975), and relegated the Sumerian language to ceremonial realms in favor of Akkadian as the common vernacular (Woods 2006). Around 2150 BC, the Empire fell due to economic distress, civil battles, and the invasion of the Gutians, thusly fragmenting north and south Mesopotamia. Finally, the Ur III dynasty witnessed standardization and codification of administrative processes, (including archival, tax, and calendar protocols), land division into provinces ruled by local governors, tributary tax (*bala*) collection, slave and migrant labor, the authorship of laws, state run textile production, centralized agriculture, and Sumerian texts became commonplace.

Overall, for millennia, Mesopotamia, like contemporary large-scale societies such as those in Egypt, went through a series of political consolidation and fragmentation cycles; it also experienced an expanding interaction network across many societies, although fluctuations in contact spheres with them were not necessarily continuous or linear. For example, while Uruk exchange seems to have occurred via residences of only loosely state controlled Mesopotamian entrepreneurs within local sites, and included a wide range of goods, focus in the 3rd millennium shifted to bulk commodities, and seems to have included participants from "…palace, temple, and private sectors of Mesopotamian society…" (Stein 2005: 148-149; Adams 1974). These trends are relevant to this study because, despite being heterogeneous societies, each with its own set of unique stimuli and strategies, it's clear that variable intensity in long-distance travel, interaction, and exchange were commonplace in southwest Asian societies before the 2nd millennium BC.

The Middle Bronze Age: 2000 to 1700 BC

"Primarily then we must infer that the Assyrians on their arrival in Anatolia did not enter a cultural void. They found themselves among a pattern of well-developed city communities with a pronounced character and long-established traditions of their own" (Seton Lloyd 1967: 54).

The period following the EBA, the Middle Bronze Age, though commencing at different times in different places, was characterized in some areas by extensive written documents, expansionist activity, strong kin-based economic activity, and mostly fractionalized political landscapes. Based on review of archaeological evidence from the Early Bronze Age, Seton Lloyd appears to have gotten it right – the appearance of Old Assyrian cuneiform tablets on the central Anatolian plateau in the 2nd millennium BC coincided with a kaleidoscope of hierarchic territorial city-states, each with their own unique politico-economic permutations and archaeological manifestations. During the EBA, Anatolia was anything but an unpopulated landscape or an amalgamation of stunted economic growth and sociopolitical structures. Quite to the contrary, large centers existed, and local styles survived for hundreds of years amidst dynamic regional landscapes, many of which underwent multiple episodes of expansion and contraction as rival factions jockeyed for physical and/or ideological power. By the 2nd millennium BC, politico-economic and social change on the plateau was common, repeatedly catalyzed by a composite of local and non-local inputs and agendas; and, despite the absence of a local writing protocol – often a hallmark of "civilization" – Assyrian texts were found in a foreign land that already was following its own non-linear path toward urbanization.

In other areas around of the Mediterranean, similar levels of urbanized activity also took place, some further along than others. For example, south of the Mediterranean, in Egypt, we see more literary achievement, refined art, and a more structured administrative organization that expanded beyond traditional borders into western Asia and Nubia (Grajetzki 2006). Also, along the Nubian Nile River, the Egyptian state established towns primarily to control riverine traffic and exchange activity (Manning 2013: 76). The period is also marked by forced labor, hired soldiers (Medjay), and the rise of “strong provincial families” (Ibid.).

To the west, on the island of Crete, the Proto-Palatial period of the Minoan civilization lasted from 1900 to 1700 BC. This period was characterized by the commencement of a more bureaucratic political structure with elites and their administrations, the building of large palaces, a three-class system (nobles, peasants, and slaves), the appearance of Linear A writing, intensified craft specialization, and the building of roads to connect its regional centers (Watrous 2021: 52-80; Wilson 2021). Specialized professions included traders, masons, potters, stone vase artisans, seal carvers, metal-workers, and pastoralists (Watrous 2021: 64). Workshops produced more stylized and sophisticated vessels, vases, adornments, textiles, and seals. Gold hilted daggers and silver swords were found along with caches of stone vases, which were articulated with an elite class (Ibid.). The intensification and expansion of interaction networks from the preceding period included imports such as copper from Anatolia, tin from Syria, ivory from Egypt, and lapis from Afghanistan (Watrous 2021: 59-60). Most importantly, however, is that for the first time Minoan exports were found in Egypt and at multiple locations in the eastern Mediterranean from Ugarit to Hazor, clearly establishing their participation in long-distance trade networks and the use of boats as vehicles of exchange (Watrous 2021: 59).

To the north and east of the Mediterranean, after the fall of Ur III dynasty at the hands of the Elamites, around 2000 BC, a period of political fragmentation prevailed. Historians and archaeologists alike have characterized this period as a time when:

> "greater Mesopotamia and Anatolia…[were]…divided into hundreds of polities organized in shifting military and political alliances (ca. 2000-1750 BCE) that vied for land and resources. Political and social networks of territorially defined city-states and tribal confederations based on lines of perceived kinship overlap in a complex manner" (Bang and Scheidel, 2013: 125).

Numerous oscillations of regional dominance were enjoyed by various polities, such as:

> "…Larsa and Isin (southern Iraq); Ešnunna, Yamhad, Qatna, Mari, Hazor, and Mamma (northern Iraq, Syria, Palestine, and southern Turkey); and Kaneš, Kuššara, Purušhaddum, and Zalpuwa (Anatolia). Toward the end of the period, Šamši-Adad unified northern Syria into a loose imperial network, parts of which [however] were subsequently taken over by Zimrilim of Mari" (Ibid.).

While we know more about the socio-political organization of lands of Syria and Iraq (Elam and Anšan under direction of the Šimaški and Sukkalmah from circa 2000 to 1600 BC), as well as southern Mesopotamia (unified under Hammurabi by 1792 BC), we know relatively little about what occurred in central Anatolia until the region was unified by the Hittites around 1650 BC (for inter-regional comparative chronologies, see Akkermans and Schwartz 2009: 292).

What we do know, according to the Old Assyrian texts is that, for the first 300 years of the 2nd millennium BC, people located in northern Mesopotamia, “headquartered” at Aŝŝur, organized and engaged in long distance travel, and exchanged goods with Anatolians and others on the Central plateau. The texts also reveal that these same long-distance specialists sometimes settled in *karu* (exchange districts) and, for respite, at least utilized *wabaratum* (exchange outposts) and intermixed with locals. Based on the Assyriological translations of cuneiform tablets that reflect the economic transactions between central Anatolians and Assyrians, this period in central Anatolian history, despite being the MBA, has also been dubbed variously the Assyrian Colony Period, Assyrian Trade Period, or Old Assyrian Period. Philologists believe these Assyrian long-distance specialists turned a profit exchanging tin and textiles for gold and silver, and that this long-distance activity was controlled by enterprising families located at Aŝŝur, in the Tigris basin (Larsen 1976, Veenhof 1972). Although debatable what aggregate stimuli may have been at work during this time, major changes took place in central Anatolia. Archaeological review has demonstrated the appearance of new ceramics, architectural styles, writing, and iconography. However, while philological scholarship suggests that concurrent and associated shifts in economic organization took place in central Anatolia during this time, archaeological inquiry has yet to corroborate this contention. Hence, to understand the potential type and extent of economic change that transpired on the plateau during the 2nd millennium BC, this research is focused on monitoring diachronic inflections in faunal remains from Kaman-Kalehöyük.

In the sections that follow, I summarize what we know about the Old Assyrian capital at Aššur and the Anatolian landscape in the early part of the 2nd millennium BC. I also provide detail about both the archaeological finds and the cuneiform translations of texts attributed to Kültepe-Kanesh. By providing this overview, not only will trends in material remains found at Kaman-Kalehöyük be better situated within a larger Anatolian archaeological context, but we will also be better positioned to interpret the results from the current faunal study.

The Old Assyrian Capital in northern Mesopotamia: Aššur

Not unlike many other Mesopotamian sites, Aššur was located in an area that bordered both a rainfall and steppe zone, lacked metals and other “high-status items” critical to playing economic roles in ancient societies (Stein 2005: 145), and was subject to foreign threat. For these three reasons, it was perhaps an illogical choice for a capital city; however, it also had ample arable land, and sat squarely on one of the two routes connecting polities to both the west and the east. As such, this was an important location for controlling resource flow, undoubtedly critical in times of political upheaval and military activity. The earliest occupation levels of Aššur were identified as circa 2400 BC, and demonstrated a connection to southern Mesopotamian traditions through ritual contexts referencing the goddess Ishtar. Aššur excavations were limited in scope, damaged by later strata, and focused almost exclusively on public areas, minimizing our archaeological understanding of the day-to-day life in the capital. Aside from royal inscription and a few school tablets, textual remains from Aššur are equally limited, and inference is often drawn from later periods, or other locations (see Appendix 1). There are, however, some 20 royal inscriptions from Aššur; they stand as regnal boasts of building programs to honor gods such as Aššur, Ishtar, and Adad[8] (Larsen 1976: 55-62; Veenhof and Eidem 2008: 35). One document recovered from the 1st millennium BC yielded an Assyrian King List comprised of thirty-nine names, the last of which was Šamšī-Adad, the Amorite, who usurped the throne from the last of six Old Assyrian kings, Erisu; he subsequently ruled for thirty-three years (see Larsen 1976: 34-35 for a complete list). Other southern texts reference exchange activity between north and south Mesopotamia, but were from the reign of Šamšī –Adad, and therefore date to the

[8] One private letter from Aššur was bought by V. Scheil in Mosul and published in 1909 – a letter from Aššur-nada to his father Aššur-idi in Aššur.

period after the Anatolian-Assyrian interactions of the 2^{nd} millennium BC (Leemans 1960). Separately, we do know that Kültepe-Kanesh texts from central Anatolia occasionally mention dealings between “Akkadians” and Aššur, and that later period Old Babylonian texts demonstrate that the exchange activity between north and south Mesopotamia continued after the Old Assyrian Period (Veenhof 1972). In addition, a few texts from Nuzi (home of Gasurites, located on the Tigris River southwest of modern Kirkuk, Iraq) recount an exchange that included barley and also mention caravan activity; they also suggest their participation in an exchange network that included the Old Assyrians (Ibid.: 189-90). We also know from later texts that Aššur continued to serve as the location for coronation ceremonies long after it ceased to be the Assyrian capital, thus suggesting its cosmological or ideological significance in the ancient landscape. The potential reverence associated with the cosmological or ideological power that natives of Aššur may have possessed may help explain why Anatolian elites: a) allowed Assyrians passage through the politically fragmented and unstable peninsula unharmed, b) were more amenable to developing exchange relationships with Assyrians, c) desired Assyrian-made textiles that were “forged” in, symbolized, and communicated an articulation with a sanctified center, and/or d) placed more cognitive “value” on northern Mesopotamian goods above commensurate goods that were locally produced.

In summary, we only have hints – specifically those derived from other locations – of what might have taken place at Aššur during the 2^{nd} millennium BC. As a result of these philological and archaeological challenges, “many aspects of life in ancient Aššur, the temples, the palace, the ruler, the people and economy apart from the trade, etc., remain in the shadow, and are not easily reconstructed. This may explain why we end up with a somewhat biased picture of Old Assyrian history, culture, and society, sadly leaving large gaps in our knowledge” (Veenhof and Eidem 2008: 20).

Central Anatolia

The celebrated Anatolian-Assyrian long-distance exchange period lasted about five generations, until Aššur itself fell to the Amorites under by Šamši-Adad. After a period of jockeying for position with rival city-states, such as the Zimri-Lim dynasty at Mari, exchange activity between Mesopotamia and central Anatolia returned, but in a less structured and controlled environment, or at least chronicled differently. In the MBA on the central Anatolian plateau, additional changes took place that coincided with the appearance of Mesopotamian script cuneiform tablets: there is a mixture of both hand and wheel-made pottery; Assyrian and Syrian cylinder seals are widespread alongside Anatolian style stamp seals; seal impressions reflect a mixture of different cultural motifs (Old Babylonian, Old Assyrian, Old Syrian, and Anatolian); and figurative art begins to appear (M. Omura 1996; Özgüç 1968).

In Anatolia, there are hundreds of sites that date to the first three hundred years of the 2nd millennium BC; however, only three have been identified by their ancient names (Figure 1: #19 Boğazköy, #21 Alişar, and #23 Kültepe-Kanesh), and only a handful have yielded cuneiform tablets that articulate them with the exchange network in which the Old Assyrians participated. An additional local Anatolian site, Acemhöyük (#18 in Figure 1), has yielded one of the largest occupations of this period, but its role in any inter-regional exchange system remains an enigma. At Acemhöyük, through 2011, excavations focused on its two "palace" complexes, and while no tablets were found, other archaeological remains dated the occupation to about 1775 BC. Objects such as Mesopotamian-style clay bullae and sealing impressions of the Assyrian king Šamšī-Adad indicate the site's participation in the long-distance interaction network that included the Assyrians, albeit later in the sequence.

Two ceramic styles suggest the continuity of central Anatolian traditions, and two others suggest change at the local level (Sagona and Zimansky 2009: 240-241). First, elaborate handmade open bowls dubbed "Cappadocian ware", first found in Alişar III contexts, continued "Intermediate ware" traditions from the EBA, and are painted with red, black, and white geometric patterns. This ware eventually disappeared in the MBA and was more common at sites in the south than in the north. Second, larger wheel made pitchers, with similar geometric designs but painted in monochrome, are more common throughout central Anatolia, and are often covered with a reddish-brown slip and lightly burnished. In the early MBA, two new styles emerged: wheel made pitchers with long-beaked spouts and containers with high pedestals, and vessels with animal figures on their handles or rims. The spouts and pedestaled wares had red or brown slips, and are highly distinctive; they have been found at many locations including Kültepe-Kanesh and Acemhöyük, with minor local variation. Animal figured vessels are common throughout the entire MBA, sometimes referred to anachronistically as "Hittite ware" and continue until the end of the Bronze Age (Kulakoğlu 1999: 149-166). Lastly, at Kültepe-Kanesh, Acemhöyük, and many other locations, large quantities of figural representations have been found. In addition to those attached to ceramics, some stylized human figurines made of ivory also point toward both long-distance interaction spheres as well as new cosmologies.

The appearance of cylinder seal technology, already used in Mesopotamia for more than a millennium, emerges in the early MBA and is interspersed with Anatolian stamp seals, bearing styles and motifs that are both local and foreign (Mesopotamian and Syrian). Interestingly, while this new technology presents itself alongside the expression of Old Assyrian cuneiform script in Anatolia, motifs contained on the cylinder seals and in seal impressions are often artistic representations of distinctly Anatolian style, suggesting deeply entrenched local traditions (see Collon 1990 and M. Omura 1996). The expressed combination of foreign technology and local motifs suggests interactions with an expanding group of cultural identities, such as the Old Assyrians or Syrians, which likely influenced certain aspects of the indigenous societies of the central plateau. The persistence of a local flair, however, indicates more local control and power and hints at sociopolitical structures, which predated and lasted after the purported arrival of the Old Assyrians on the plateau.

The Anatolian "Exchange" Capital: Kültepe-Kanesh

The quintessential local Anatolian site of the period, and the "center" of economic activity on the plateau, is Kültepe-Kanesh (modern Kültepe), which is one of the largest, yet most damaged sites on the central plateau (Kulakoğlu 2011: 1013). The site has been continuously excavated since 1948, and has yielded over 20,000 Old Assyrian cuneiform tablets, thus becoming the research focus of Assyriologists for decades. The site occupies a strategic position on a traditional overland exchange route, sits just south of the Kızıl Irmak (the Red River, or in Roman times, the Halys), is located about 20 kilometers northeast of ancient Mazaka (modern Kayseri), and is separated into a citadel and lower town. Kültepe-Kanesh serves as the primary chronological reference for central Anatolia from 2000 to 1500 BC, flourishing in the first half of the 2nd millennium BC.

In the MBA (though at the site, it's referred to as the Old Assyrian Period or Assyrian Colony Period) its five-hundred-meter main mound was entirely occupied, and together with the lower city (axes of about 1500 by 1000 meters), it remains one of the largest archaeological sites in Anatolia. Of the citadel's eighteen occupational strata, levels 10 through 6 correspond to the MBA, with 8 and 7 yielding cuneiform tablets. Current estimates suggest that at its height, Kültepe-Kanesh may have supported a population of fifty to sixty thousand (Kulakoğlu 2014: 85). In this period Kültepe-

Kanesh has been characterized as a city "of successful capitalists, a cosmopolitan center conversant in five languages" (Özgüç 1997: 257).

For its first fifty years, the goal of the Kültepe-Kanesh excavation was focused on studying all aspects of Old Assyrian merchant's activities via textual remains, along with studies of non-indigenous goods, and iconography (Gates 1996: 296). Other more recent archaeological studies at Kültepe-Kanesh, despite paling in volume relative to the corpus Assyriological work done to date, have focused on social identity in the merchant district, and suggest that Assyrians lived side by side with Anatolians in a multi-ethnic district (Atici 2014; Hertel 2014). These, and other future archaeological studies, like Strupler's (2021) work on seals and sealing practices, at Kültepe-Kanesh and other sites such as Kaman-Kalehöyük, in conjunction with sustained work on translating the texts, will continue to help us form a more comprehensive picture of the central Anatolian landscape in the second millennium BC.

Kültepe-Kanesh Texts

The Kültepe-Kanesh texts have been attributed to some 112 residences and a few hundred Assyrians located in the lower town (Hertel 2014: 44-51), an area that was only a small part of Kültepe-Kanesh, "…measuring 250 by 350 meters, [and] situated to the northeast of the city mound" (Veenhof and Eidem 2008: 55). Based on proper naming conventions in the texts, residences have been divided into four categories:

Assyrian, Anatolian, houses where archives were found but the cultural identity is "undetermined", and houses with no archives (Hertel 2014: 44-51). Recovered tablets are comprised of mostly economic and legal writings of those who were involved in exchange activity, along with some private letters. The bulk of these writings have been dated to a thirty-five-year span early in the sequence, circa 1895-1860 BC (Hertel 2014: 25-6). In sum, philological remains are what scholars have used to determine the "presence" of Assyrians in Anatolia, and more specifically, at Kültepe-Kanesh. The determination of "presence", based on a single category of material remains, in this instance written remains, is exceptionally noteworthy; from an archaeological perspective, the physical "presence" of foreign people among locals is very difficult to demonstrate, and typically requires multiple lines of evidence to reduce the risk of conflating physical "presence" with "expression" via emulation, exchange, or a multitude of other phenomena (for a more comprehensive discussion, see Stein 2005: 3-31 and 143-172).

Notwithstanding the issue of "presence" versus "expression", textual translations suggest that under the patronage of a local Anatolian "prince", merchants from Aššur imported tin, textiles, and other goods into Anatolia by means of donkey caravans[9]. The Assyrians then bartered their wares with local Anatolians in exchange for silver and gold, which was then transported back to Aššur. Texts also speak of family

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[9] For further discussion regarding donkey domestication as a turning point in the establishment of longer distance exchange networks, see H. Wright (2001: 127) and Algaze (2008: 66-67). Postgate (1995: 84) suggests that the donkeys used for traversing long distances were bred by Amorites.

affairs, inheritances, and distribution of goods to other exchange centers or smaller outposts.

According to the written remains, the Assyrians who were involved in exchange interaction activities at Kültepe-Kanesh, represented powerful families in Aššur who were highly "regulated" by local Anatolian officials as well as by other Assyrians. For example, at Aššur, "taxes" (or tributary payments) were levied on consignments as Assyrians departed the city, and secondary "taxes" were collected upon arrival in Kültepe-Kanesh. Taxes in Kültepe-Kanesh were exacted to run and maintain the structure of the *karum*, ensuring no local laws were breached, and relations with local rulers were preserved. One of the most well documented archives, that of Aššur-nada, has provided insight into exchange goods, caravans, loans, taxes, and selling practices, as well as his travels throughout Anatolia (Postgate 1995: 213; Garelli 1966: 112-13; Larsen 2002).

Rules were prevalent; Assyrians were not allowed to participate in the exchange of local textiles or copper without express permission, nor were they allowed to handle certain higher "value" goods, which were under stricter control (Larsen 1976: 130; Veenhof 1972). Smuggling was not tolerated, and we know of certain instances where Assyrians who tried to side-step local rules were thrown in "jail" (Veenhof 1972: 307-8). Texts also speak of Assyrian administrators who were present in Kültepe-Kanesh, in an effort to oversee the conduct of those involved in "commodity" exchange. Supposedly, despite being almost 1500 kilometers away, these administrators were in constant contact with Aššur, and regarding complicated legal or diplomatic issues, sought council from the City Assembly, an oligarchy of the wealthy, located in Aššur (Larsen 1976).

The texts attest to the regional structure of the Anatolian kingdoms (*mātu)*, and specifically mention Hatti, Kültepe-Kanesh, Purušhattum, and Wahšusana as focal points (Bryce 1998: 24). Each of these *mātu* were led by a *rubaʾum* (leader, mayor, king), who exercised broad control over the smaller communities within his/her territory. To coordinate activities such as "commodity" exchange within a region and with the Assyrian administration, a single location and *mātum* was the seat of power (Ibid.: 25-6). Some contend that the "*karum* of Kültepe-Kanesh was the controlling center to which all the other *karums* [in Anatolia] were subordinate[10]; in turn, it was directly connected to Aššur" (Özgüç 1983: 319). This conclusion has been drawn from letters such as the following from the officials at Wahšusana to the new *rubaʾum* at Wašhaniya who was seeking to renew a treaty:

> *We answered: 'The karum at Kültepe-Kanesh is our [Lord]. We shall write so that they may write to you or to us. Two men from the Land will come to you and then they can make you swear an oath! It is up to you now! Let your orders come here. We have given 20 minas of copper to our messengers. (Larsen 1976: 249).*

[10] While it is clear for a period of time that Kültepe-Kanesh played a critical role in its region, and with the Old Assyrians, we know that by approximately 1750 BC, other rulers began to challenge and rival Kültepe-Kanesh's prominence. The Anum-Hirbi letter from the Prince of Mamma to the Prince of Kültepe-Kanesh (Warshama) suggests the two were of near equal power; the letter mentions battles, subordinate towns/leaders, and deception. For more detail, see Balkan 1957.

The tablet translations clearly show that Kültepe-Kanesh played a key role in this period's long-distance exchange network. Unclear is the pervasive issue of how the purported presence of the Assyrians, or the expression of their texts, on the plateau may have impacted the indigenous populations of central Anatolia and vice versa, or how this inter-cultural entanglement is reflected in the local pastoral economy.

The Kültepe-Kanesh texts, when contemplated alongside Mesopotamian zooarchaeological data and the Mari archives, do provide insight into which meats were consumed by the Assyrians in the 2nd millennium BC, how prevalent protein was in their diets, and how animals and meats were procured. First, zooarchaeological analyses from more than 60 sites with Mesopotamian occupations have shown that caprines often constitute more than 75% of the main domesticates (Stein and Nicola 1996: 57-60; Grossman and Paulette 2020: 7-8). These data suggest that caprines were key components of the Mesopotamian economy over a long time horizon and a wide geographical footprint. Additionally, an isotopic study of human remains found higher protein levels at the north central Black Sea site of İkiztepe and southwestern Anatolian site of Bademağacı when compared to Bakla Tepe in the far west and Titriş Höyük in the southeast (Irvine, B., Y. Erdal, and M. Richards 2019). Together these types of data suggest that in some instances zooarchaeological analyses may allow us to detect distinct social groups based on certain faunal profiles and levels of protein consumption.

The Mari archives (~ 1775 BC) provided information related to meals (*naptanātum*) and insight into Mesopotamian meat sources and choices, particularly those related to royalty (Sasson 2004: 184). Translations mention the consumption of gazelle meat for the palace, cattle meat for visiting dignitaries, pig meat that was refused by some regional leaders as servant food yet welcomed by others, rabbits and sheep for royalty, and that bear meat from the western Habur and exotic ostrich meat were reserved for the royal table (Popova and Quillien 2021: 235-245; Sasson 2004: 206-207, 209). Textual studies also discuss the transport of sheep and cattle meats to Mari from Mardamon in the Habur triangle and Terqa in the middle Euphrates, and from Umma to Ur in southern Mesopotamia, and the gifting of roe deer and cattle by Mari vassals (Sasson 2004: 189, 195-196). Interestingly, goats are infrequently mentioned in the Mari archives, and typically only in relation to nomadic groups (Ibid.: 209).

Building on zooarchaeological data and other textual studies, from the translations of Kültepe-Kanesh tablets we learn that the Assyrians obtained whole animals, specific cuts of meat, and cooked "meals" from local Anatolian sources (Albayrak 2003; Gökçek 2004 in Atici 2014: 204-205). These same scholars mention intentional "fattening" of cattle and pigs, and the use of various oils, animal fat, and lard. Researchers also cite evidence which suggests preferential consumption of specific body parts, including "…breast, stomach, leg, and shank" (Atici 2014: 204-205). Perhaps most interesting is that sheep were valued differently based upon their origin, fleece, expected meat quality, overall condition, and breed (Ibid.), and cattle could either be purchased or rented (Gökçek 2004: 69). If true, this evidence suggests that sheep may have been raised by specialists for prized meat yield, and that certain cattle were bred for traction. Last, there is some mention of diseased cattle “selling” at lower “prices” (Ibid.), suggesting the range of criteria that determined the value of a livestock is consistent with expectations for a specialized, hierarchic society.

From an overall MBA overview, it should be clear that the Kültepe-Kanesh texts are a wonderful source of information, and it’s easy to see why their mystique has captivated the minds of Assyriologists and central Anatolian archaeologists for decades. Corroborating archaeological studies, particularly outside of those conducted at the bellwether site of Kültepe-Kanesh, have a long way to go to catch up to categorically specific studies of the cuneiform tablets. Intensifying the need for more early MBA archaeological studies is the relatively little we know of the Assyrian capital at Aššur, and that until very recently central Anatolian excavations have taken place almost exclusively at very large sites and have focused on the later Hittite periods. In addition, 2nd millennium BC interpretive frameworks have had to rely primarily upon a limited scope of recovered material, the texts, which are inherently biased and narrow in scope. More recent archaeological surveys and excavated material of the past two decades, however, provide a great opportunity to couple the wealth of MBA philological work with careful studies of other material remains to create a still more complete picture of what transpired between the Anatolians and Assyrians in the early stages of the 2nd millennium BC.

To complement the vast corpus of philological finds and interpretations, especially those related to animal herd composition and their derivatives, we need to study the faunal remains from locations that will help shed light on the topic. A local small rural site like Kaman-Kalehöyük, with occupation levels dated to both the period(s) prior and subsequent to the appearance of Old Assyrian cuneiform tablets in central Anatolia, is a perfect candidate case study. While we may never be able to secure indisputable evidence that determines Assyrians lived at or even visited Kaman-Kalehöyük, we do know, based on material remains, that Kaman-Kalehöyük was somehow indirectly interacting with the northern Mesopotamians. As a result, study of faunal patterns over time at Kaman-Kalehöyük will help inform scholarship as to how local production and consumption patterns may have been impacted either by the site's participation in a new or geo-culturally expanding interaction network or by the introduction of new technologies, emulative schemes, and/or persons and preferences on the plateau in the 2nd millennium BC.

Discussion

The cuneiform texts coupled with the non-linear patterns in politico-economic and social structures across the peninsula (and in Mesopotamia) raise more questions than they answer, and many of those questions are beyond the scope of this study. For example, we don't know why the Anatolian-Assyrian exchange activity was so short lived and why it ended so abruptly. We also don't know why tin was no longer required by Anatolians from the Assyrians, whether Anatolians found an alternate tin source, whether the textiles once desired from Mesopotamia fell out of favor, or if they were successfully replicated locally. In addition, studies should explore whether any parts of the cuneiform texts were fiction or the tablets themselves carried intrinsic or symbolic power. Remains from both the EBA and MBA point toward long distance interaction spheres of culturally distinct societies with different languages, but we are unsure how they communicated. Also, the archaeological expression of writing on the plateau in the 2nd millennium is rare, yet short-lived, though even when found, it is unclear if it signifies presence of people, direct or indirect contact, or simply the existence of far-reaching interaction or exchange networks. Regarding the tablets' content, and considering that they were likely inscribed by Mesopotamians, it's open for debate whether they accurately and comprehensively portray the range of what actually was exchanged between Anatolians and Assyrians, or whether there were other commodities exchanged in large quantities that simply were not captured in the recovered and translated texts. While it is possible that the Anatolian-Assyrian interactions taking place in the MBA might have focused on certain types of raw materials and desired goods, the act itself of exchange between Anatolians and Mesopotamians was not a new phenomenon.

Although the current corpus of academic literature begs these and many other intriguing questions, review of the Anatolian landscape in both the EBA and MBA still informs archaeological research design and subsequent interpretations regarding the Anatolian–Assyrian interaction in several ways. First, evidenced by a plethora of archaeological evidence ranging from settlement size to ceramics, clearly long-distance travel and cross-cultural interaction spheres existed in the EBA's latter stages. Second, also evident, from metallurgical studies and burial remains, is that hierarchic societies dotted the EBA Anatolian landscape, and that change at the local level was common. Third, the persistence of Anatolian ceramics from EBA to MBA, versus a sudden switch, is consistent with non-conquest strategies and change controlled at the local level. Fourth, the adoption of new cylinder seal technology with both local and foreign motifs, coexisting with Anatolian stamp seals, further speaks to focal models of agency and long-lived local cosmologies. Fifth, presence of the Assyrians in Anatolia during the 2nd millennium BC relies almost exclusively on textual remains; whereas, the argument for the presence of 4th millennium BC Mesopotamians residing in Anatolia, although still a subject of debate, is supported by multiple lines of archaeological evidence. Even in the later stratigraphic layers of the Anatolian-Assyrian interaction horizon, the presence of Mesopotamians in Anatolia is archaeologically supported only by Mesopotamian cylinder seals (though Syrian types were found as well) and the famed cuneiform texts. Other evidence that might be consistent with Assyrians living in Anatolia, such as ceramics, architecture, and faunal/botanical differentiation from local communities, has yet to be identified. Sixth, the range of archaeological and textual evidence uncovered to date still requires further investigation into: a) the geographic extent of Assyrian penetration into Anatolia, b) the nature of Assyrian presence or influence in Anatolia (economic, symbolic, ideological?), and c) their potential impact upon the local populations of the plateau at both larger more hierarchic sites and smaller less urban locales. For example, if artifacts represented interaction or exchange activity without foreign residents in local locations, we might expect to find only portable items in the host community remains, such as small tablets and cylinder seals, which are portable. In addition, foreign architecture and nuanced faunal patterns may not be detectable in the archaeological record. If, however, interaction was limited to the emulation of foreign styles, presumably by elites who perhaps had both the access and the means to acquire goods from foreigners, then we might expect imports and imitation to be restricted to more elite locations or households, while lower status locations or households would preserve local styles. Or, we may find caches of certain foreign goods at sites, or in specific contexts occupied by those that controlled the distribution of these goods.

In this study, I am considering the possibility that Kaman-Kalehöyük was a small site in the countryside, which may have given increased support to a growing number of people residing at more urban locations in a multi-tiered hierarchical landscape who were less focused on producing their own food. And, I am evaluating whether faunal evidence points toward expanding degrees of social inequality, coinciding with more formalized interaction and exchange between Anatolians and the Old Assyrians. By establishing baseline faunal profiles for both the EBA and MBA at Kaman-Kalehöyük, and comparing them, a more complete picture of the 2nd millennium BC landscape will begin to form.

CHAPTER 4: CASE STUDY: KAMAN-KALEHÖYÜK

This chapter addresses four main topics. First, I introduce Kaman-Kalehöyük, the case study site of this analysis, in terms of its general characteristics, excavation history, and research objectives. Second, I further contextualize Kaman-Kalehöyük by summarizing archaeological survey findings in proximity to the site where EBA and MBA ceramics have been recovered. Third, I describe Kaman-Kalehöyük EBA and MBA archaeological remains and my study areas. Throughout this chapter, I also comment on the implications that certain excavated material remains have on my evaluation of increasing degrees of specialization and social inequality.


Figure 2: Kaman-Kalehöyük Aerial View (L) and Figure 3: Regional Map of Key Sites (R).

General Characteristics and Environment

Kaman-Kalehöyük is known from nearly forty excavation seasons conducted under the tireless, gracious, and patient leadership of Drs. Sachihiro and Masako Omura, as well as Dr. Kimiyoshi Matsumura. The site is a 6 hectare (280 meters in diameter), 16-meter-high mound on the Anatolian plateau and is located in the Kirşehir province of Turkey, approximately 135 kilometers southeast of Ankara and 3 kilometers outside of the modern town of Kaman-Kalehöyük (Figures 2 and 3). The village of Çağırkan, on the outskirts of modern Kaman-Kalehöyük, lies 1.5 kilometers to the south of the site, shadowed by the Baran Mountain Range (Figure 4), which cuts a northwest to southeast line through the central Anatolian plateau (Omura 2011: 1095).

Figure 4. The Baran Range.

Before excavations began, over 200,000 artifacts of various types were gathered from the site via surface collection; subsequent analysis indicated that Kaman-

Kalehöyük was occupied from at least the last half of the EBA until the Ottoman period. The site occupies a strategic geographical position in close proximity to established riverine (between the Kızıl Irmak and the Delice Rivers) and overland trade routes, the former connecting ports on the Black Sea coast with more southern sites, and the latter connecting the west and east via an old trade route linking the south (Kirşehir) to the north, often referred to as the migration route (Göç Yolu), Silk Route (Ipek Yolu), or caravan route (Kervan Yolu). This route runs on an east-west axis and is located immediately to the south of the site. Kaman-Kalehöyük lies at approximately the half-way point on the shortest trek from Kültepe-Kanesh to Ankara (the 37-hour point of a 66-hour, 315-kilometer journey on foot). Mid-2nd millennium BC (just a few hundred years after the Anatolian-Assyrian exchange activity supposedly slowed down) architectural remains, including a large granary (7.5-10 m in diameter, and 1.5 m high), a cache of Old Hittite clay bullae, and sealing impressions (Weeden 2011: 611) suggest that Kaman-Kalehöyük served as an important collection and/or regional distribution location in at least later periods (Omura 2011: 1106).

In the surrounding area today, wheat is aplenty, and locals primarily herd sheep and cattle, with goats, donkeys, and horses playing a lesser role. Though the general climate is arid, with an annual rainfall of roughly 400 millimeters per annum, water sources are in close proximity to the site. A natural spring sits 150 meters to the northeast of the site, and streams run north to south on two sides of the mound, effectively encircling the mound. And, Kaman-Kalehöyük is located less than 20 kilometers within the bend of the northward flowing Kızıl Irmak. Most likely, the existence of multiple natural water sources is one of the reasons Kaman-Kalehöyük has such a long occupational sequence.

In sum, given Kaman-Kalehöyük's proximity to established migration routes, and its fertile plain, the site may have played an important role in regional exchange during the early stages of the MBA, and possibly earlier. That said, while Kaman-Kalehöyük is strategically situated, it is not in close proximity to any one of the <u>known</u> locations of larger Bronze Age Anatolian sites, centers, or kingdoms. It is located nearly equidistant from Hattuš-Boğazköy (140 km), Acemhöyük (145 km), Amkuwa-Alişar (165 km), and Kültepe-Kanesh (188 km). For perspective, the aforementioned sites are all substantially larger than Kaman-Kalehöyük and served very different functions. Kültepe-Kanesh, for example, a major population center, reached over 170 hectares during the MBA, whereas, the extent of Kaman-Kalehöyük was approximately 6 hectares (Barjamovic 2014: 61).

Archaeological survey work helps situate Kaman-Kalehöyük better in both the EBA and MBA periods. In parallel with the Kaman-Kalehöyük excavations, from 1986 to 2007 a team also conducted surveys across northern central Anatolia, identifying over 1500 mounds that spanned from the later part of the Chalcolithic (~4000 to 3000 BC) to the Ottoman Period (15th to 17th centuries AD). The goals of the surveys were to both identify future candidate excavation sites while also better understanding chronological sequences in the region and period specific settlement patterns. Surveys were conducted across nine central Anatolian provinces[11], and reports included surface collections, site measurements, and mound descriptions. Three particular archaeological surveys comprised of 140 sites serve to shed light into settlement patterns on the plateau during the EBA and MBA. First, a survey conducted in 1994 of 44 mounds, mostly to the west of modern-day Ankara, revealed that nearly all sites possessed EBA ceramics, indicating the existence of deeply rooted local traditions that covered a wide geographical footprint. Sites ranged in size from about 1 hectare (common) to only two sites that reached 6 hectares (Höyük Sarıoba in Polatlı southwest of Ankara and Bitik in Kazan northwest of Ankara), although no sites larger than that were identified (Omura 1996: 135-192). A 2005 archaeological survey, also to the west of Kaman-Kalehöyük and west of the Kızıl Irmak, identified 46 unexcavated sites, with 12 dating to the EBA, and 13 to the MBA (Omura 2006: 63-102). Surface collection demonstrated shared pottery styles in both periods, with the highest concentrations of material appearing at sites such as Bahçehisar (EBA), Çelebunin Çesme (EBA), Höyük Balçıkhisar (EBA), Gıre Yunak (EBA and MBA), Karakuyu Yayla (MBA), Höyük Kutluhan (MBA), and Ağadağı Mevkii (MBA). Sites from the 2005 survey dated to the EBA ranged in size from about 1 to 2.5 hectares, and sites from the MBA spanned 1 to 5.3 hectares (Ibid.). Last, in a 2007 survey to the north of Kaman-Kalehöyük, in Kırrıkale, 26 sites yielded EBA ceramics, and 20 had potsherds dating to the MBA. Sites ranged in size from less than 1 hectare (20+ sites) to more than 5 hectares (e.g., Ak Kaş was 6+ and 07-

[11] Kırşehir, Kırrikkale, Ankara, Yozgat, Nevşehir, Aksaray, Niğde, Kayseri, and Konya

31 Höyük Çalış was 8+ hectares); however, the extent of specific cultural occupations within each site is unknown (Omura 2008: 45-92). These combined results suggest that in both the EBA and MBA the north plateau in central Anatolia had at least a two-tiered site size hierarchy, and likely three or more tiers in the MBA. Data points toward small villages (less than 1 hectare) and medium sized sites (> 1 and < 10 hectares) in both periods, with larger centers like Kültepe-Kanesh and Acemhöyük (30+ hectares) emerging in the MBA.

Kaman-Kalehöyük's location and size are critical to my study because as Zeder (1991: 249) has demonstrated, smaller, more rural settlements are better suited for examining animal herd management; whereas, more urban contexts are better for learning about distribution schemes and end-products. Adding further intrigue to Kaman-Kalehöyük's potential role in intra- or interregional interactions and exchange is Derckson's argument (1996: 14) that a large Anatolian copper exchange center, *Durhumit,* was located on or near the east bank of the Kızıl Irmak, in close proximity to Kaman-Kalehöyük (Veenhof and Eidem 2008: 151 f697). While *Durhumit* has yet to be found, based on site size Büklükale and Yassıhöyük seem viable candidates.[12]

Büklükale, a 30 hectare site, is located 50 kilometers west of Kaman-Kalehöyük and 60 kilometers southeast of Ankara. It is on the west bank of the Kızılırmak River, and is situated at the river's narrowest point. Remains of both a Seljuk and Roman bridges attest to this location as a strategic crossing point and travel route to Ankara. In

[12] http://www.jiaa-kaman.org/en/excavation.html

2019, magnetic resonance showed large MBA structures were present at Büklükale, along with a lower town (Matsumura 2020: 238). Subsequent excavations on the citadel revealed a 7 meter high terrace wall along with a building at least 50 meters in length and 30 meters in width. Carbon-14 results date the fill in this building to approximately 1980 BC (Ibid.: 239) adding further intrigue to the role this site played in the 2nd millennium BC. While some scholars have speculated Büklükale to be ancient Durhumit (Forlanini 2008: 68–74; 2009: 56–58) or Washushana (Barjamovic 2010: 21-22), confirmation is pending future excavation seasons and subsequent analyses.

The second candidate site, Yassıhöyük, is located just 30 kilometers east of Kaman-Kalehöyük. Yassıhöyük is a 32-hectare site, was surveyed four times from 1986 to 2002 (Omura 2003: 53), and excavations at the site began in 2009. Initial surface collection ceramics suggested that Yassıhöyük was contemporaneous with other local MBA large centers like Acemhöyük and Kültepe-Kanesh. Later magnetic resonance tests and subsequent excavation have substantiated both its size and regional traditions. Though final periodization is pending future excavation, soundings at Yassıhöyük identified a structure near the top of the mound that was 45-50 meters in length and 40 meters in width, clearly indicating more public architecture. Ceramic sequences and styles found in both surface collection and excavation, such as more coarsely made bowls, short-necked jars, and finer beaked pitchers, connect Yassıhöyük with Kaman-Kalehöyük assemblages in both the EBA and MBA, and Kültepe-Kanesh in the MBA (M. Omura 2008: 107-108). These cultural continuities suggest that future excavations may articulate Kaman-Kalehöyük with the political economy of Yassıhöyük, thereby strengthening Kaman-Kalehöyük's position as a production locale or interaction waypoint tied to a larger exchange system. As a result, Kaman-Kalehöyük provides a great case study for not only better understanding local production and herding strategies, but also how herding decisions may have been impacted by intensified interactions between Anatolians and the Old Assyrians on the plateau in the 2nd millennium BC.

The Excavations

Ground was broken at Kaman-Kalehöyük in 1986 with the objective of more clearly understanding the cultural chronology of the north central Anatolian plateau's countryside. Excavations at the site are ongoing and have continued uninterrupted for nearly forty years with the support and legacy of Prince Takahito Mikasa under the directorship of Dr. Sachihiro Omura, as part of the Japanese Institute of Anatolian Archaeology (JIAA).[13] Over this time horizon, extensive exposures have been achieved both vertically and horizontally at Kaman-Kalehöyük (thousands of square meters; Figures 5 and 6). And, within the last decade, permanent housing and a museum were constructed minutes from the mound, indicative of the considerable commitment on

[13] For more detail, see http://www.jiaa-Kaman-Kalehöyük.org/en/index.html

the part of the project to better understanding ancient Anatolian history in the northern central region.


Figure 5: Kaman-Kalehöyük North Step Trench (L);

Figure 6: Example of Southeast Horizontal Exposure (R).

The site itself is organized in a grid system using cardinal points. Sectors are 10 x 10-meter grids, which are further subdivided into four 5 x 5-meter areas. Sectors are numbered separately in both the north (Kuzey) and south (Güney) trenches. In Figure 7, the blue shaded areas are the sectors from which material remains were extracted for this study (sectors IV, V, VI); the orange shaded areas represent three sectors at the top of the site that are referenced heretofore (sectors 0 to III). Topographically, the site is very steep on three sides and most easily accessed from the south/southeast.

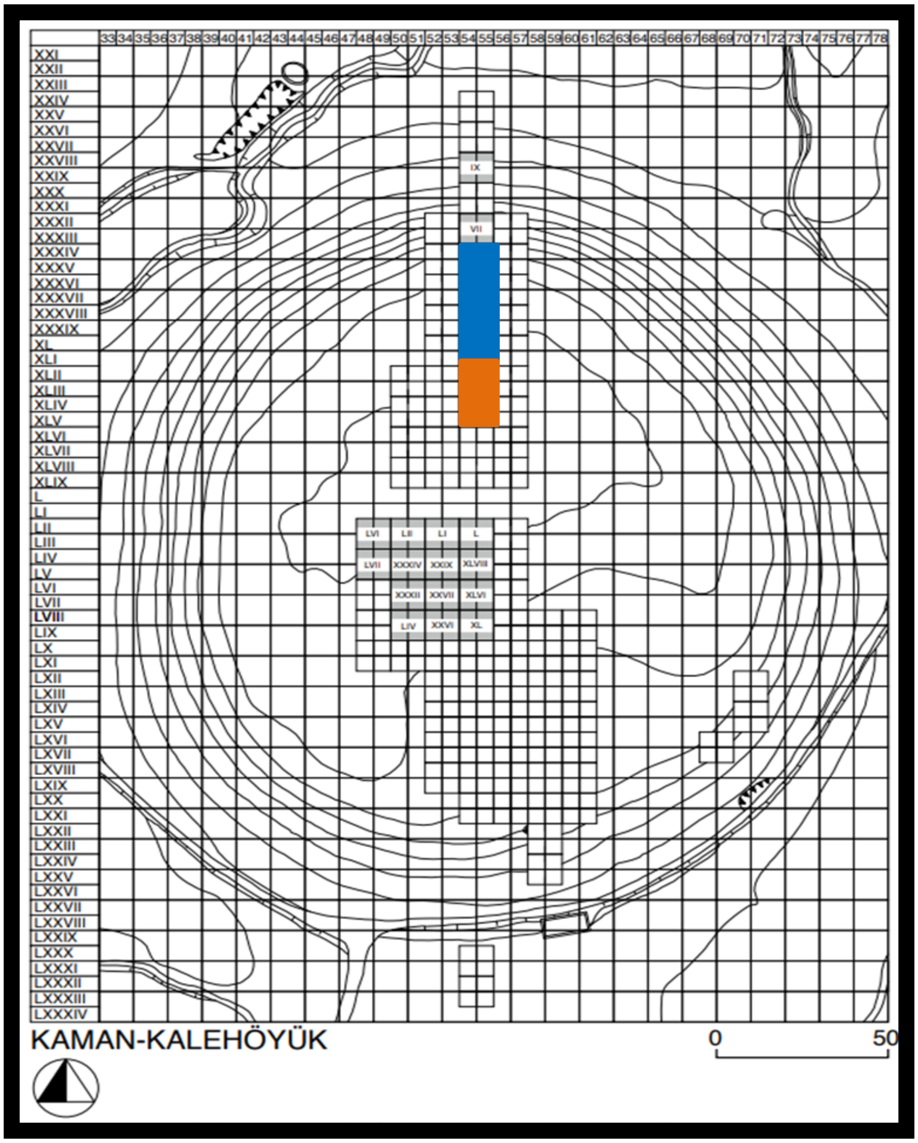


Figure 7. Kaman-Kalehöyük Site Plan and Topographic Map.

At Kaman-Kalehöyük, sediments are extracted by trench supervisors, local, and non-local teams using pickaxes, shovels, trowels, and brushes; 100% of deposit material is passed through a one-centimeter dry sieve, and then hand-searched for smaller remains (Figures 8-9). All artifacts are stored in warehouses located near the main mound, in wooden or plastic crates, and labeled by provenience (Figures 10-11). Any notable finds are spatio-temporally recorded in their exact location relative to the site's datum point, reviewed at daily meetings, and recorded. Those artifacts deemed of archaeological importance are evaluated by conservationists, the excavation team, and Turkish officials for more comprehensive preservation, potential museum display, and further study.

Figure 8: Mechanical Sieving Machine (L);

Figure 9: Artifact Hand Sorting and Organization (R).

Four main occupation levels have been identified at the site based on ceramics, architecture, and small finds: the Ottoman Period (15th to 17th centuries AD), Iron Age (12th to 4th centuries BC), Late to Middle Bronze Ages (20th to 12th centuries BC), and the Early Bronze Age (23rd to 20th centuries BC). The Late to Middle Bronze ages correspond to Stratum III, and are further broken into three sub-phases: IIIa – Hittite Empire, IIIb – Old Hittite, and IIIc – the first three hundred years of the Middle Bronze Age, or as some refer to it, the Old Assyrian Period (Veenhof and Eidem 2008: 19). Immediately preceding the Old Assyrian deposits is Stratum IV which is comprised of two main occupation levels, distinguished primarily by ceramic assemblage differences. Stratum IVa, an "Intermediate" or "Transitional" Early/Middle Bronze period is identified by both coarse hand-made as well as wheel-made pottery; and, Stratum IVb, Early Bronze, is characterized by coarse, hand-made wares (Omura 2011: 1108).

Figure 10: Storage Facility for Material by Context (L);

Figure 11: 2014-2015 Fauna Storage (R).

Chalcolithic pottery and small finds, like the fertility goddess figurine in Figure 12, which dates to the Neolithic, suggest the possibility that much earlier occupational levels exist at the site that have not yet been unearthed. This particular figurine is reminiscent of types found on the Konya plain, in much closer proximity to Kültepe-Kanesh, more than 175 kilometers away. Artifacts like this figurine which is crafted in local style, also suggests strong local cosmologies or traditions and interaction networks that encompassed areas outside of the immediate vicinity of Kaman-Kalehöyük.

Figure 12. Kaman-Kalehöyük Neolithic Period Fertility Goddess Figurine.

This study of change through time in the faunal remains from Kaman-Kalehöyük IVb (Early Bronze Age) to IIIc (early Middle Bronze Age or Old Assyrian Period) deposits represents one of the first comprehensive diachronic zooarchaeological evaluations of Kaman-Kalehöyük's animal economy focused on comparing these periods (confer Hongo 1996 and Atici 2003 and 2005). Only a small number of clear EBA (IV-b) deposits have been uncovered to date, due, in part, to the continuous occupation of the site over the millennia, broad horizontal exposures pursued in other periods, and the resulting depth of 3rd millennium BC deposits (which begin approximately 8 meters deep), as well as the destruction of earlier contexts by later strata (such as the large storage features of the Old Hittite Period). Fortunately, the deposits uncovered to date represent a range of archaeological contexts and yielded an adequate sample size for this study. A thorough review of available field notes, architectural drawings, and small finds provided detailed contextual information for the faunal remains as well as the opportunity to piece together EBA data. Together, this data provided an opportunity to formulate a perspective on local EBA economic structures and how they may have changed over time.

Kaman-Kalehöyük EBA and MBA Material Remains

Our corpus of knowledge related to EBA and MBA deposits at Kaman-Kalehöyük is very different: the former is isolated to the northern step trench exposures while the latter spans excavated material over two-thirds of the mound. Although EBA pottery was collected across the site, architecture related to the EBA has only been uncovered in the northern area of the site. Throughout the 2015 excavation season, EBA layers, although in many cases badly damaged by later strata, were identified in a step trench that begins near the top of the mound, and continues northward to a steep slope. These EBA remains spanned the length of nine 10 x 10-meter exposures. EBA stratigraphic layers extend into both the west and east sides of the step trench, are always beneath, and often are cut by later MBA contexts. Worth noting is that the northern edge of Kaman-Kalehöyük is far less accessible from the mound's base than other parts of the site, and if it was the same in ancient times, this would suggest that the EBA occupation likely continues south and eastward, where the site slope is far less steep. Given the nature and location of the EBA remains in the north, coupled with ceramic surface collection, the EBA settlement size at Kaman-Kalehöyük could have been anywhere from 1 to 6 hectares. If the north step trench, however, represents a radius (90 meters), and if the EBA settlement was relatively symmetrical, Kaman-Kalehöyük's EBA occupation would have reached 180 meters in any direction, or roughly 3 hectares. Relative to the surveyed cohort then, if Kaman-Kalehöyük reached 3 hectares in the EBA, and grew to 6 hectares during the MBA, the site falls somewhere in the small village to medium size site category, respectively.

The EBA at Kaman-Kalehöyük is represented by six building levels, as determined by stratigraphic sequences in Sectors IV-V-VI in the North section of the site near the top of the mound. Strata have been dated to the 23rd – 20th centuries BC, and split into a "Transitional" or "Intermediate" Period (IVa: Levels 1-4), and a clear EBA (IVb: Levels 5-6). Compared to other periods, little analysis has been completed on either of these EBA layers, although we do know that all building levels were destroyed by fire, potentially indicating widespread political turmoil, regular conflict during this time, a change in leadership, or the result of razing in order to level the site for rebuilding.

While to date the EBA at Kaman-Kalehöyük has been relatively under-studied due to damage from later periods and strata buried deeply under many later occupation levels, the building levels of the MBA have enjoyed much more scholarly attention. The MBA (IIIc) is the stratigraphic layer just following the “Transitional” EBA to MBA period and is identified at Kaman-Kalehöyük by the expression of typical non-local cylinder seals, bullae, Anatolian stamp seals, wheel-made ceramics, and cuneiform tablets that are comparable to the *karum* periods at Kültepe-Kanesh, spanning 1950-1750 BC (Hongo 1996; Omura 2011). Although there is no evidence for the existence of a *karum* (exchange or trade district) at Kaman-Kalehöyük (also see Acemhöyük), given the range of material that has been uncovered at the site, we cannot rule out the possibility that Old Assyrians visited, or were seasonally present at the site. The unearthing of period specific cuneiform tablet fragments at Kaman-Kalehöyük (Yoshida 2002; Michel 2011) is important because, aside from Kültepe-Kanesh (over 20,000 tablets), there are only four other sites that have produced cuneiform tablets or tablet fragments (Michel 2011: 319). This discovery alone places Kaman-Kalehöyük in a unique category because it's not only one of the few locations in central Anatolia to produce written remains in the early 2nd millennium BC, but it is a much smaller site, and also is located further west than the others, although it still lies to the east of the Kızıl Irmak (Red River). In the context of this study, the Kızıl Irmak serves as both a natural and cultural regional barrier – to the west of it, no cuneiform tablets have been found as of the writing of this paper; moreover, while shared ceramic styles between west and east sides of the river exist, after the onset of the MBA, assemblages share fewer common elements than do sites that are from the same respective sides of the river.

Collectively, materials recovered from the MBA at the site suggest that some residents at Kaman-Kalehöyük participated in a regional, if not inter-regional, interaction or exchange system, and may have had contact with northern Mesopotamians. Based upon its location, size, extensive vertical and horizontal exposures, dry screening protocol, well-defined stratigraphic sequences, and over thirty years of warehoused MBA material remains, remains from Kaman-Kalehöyük provided an outstanding opportunity in which to study the economic organization of a local peripheral site in both the EBA and MBA. It also provided a unique opportunity to monitor how smaller, less urban sites may have been economically or socially impacted as a result of the seasonal presence of northern Mesopotamians on the plateau in the 2nd millennium BC.

The following paragraphs represent an overview of currently available data, information related to my study areas, and period specific: architecture, ceramics, iconography (including written materials), other small finds, and archaeobotanical remains. This data was compiled from a range of sources on-site, including field notes, plans, journals, photographs, maps, personal observation, and published material. With the exception of faunal remains, which will be discussed more fully in Chapter 5, Table 2 serves as a quick reference to the excavated remains from Kaman-Kalehöyük discussed in this chapter.

		EBA	MBA
Architecture	Multi-room	Yes	Yes
	Orientation	NE/SW	N/S and NW/SE
	Construction materials	Mud-brick, stone, wood	Mud-brick, stone, wood
	Floors	White plaster	Compacted earth, white plaster
	Hearths	Round	Horseshoe
	Perimeter Wall	None to date	Present
	Interior features	None to date	Benches
Ceramics	Colors	Brown, red, tan, crème	Red burnished
	Construction	Handmade and small	Wheel-made, small and large
	Types	Wide spouts, rounded handles, flat bottoms	Beak spouts, Lion rhyton, triangular handles, pointed bases, Alishar III, small cups
	Painted Ceramics	Geometric, cross-hatch	Waves, wide stripes
Iconography	Seals	None to date	Cylinder (baked clay, haematite, limestone) and stamp (bone, stone)
	Sealings	None to date	Present
Writing	Present?	None to date	Cuneiform tablet fragments
Technology	Weapons	None to date	Bronze daggers, spear heads, blades
	Spindle whorls	Plain with flat bottom	Plain and geometric patterned, punted bottom
	Pins	Bronze simple	Bronze simple and fine; fine bone
	Tools	Flint blade, earthen pestle, stone, worked bone	Sickles/Awls/Needles, worked bone/stone, bone pestle, earthen thimbles and weights
	Grinding	Earthen pestle; grinding stone	Grinding stone
Burials	Type	None to date	Mass
Adornments	Earrings, pins, necklaces	Simple gold, bronze rings, simple bronze pins, pierced bone	Fine and simple bone pins; simple, fine, and filigree gold items and rings, necklaces; many bronze rings; siimple and elaborate bronze pins
Botanicals	Wheat	Lower (small sample)	Higher (small sample)
	Barley	Higher (small sample)	Lower (small sample)

Table 2. Kaman-Kalehöyük EBA and MBA Archaeological Material Comparison.

EBA Architecture, Associated Finds, and Study Area

Excavations through 2015 yielded portions of three EBA structures. One specific locus, labeled “Room 448”, was better preserved than the rest and is the primary EBA context evaluated in this study. Parts of floors, exterior paths, interior and exterior pits, and likely adjacent courtyard areas associated with Room 448 are also included. Faunal data from these EBA deposits complements previous analyses conducted by Atici (2003,

2005) in an adjacent trench (Sector III), which included room fill from a damaged architectural feature in building level 5 (Room 287), two exterior deposits, and four pits.

All structures included in this study seem to be domestic in nature and, based on the limited number of areas excavated, no current evidence suggests houses varied in terms of size or construction quality. Noteworthy, however, is that the remains evaluated in this study were drawn from stratigraphically sealed loci near the mound's highest points on the far north end. Even today, access to this location requires a long trek from the south because, to the north is a natural, virtually non-ascendable drop off. Large walls, coupled with small finds, storage jars, and grain remnants all point toward a social hierarchy and perhaps an elite complex in this part of the site. As of the writing of this paper, the Kaman-Kalehöyük team has yet to find any evidence of writing in the EBA nor any human or non-human burials.

Building structures of the Early Bronze Age at Kaman-Kalehöyük were made of wood and sun-dried mud-brick, with stone foundations. Structures and walls had either single large stone or double row medium stone foundations, with both types measuring approximately 0.6 to 0.8 meters wide. Though few in number, excavated rooms appear to be reasonably large; the interior of Room 448, for example, is at minimum four and a half meters long by five meters wide, and if the excavated hearth feature found inside of it was placed in the center of the room, the room itself was likely greater than thirty-six square meters. Based on charred wood remains recovered inside this room, some structures likely used long wooden beams as part of the building or roofing process. Pits of varying diameter (one to nearly two and a half meters of wide-ranging depth), both within and outside interior rooms (and exterior surfaces adjacent to them), have been excavated. Pit locations are consistent with the storage of goods inside structures and also the discard of refuse outside of them. In the IVb-EBA period rooms, hearths between one and one and one-half meters in diameter were present inside building structures; these are accompanied by typical smooth bases and ash deposits. Although to date there are few examples, based on site notes, it appears that walls were reused and shared, oriented northeast to southwest, and that floors and walls were sealed with a thick white plaster.

Room 448 and its associated structural components and small finds are of particular interest to this study. First, the room is located near the highest point of the mound, which ostensibly could have provided the best defensible position from any invaders, an excellent lookout for defensive purposes, housed local elites, or served as a more communal gathering location for cosmological or other social reasons. Room 448 appears to be part of a multi-roomed structure, evidenced by the threshold area in the northeast corner of the excavated area and the connected walls 31, 32, 34, and 36 (Figures 13 and 14). The west facing walls that include Room 448 likely extended to about 10 meters long, since the southwestern wall (W34) runs into the next grid toward the center of the mound. In the interior, a hearth was found roughly in/near the center of the room, and both walls and the floor in Room 448 were plastered, which is similar to the later MBA, but to date it is unknown if all floors in all structures across the mound were plastered.

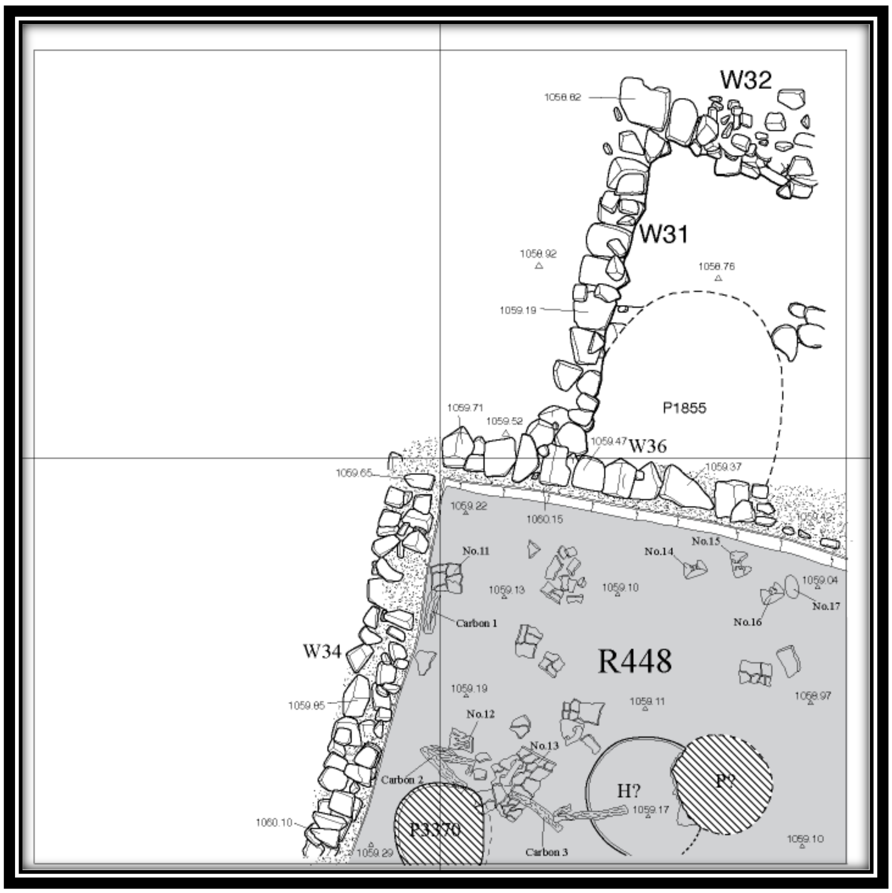


Figure 13: Rooms 448 (walls 34 and 36) and 450 (walls 31, 32, 36): quadrants 5x5 meters.

Many items were found both on the floor of Room 448 and in the burned layers just above it, including potsherds and more complete vessels, burned wood/beams, three hearth pedestals (which seemed a bit unusual), earthen loom weights, a golden earring, a grinding stone, and a bronze pin (see Figures 16A-B for small finds 1-17 in field notes). Pottery was hand-made and included a variety of styles and finishes (Figures 15 and 17); a crème-colored cooking pot was found, along with crudely made single-handled pitchers, small handled cups, a simple cooking tray, a spouted vessel, a single-handled jug, and many fragments of large two-handled crème and red-colored vessels (dubbed pithoi in the notes). A single painted potsherd was recovered, and contained simple geometric designs, including angled lines and cross-hatching. Additionally, burned wood and wheat was found both within large storage containers and on the floor of the room, the latter of which could have spilled from the vessels.

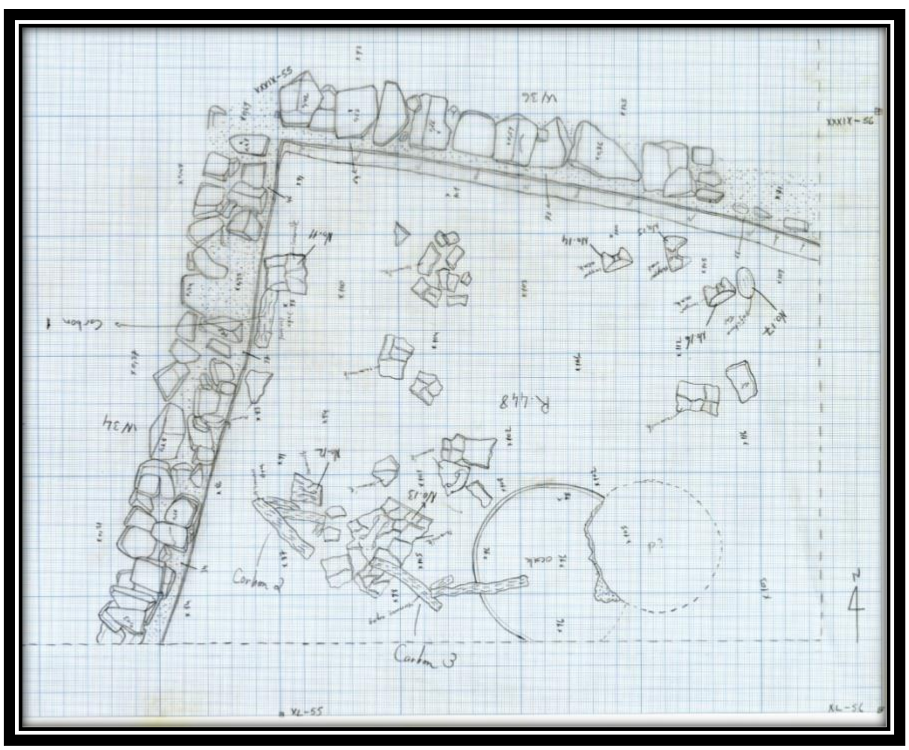
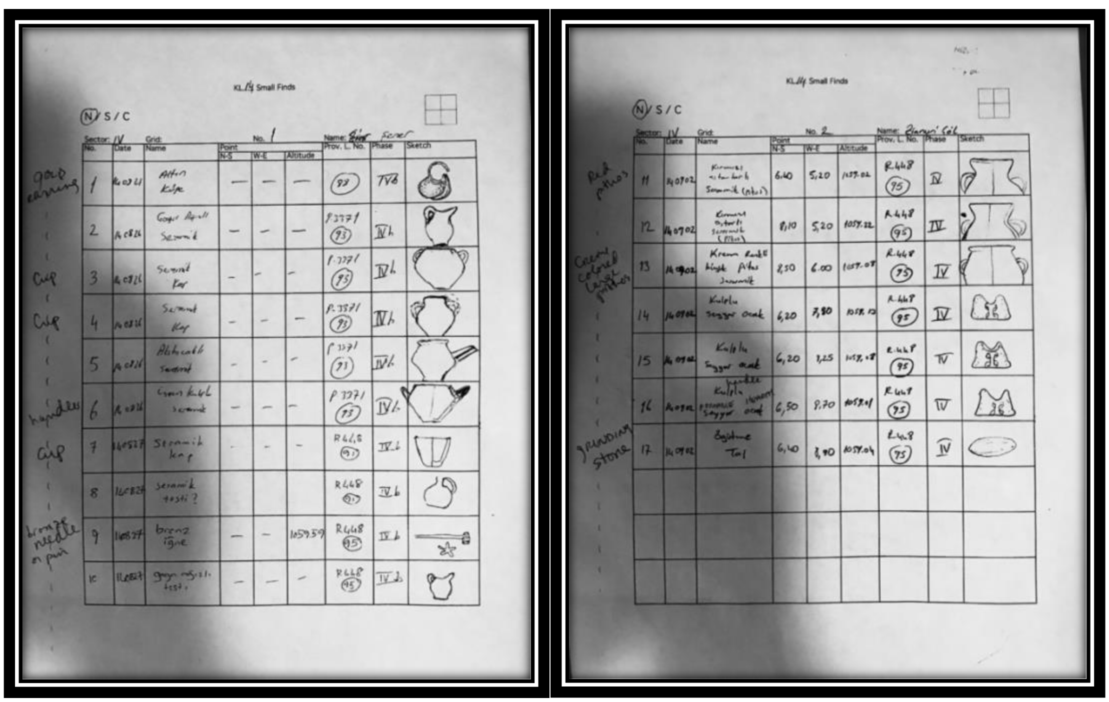


Figure 14. Room 448. Schematic drawn in-field.

Figure 15. Typical Kaman-Kalehöyük EBA Handmade Pottery Shapes and Colors

(with slightly offset handles).



Figures 16A-B. Room 448 Listing of Small Finds; 2014 Field Notes courtesy S. Omura and JIAA.

Figure 17. EBA (Level IV-b) Cooking Pot in Sector IV, adjacent to Room 448.

The golden earring and bronze pin found in the layers of fill above the floor in Room 448 suggest at least two things about the late third to early second millennium BC in central Anatolia: 1) precious metals were present in the region and were likely used as adornment by at least some members of the Kaman-Kalehöyük population (Figure 18B); and 2), the star-shaped top of the bronze pin recovered in Room 448 demonstrates at least access to, if not local production of, finer metal-crafting activity (Figure 16A). A hearth, in conjunction with a grinding stone, a cooking pot, a platter/tray, and wheat (both spilled on the floor and within the pithoi) serve to indicate that, at a minimum, food was prepared in Room 448, and grain storage took place there as well. Lastly, the recovery of multiple spindles and an earthen pestle in this room, coupled with the aforementioned finds, suggests that an array of domestic activities occurred in or near this location as well (Figures 17 and 18). In sum, whether on a macro or micro scale, production activities were evident in this part of the mound during the EBA. These multiple lines of evidence point toward some degree of socioeconomic stratification at Kaman-Kalehöyük in the EBA. First, these contexts were located on a high part of the site near the center of the mound, potentially with cosmological implications. Second, architectural remains are indicative of a large structure, either a public building or reflective of a wall that was shared by multiple connected structures. Third, bronze artifacts are relatively scarce in the EBA when compared to later periods, and gold is generally only found in elite graves or monumental architecture at other sites in central Anatolia. Finally, the storage of wheat in this room suggests a surplus of food resources; and, storage jars and grain surpluses are often associated with elite contexts.

Last, although my study does not include an evaluation of the Kaman-Kalehöyük late EBA strata (IV-a "Transitional" period), it is noteworthy that the sites' ceramic sequence presents some of the same wheel-made wares that were found in later MBA deposits at Kültepe-Kanesh (Ibid.: 1109). The shared ceramic styles between the two sites are consistent with interpretations of inter-regional interactions, and may indicate participation in an EBA social, cultural, and/or exchange network that included Kültepe-Kanesh, prior to more formalized interactions with the Old Assyrians on the plateau during the MBA. In addition, an increase in wheel-made, thus more mass produced, pottery in the "Transitional" period strata may indicate the introduction of new people, new technology, new demand, new local regimes, and/or a change in population size or social structure, predating the appearance of Old Assyrian cuneiform tablets on the plateau, the latter of which is often conflated with the “arrival of the Old Assyrians”.

Figures 18 A-B-C: EBA Spindles (Top); EBA Golden Earrings/Rings (L); EBA Pestle (R).

The EBA in central Anatolia has been characterized by the competitive hierarchically organized territorial city states with their specialized economies, the maintenance of regional traditions, and the oscillations in expansion and contraction of interaction networks. Furthermore, as discussed in Chapter 3, Çevik (2007) suggested that the political economy of the central plateau during the EBA was one of a centralized authority that had some measure of control over their peripheral areas. This is consistent with current evidence, but also pending the identification of more local large centers. Aside from Yassıhöyük, the 32-hectare site located 30 kilometers from Kaman-Kalehöyük, surveyed sites of the EBA across central Anatolia range in size from small villages (less than 1 hectare) to medium sized sites (which approximate 5-6 hectares). Despite not knowing the full extent of the EBA occupation at Kaman-Kalehöyük, it remains a candidate as either a strategic small village or medium sized site located in the periphery of a large center since it is situated on traditional overland travel and riverine transport routes. Given that Kaman-Kalehöyük falls within the small to medium size site continuum, and was likely home to fewer non-food producers than much larger sites, it is an ideal candidate for further evaluating herding strategies. Based on the EBA material remains, Kaman-Kalehöyük has demonstrated local Anatolian continuity, yielded shared regional styles and technologies with other small to medium sized local sites (ceramics), demonstrated evidence for social inequality and/or a potential elite complex, and was possibly attached to a large center (a site like Yassıhöyük or otherwise). Last, while Room 448 presented evidence for local production activity, a more detailed evaluation of Kaman-Kalehöyük's herding economy in the EBA – one of the goals of this study – will help better situate Kaman-Kalehöyük within the broader central Anatolian EBA landscape.

MBA Architecture, Associated Finds, and Study Area

Archaeologically, the MBA period at Kaman-Kalehöyük may be characterized as one of substantial change from the preceding EBA. In short, during the MBA, site plans included at least these seven salient features: more public sized buildings and a possible fortification wall were discovered; Old Assyrian cuneiform tablet fragments were recovered; cylinder seal technology (often attributed to Mesopotamia and/or Syria) was present and reflected a variety of local and non-local cultural traditions; a large increase in both agricultural and warfare artifacts were found; mass and individual burials were unearthed; new regionally widespread wheel-made ceramic styles emerged indicating broader interactions; and, possible shifts in archaeo-botanical patterns were identified. Despite the aforementioned multiscalar archaeological changes, complementary diachronic zooarchaeological evaluations do not exist. Previous faunal analyses were either preliminary in nature due to extremely small EBA sample sizes (Hongo 1996) or were focused on synchronic evaluations of EBA deposits (Atici 2003, 2005). These analyses will be discussed in more detail later in this chapter.

There are eight building levels in the Kaman-Kalehöyük MBA sequence (Phase III: 5-12, ca. 1950-1780 BC). All building levels were severely burned, many later deposits cut earlier strata, yet, through time, better preserved sun-dried mud brick walls consistently measured approximately 0.8 meters thick. Not all building levels have been identified across the entire mound since site level interpretation is challenging and requires more extensive synchronic evaluation of the cartographic intricacies associated with so many razed building levels.

What we do know is that in the earliest building level of the MBA at Kaman-Kalehöyük, a 1.5 meter wide, 3-meter-high perimeter wall was identified in the northern part of the site (Sector V, the 10-meter grid just north of the study area) with an adjacent 1-meter-wide pebble walkway, possibly indicating the edge of the settlement or a fortification wall. Then, in building level 11, a large wall was identified with a north-south orientation and was constructed of stones that were approximately 70-80 centimeters in diameter. Despite the conflagration in level 11, rooms were built along the same axis, and using the same large wall, through level 9. Inside certain structures, horseshoe shaped hearths were excavated in rooms from building levels 12, 10, and 9, which are characteristic of the period. In addition, ceramics with beak shaped spouts were found in fill from level 10, along with a rhyton in the shape of a lion, all of which are similar to those found in Level II excavations at Kültepe-Kanesh (Omura 1993: figures 7-11; Kontani 1991).

With level 8, the architectural orientation shifted to a northwest-southeast axis, and deposits were comprised almost exclusively of wheel-made red burnished ceramics, typical wares in the first half of the 2nd millennium BC in the central region (Omura 1993, 1994). Pottery included cups with pointed or rounded bottoms and bowls with triangular handles and pointed bases; some are painted with simple wave patterns (Figures 19A-B). Building levels 7 and 6 were characterized by a change back to north-south orientation, compacted earthen floors, and characteristic 2nd millennium BC pottery that was found *in situ* in some of the structures. Last, in level 5, remains of a building with a 70-centimeter-wide wall were found; a hearth adjacent to the wall may have been used as a production kiln since many coarse, unfinished potsherds were found inside of the feature (Hongo 1996: 12).

In terms of ceramics, while common household wares such as cooking pots and serving vessels were present in both periods, smaller coarse hand-made ware and flat bottoms from the EBA were replaced with both small and large fine wheel-made ceramics with pointed bottoms and fewer color variations in the MBA. While more EBA excavations are needed in the surrounding areas to better understand the types and distribution of ceramics, the recovery of wheel-made ceramics similar in style and form to Kaman-Kalehöyük in the MBA at sites both to the north and south of the site demonstrates the more widespread geographical expression of these wares. The wider geographical expression of similar MBA wares is consistent with more specialized production, the dispersion of new techniques that might have made pottery production more efficient, and/or an increase in more regionalized communications or interactions across more people and locations.

Figures 19A-B: Typical Kaman-Kalehöyük MBA Wheel-made Pottery

(finer temper, pointed bottoms).

Interestingly, a greater proportion of MBA vessels were much larger in size and of a different form than those recovered in the earlier period and a rare rhyton cup was found. The larger MBA ceramics, especially those with wheat residues on the inside, indicated an increased focus on surplus generation, grain storage, and likely differential access to, and control of, those surpluses. The shift from wide-spouted smaller forms in the EBA to beak-spouted small and large ceramic forms in the MBA suggests a change in the types of liquids which may have been stored or served from these vessels. For example, wide-spouted smaller ware may have been used to dispense water in the EBA; whereas, beak-spouted large ware may have been used to store or dispense oil or some other liquid, such as wine, which may have been more uncommon or required better flow control. The size and forms of the vessels recovered in the MBA are consistent with the accumulation of surpluses and potentially differential access to certain goods by certain members of the Kaman-Kalehöyük society. Finally, a rare lion rhyton cup similar in style to those found at Kültepe-Kanesh (Omura 1993: figures 7-11; Kontani 1991), was recovered from the Kaman-Kalehöyük MBA deposits. These cups are often associated with more ceremonial contexts, and the presence of one at Kaman-Kalehöyük suggests that certain members of the settlement may have possessed, displayed, and used uncommon or status-restricted wares. Rare vessels, *de facto*, are the privilege of very few members of society or local officials, and may indicate the existence of a new politico-economic regime and/or social structure at Kaman-Kalehöyük in the later period.

Through the 2013 excavation season, nine "rooms" dating to the MBA, and located near the center of the mound, were excavated and used to characterize the architecture of the period. In a few of the rooms, a half meter wide shelf or "bench-like facility" was found attached to the inner wall potentially indicating ritual activity; some of the walls contained heavy plaster, and the floors of the rooms were tamped, with two layers of ash on top of them (Omura 2011: 1106). With the exception of the "bench-like facility", other architectural characteristics are similar to other central Anatolian sites like Kültepe-Kanesh (Kulakoğlu 2011: 1020). The similarities of architectural styles may have been reflective of local traditions or simply the result of the building materials available in the region. Within the ash layers, and similar to findings in the EBA, excavators found a great deal of carbonized wood remains, which were likely used in the construction of structures, either as vertical posts used for roofing or perhaps even as support for multi-tiered structures.

Of particular interest are the ash layers above the floor in Room 150 (also refer to Room 149). While they contained carbonized wood, also within the first ash layer, three human skeletons were recovered: one adult and two children. In the second ash layer, twenty-three more skeletons were found, all identified as male (Hunt 2006, 2007). Human remains found on the floors of rooms 149 and 150 contained carbonized brain matter, and were associated with bronze weaponry (swords, blades, spearheads, etc.), as well as an *in situ* seal impression (Hongo 1996: 15). This evidence suggests a violent end to the period and supports the idea of constantly changing alliances and shifting control over the central Anatolian plateau in the 2nd millennium BC. While the function of Room 150 is unknown, Omura has suggested, based on location and reconstructed multi-roomed buildings, that this structure may represent some type of public architecture (Omura 2011: 1109).

Even though most of the rooms from Phase IIIc were at least partially damaged by the large round granary structures from the later Old Hittite Period, there were some other notable findings. In the smallest room of the nine excavated, measuring 1.7 by 2.5 meters, two interesting features presented themselves: an architectural anomaly resembling a window in a wall, and more intriguing, severely burned remains of eleven more skeletons, mostly infants (Omura 2011: 1107).

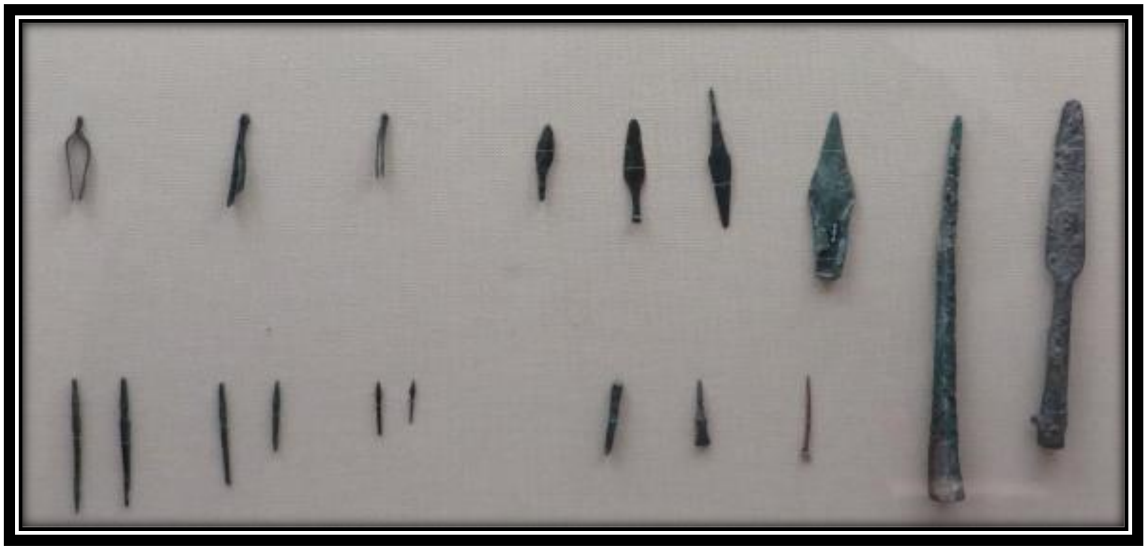


Figure 20. MBA Bronze Weaponry.

Additionally, in the exterior areas adjacent to the nine rooms still more skeletons were found, though badly damaged, along with bronze daggers, blades, and spearheads (Akanuma 2007; Figure 20). One skeleton was excavated by the author *in situ* with a spearhead embedded between its ribs and in the fetal position (see Figure 21; excavated in 1994), suggesting a battle, struggle, or ritualized sacrifice might have taken place at Kaman-Kalehöyük during the MBA (Omura 2011).

The recovery of these human skeletal remains, along with associated weaponry, and evidence for a possible fortification wall in the MBA, together aligned to other studies that have noted increasing levels of conflict among competing territorial city-states during the 2nd millennium BC (Bang and Scheidel 2013: 125). These remains also are consistent with the specialized production of implements of warfare, reveal the emergence of specialized jobs focused on protection and/or warfare, and suggest the attachment of followers to certain leaders (Bryce 1998: 24).

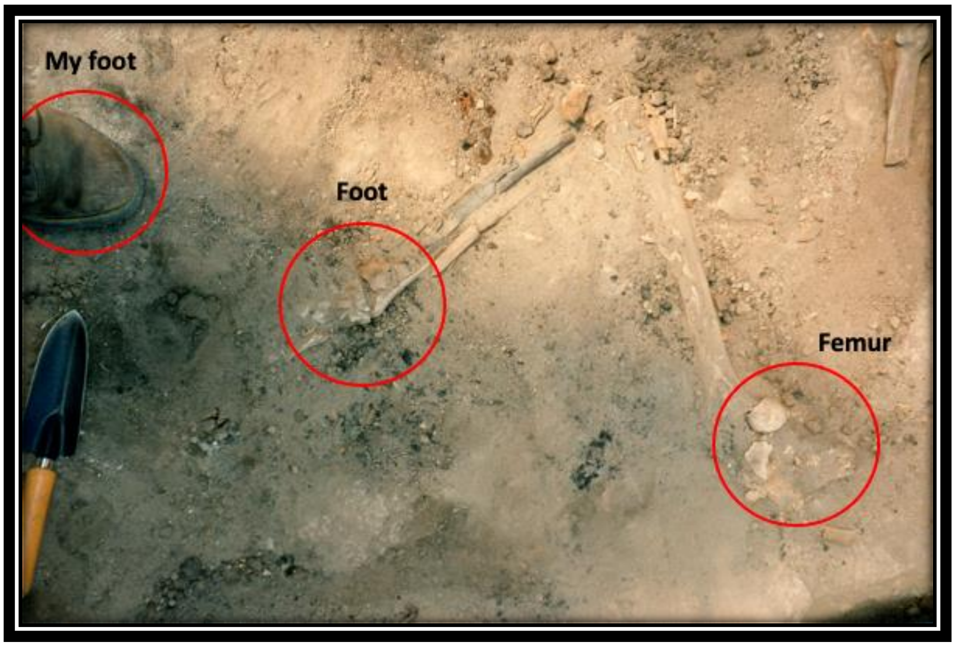


Figure 21. MBA Burial.

For this study, I was fortunate to be able to analyze excavated fauna from one of the better-preserved MBA rooms that had remained un-analyzed as of 2015. Extracted in 2013, fauna from Room 429 in the north trenches (Figure 22) provided an opportunity to study a commensurate architectural structure in close proximity to the EBA room contexts I evaluated. By piecing together several schematics, clearly this room was part of a multi-roomed structure, just like my EBA study area. This architectural feature is approximately 6 meters in length by 7 meters wide, and it contains what appears to be a storage area (rectangular 2 meters wide by 1 meter long) and hearth constructed in the period-specific manner. Its orientation is northwest to southeast, which positions it firmly within building level 8 of the MBA and reduces the probability that it was disturbed by non-MBA strata. Room 429 appears to be a part of either a large residence or some type of public architecture since its walls extend both further north and south; furthermore, at the northern edge, it shares an interior wall with Room 425 containing a large flat stone that appears to be a threshold connecting the rooms (Figure 22). In addition, further review of architectural drawings to the north and south reveal that the MBA included not only multi-roomed buildings, but also 1.5 to 2-meter-wide smooth pebbled walkways following a north-south axis, suggesting the possible reuse of walkways from other building levels of the MBA. The additional contexts reviewed for the MBA came from exterior fill material adjacent to this complex and were excavated in the 2006 field season.

A large volume of archaeological material was found that suggested access to finer craft production during the MBA at Kaman-Kalehöyük. More elaborate gold rings and pendants, along with some finer worked objects, and the possible early experimentation of iron smelting (Kucukarslan, Ota, Kobayashi, Nakamura, Omura 2023; Nurcan 2023) present points of departure in metallurgy from the previous period. In the MBA gold filigree rings were found alongside the simpler band styles found in the EBA (Figures 23 A-B-C), a wider variety of bronze pinhead patterns was recovered

(Figure 24), and more delicate stylized bone pins were found (Figures 25A-B). For example, in the former period, pins had a star shaped head; whereas, in the later period, a variety of new styles emerged, including round, sceptered, looped, square, and star heads.

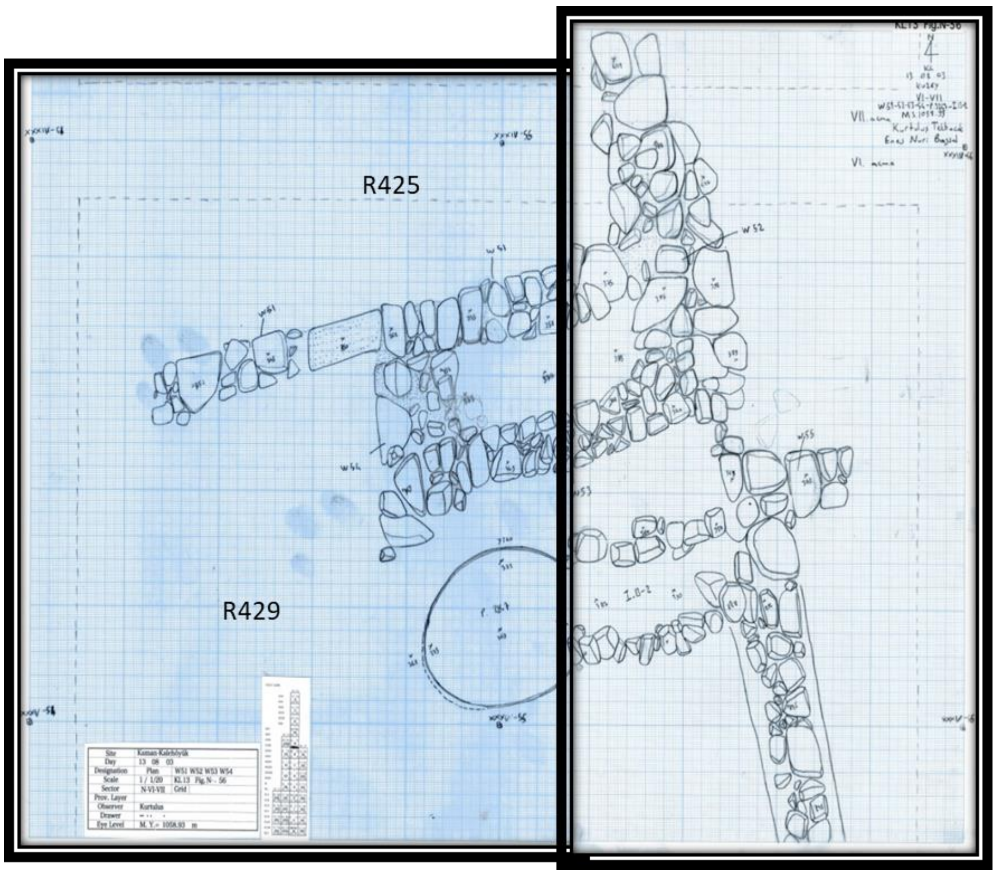


Figure 22. MBA Room 429: Sector VI, North Trenches.

The emergence of these new "fashion" styles not only indicated expanding degrees of specialization in the Kaman-Kalehöyük MBA, but also were likely associated with an expansion in degrees of social inequity. The bone and bronze pins were presumably used to fasten clothing, and are consistent with both the use of finer textiles and more elaborate adornments which may have served to differentiate certain members of the Kaman-Kalehöyük hierarchy from each other. For example, if differential access to certain textiles and pin styles were the privilege of only certain members of the Kaman-Kalehöyük social hierarchy, then the display of these styles in public would serve to communicate social messages related to status or identity (Wattenmaker 1998). In short, the substantial increases in finer crafting technologies and associated outputs of those technologies not only provides evidence consistent with expanding degrees of craft specialization, but also widening gaps in social inequity.

Figures 23A-B-C: MBA Gold: Rings (L), Pendants (C), Fine Worked Jewelry (R).

Figure 24. MBA Bronze Pins.

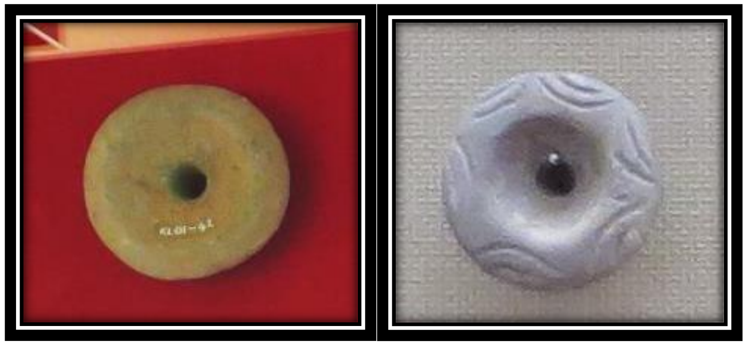
Figures 25A-B: MBA Worked Bone: Disc and Cylindrical Beads (L), and Pins (R).

Along with the finer worked metal and bone recovered in the MBA, many agricultural tools were also found (Figures 26A-B). Caches of farming technologies including awls, blades, sickles, grinding stones, and earthen weights in MBA loci may indicate an intensified focus on agriculture, the processing of harvested crops, and measuring of increased volumes of grain or other goods. It is important to note that concentrations of farming tools were recovered in two MBA interior structures (Rooms

149 and 150). These farming tool concentrations could mean that the tools were stored in a central location, such as a “shed” for use by those working the fields, and may indicate differential access to certain farming tools. In the latter case, these tools may have been owned or controlled by limited members of the Kaman-Kalehöyük population. In short, farming tools from the MBA may reflect an intensification of crop production intended for human consumption, and the generation of surpluses. These surpluses may have been leveraged to meet the rising food demands of a growing population, augment meat sources, or to support more administratively focused social groups who were less involved with raising animals for themselves. And, if differential access to more efficient farming technologies was in fact the restricted domain of a privileged few, control of those implements that allowed for quicker generation of surpluses could have perpetuated the expanding differences in social inequalities at the site. However, it is also important to note that since Kaman-Kalehöyük was a small rural, presumably farming, community in the EBA, the lack of farming tools and technologies recovered to date from the EBA likely reflects a sampling issue. More excavated material drawn from EBA deposits is required in order to better understand how tools and technologies were used both in the EBA, and how they and their use may have changed over time.

Figures 26A-B: MBA Agricultural Tools. Blades, Sickles (L) and Awls (R).

In the MBA remains, spindle whorls were found *en masse* when compared to the EBA, and shapes, sizes, and styles of the spindles changed from the earlier period. While in the EBA spindles were mostly plain with only a slightly concave bottom (Figure 27A), in the MBA spindles are both plain and marked with geometric designs, with deeper depressions (Figure 27B). The increase in spindles recovered in the MBA is consistent with an intensified focus on textile production, and together with other small finds, provides evidence consistent with not only increasing degrees of specialized craft production, but also surplus craft generation. Surpluses in crafts would afford the opportunity to those who controlled the goods to participate in exchange activity, and also suggests differential access to certain goods and volumes of goods, which also could drive increasing disparities among social groups.



Figures 27A-B: Spindles: A: EBA (L) and B: MBA (R).

While there are several points of departure in the Kaman-Kalehöyük MBA material remains when compared to the EBA, there is perhaps no greater divergence between the periods than in the expression of iconographic evidence, inclusive of seals and sealings, as well as writing.

MBA Iconography and Writing

In Southwest Asia, seals and impressed clay from the 5th millennium BC onward have provided insight into changes in art, fashion, ritual activity, local cosmologies, administrative and storage protocols, and exchange practices (Ayten and Atakuman 2023: 3; Collon 1990: 9, 19; Massa and Tuna 2019; Omura 1996; N. Özgüç 1965, 1968, 1980). These bodies of work also reinforce the point that wild and domesticated animals alike were and are intimately connected to local cosmologies and inextricably woven into the social fabric of society (Magness-Gardiner and Falconer 1994; Russell

2012). While originally created as a utilitarian item, over time, seals became known as symbols of power and authority and likely served as body ornaments, amulets, and protective objects for their owners and their owner's property. Cylinder seals were rolled onto clay and used as signatures of senders of goods, and clay seals were used to lock the contents in containers that passed from one exchange partner to another.

Stamp or cylinder seals may be made of clay, local or non-local stone, and intrinsically provide critical information related to local cosmologies, value systems, and inter-cultural contact. For example, some seals are made of lapis lazuli, indigenous to modern Afghanistan; thus, the finding of a lapis stamp seal at Tepe Gawra in northwestern Iraq around 3600 BC indicates contact of local and non-local populations (Ibid.: 33). Similarly, artifacts inscribed with the name of the Egyptian pharaoh Amenemhat the First, who reigned from 1991 to 1962 BC, were found together with more than a dozen lapis stamp and cylinder seals bearing motifs that were common in 3rd and 2nd millennia BC Iran, Mesopotamia, and Syria (Ibid.: 34) – all suggesting widespread interactions among many different peoples.

The recovery of typical 2nd millennium BC seals and sealing impressions representing a wide range of cultural traditions that span a large geo-cultural footprint suggest that by the early 2nd millennium BC residents of Kaman-Kalehöyük were in some way influenced by, or participating in, ever increasing spheres of long-distance interactions (M. Omura 1996). Seals also inform our understanding of expanding degrees of specialization and social inequality at Kaman in the MBA, especially if future excavations of Kaman-Kalehöyük EBA deposits continue to lack these types of finds.

The recovery of administrative devices signaled the existence, at Kaman-Kalehöyük or otherwise, of specialists who created, used, and interpreted these devices, as well as exchange specialists who transported the goods to be exchanged and executed the actual exchange. This archaeological evidence is consistent with other 2nd millennium BC scholarship that has characterized the MBA with intensified specialization, expanding interaction and exchange spheres, and expansionist activity associated with competing territorial city-states. Kaman-Kalehöyük MBA data is also consistent with philological studies which have described the MBA political economy as one where a local seat of power, such as a vassal of a new centralized politico-economic regional center, presided and held sway over the site (Bryce 1998: 24; Özgüç 1983: 319; Veenhof and Eidem 2008: 225). The recovery of Anatolian stamp seals and cylinder seals using Mesopotamian technology, but often with local Anatolian motifs, suggests not only expanding inter-regional interaction spheres, but also local control over exchange activity.

The administrative recording devices found in the Kaman-Kalehöyük MBA also have implications for expanding social inequities. First, cylinder and stamp seals are consistent with the expansion of social inequities since they are: typically associated with members of society who have the ability to generate surpluses, often considered heirlooms or highly valued items that are passed down from one generation to the next, often made of non-local material, used to signify ownership of certain goods, and are uncommon in the archaeological record (Collon 1990: 9, 19, 33). Furthermore, the exchange specialists who use seals may occupy unique social roles. The ethnographic record shows that exchange specialists and those who can read and write are often associated with powerful leaders or elite members of society, and sometimes are revered by those who have less experience dealing with peoples or lands outside of their immediate residential vicinity (Bittman and Sullivan 1978: 214; de Laguna 1972: 465-456; Helms 1988: 82; Lienhardt 1954: 159; Sahagun 1959: 22; Townsend 1979: 31-32). In short, seals signify expanding social inequities because they have intrinsic and symbolic value and are associated with economic power in the form of surpluses and differential access to various peoples and goods.

In order to emphasize the range of the cultural traditions displayed at Kaman-Kalehöyük during the MBA, below I summarize the stylistic elements present on a sample of iconographic remains recovered at the site. I review one baked clay seal impression, (Figure 28: KL89-240), two stone cylinder seals (Figure 29: KL90-4 and Figure 30: KL94-5), impressed bulla fragments (Figure 31: 94N-Se14), and a clay vessel sealing (Figure 32: KL94-187).

Figure 28: Cylinder Seal Impression: Schematic Old Assyrian Style (KL89-240).

KL89-240, a baked clay cylinder seal, was found in the fill removed from Room 48 of strata IIIc, dating to the fifth building level of the MBA (Figure 28). As the image shows, this cylinder seal impression includes three figures, two seated and one standing, all facing some unknown symbol. Two of the figures appear to have raised hands, two have some sort of headdress or horns, and all seem to be bearing some sort of tool or weapon. There is a dividing line, potentially a staff, between those figures with headdresses and the rear-most seated figure. Singular lines above and below the figures are present, and characters are highly schematized given lack of facial features or other details. Similar figural representations with long arms and large feet have been found in Turkey at Kültepe-Kanesh (Özgüç 1968, plates XXVII-2, 3, 4), Alişar (von der Osten 1937, plate 246/3362), and Konya-Karahöyük (Alp 1972, plates 12-14/26-32). This type of seal is thought to have been produced in Anatolia and Syria, and also appears at Tell Atchana near modern day Iskenderun, Tell Mardikh/Ebla in Syria, and into Mesopotamia, Palestine, and Iran (Mazzoni 1975; M. Omura 1996).

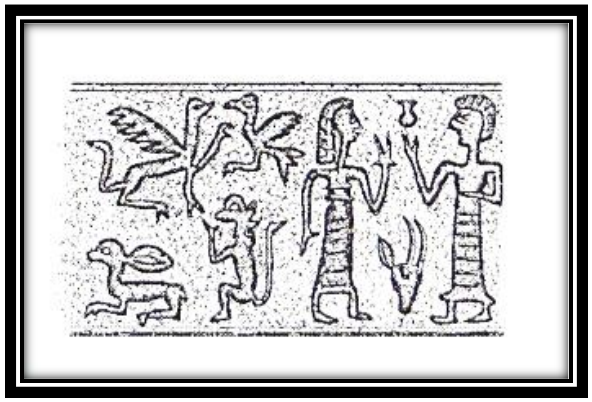


Figure 29: Cylinder Seal Impression: Syrian Style (KL90-4).

KL90-4, a hematite cylinder seal, was recovered from fill of Room 46 in the seventh building level of the MBA, and likely corresponds to Kültepe-Kanesh Ib levels (Figure 29). According to Collon, hematite was a common stone used for high quality cylinder seals from approximately 2000 to 1600 BC in Southwest Asia (1990: 36), thereby possibly indicating the existence of higher status individuals or classes. This seal was found together with a metal rod inserted through it, clearly showing how its impression was rolled by ancient people. The motif includes two figures, a male and female, facing one another. The male figure is holding a vessel in his right hand, and the female appears to be reaching for the same vessel with her left. The female figure is a typical "Syrian" woman, and similar examples have been found in central Anatolia at Kültepe-Kanesh (Özgüç 1968: 54-57) and Konya-Karahöyük (Alp 1972, plates 11/21-23). The illustration between the figures might be some horned animal, and is typical of the

“Syrian” style coined by Alp (1972: plates 11/21-22). Next to the human figures we see griffins, rabbits, and monkeys, all possessing long limbs that are similar to those found at Kültepe-Kanesh (M. Omura 1996; Özgüç 1968, plate VIII-A).

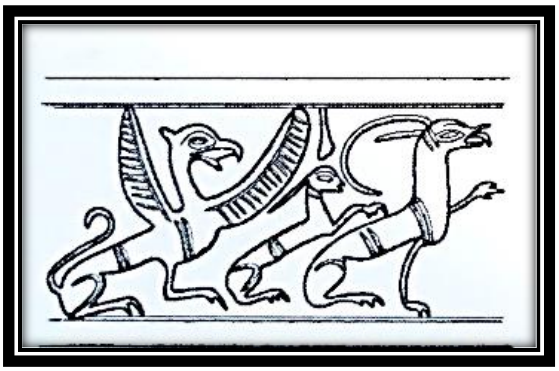


Figure 30: Cylinder Seal Impression: Anatolian Style (KL94-5).

A limestone cylinder seal, KL94-5, though bearing MBA stylistic elements, was recovered from a later period pit (P1071 in Sector II), and therefore was likely reused or kept as an heirloom (Collon 1990: 19), perhaps indicating that cylinder seals at Kaman-Kalehöyük, like those from other sites, were passed down through generations. This stone seal has a griffin, antelope fawn, and an adult antelope between incised lines at the top and bottom of the artifact. Overall, it contains components of Syrian and Anatolian styles, the former related to body proportioning and an effect of movement (Collon 1987), while the latter is related to details of the eyes, mouth, and noses found on examples from Kültepe-Kanesh, Alişar, and Hattuŝ (M. Omura 1996). The antelope facial features are similar to a unique find at Kültepe-Kanesh (Özgüç 1968, plate VII-A, XV-D), which did not neatly fit into any particular well-known regional style; it has been suggested that this seal was made locally, but heavily influenced by other traditions, hence dubbed, “Anatolian” (M. Omura 1996).

Figure 31: Cylinder Seal Impression on Bulla: Syrian Style (94N-Se14).

Find 94N-Se14 is a fragment of a bulla impressed with a cylinder seal (Figure 31). The seal displays three human figures on one side, and string lines on the opposite. Similar types of motifs have been found at Kültepe-Kanesh (Özgüç 1968, plate V3) and Alişar (von der Osten 1937, plate 246-d2987, b1000), confirming the use of this style across several hundred square kilometers inside the bend of the Kızıl Irmak. Figural features are apparent in both schematic Assyrian and Syrian styles.

Last, KL94-87 is a baked clay stopper for a narrow-mouthed vessel that has been decorated with cylinder seal impressions (Figure 32). The design is characterized by a long-robed ceremonial figure standing on top of a bull. In one part of the sealing it appears that the figure is controlling the bull with one hand, and in the other impression, holding a goblet in the air. This figure is also found at Kültepe-Kanesh in the Level II period (Özgüç 1968, plates IX-26-27; XI-31-32, XIX—56, VV-21, etc.) and has been dubbed “the Anatolian weather god” (Özgüç 1965; M. Omura 1996). A disc and crescent appear above the human figure, and three features tie this seal to the Şaluvanta-Anatolian style: a kneeling figure facing a deity (Özgüç 1965, plate VIII-23); fawns looking backwards at a deity and/or bull (Özgüç 1968, plates X-28, XVII-52, and XXI-64); and, the use of animal heads to fill in space between figures (Collon 1990: 48; Landsberger 1948).

Figure 32. Baked Clay Stopper: Şaluvanta-Anatolian Style (KL94-187).

Overall, the seal and seal impressions found at Kaman-Kalehöyük demonstrate cross-cultural interaction among many different distinct cultural groups. There are not only examples of “pure” local styles such as the Anatolian-Şaluvanta, but also a clear presentation of more far-reaching cultural traditions. Evident also, via these remains is that local Anatolians were engaged in some activity that required the identification of commodity ownership and transference, implying some measure of controlled exchange interactions as well as some method of accounting for the goods which were exchanged. The increased expression of seals and sealings in the MBA not only signifies formalized mechanisms associated with the passage of goods between or among peoples, but also is consistent with an increase in specialized production activity, increased surpluses that were controlled by certain members of society, and differential access to certain desired goods.

While seals and seal impressions provide supporting evidence consistent with the participation in long-distance interaction networks and differential access to certain goods of value, and other material remains speak to additional points of departure from the earlier period, of great significance to this diachronic study is the discovery of cuneiform tablet fragments at Kaman-Kalehöyük in the MBA. It cannot be emphasized enough that the more than 20,000 cuneiform tablets found at Kültepe-Kanesh have long been the focal point of 2nd millennium BC scholarship in central Anatolia. To date, tablets or tablet fragments have been recovered from only a few Anatolian sites: Boğazköy/Hattuš (72 tablets), Alişar/Amkuwa (63 tablets), Kaman-Kalehöyük (2 tablets) and one at Kayalıpınar (300 km east of Kaman-Kalehöyük, and 300 km northeast of Kültepe-Kanesh, near modern day Sivas, Turkey) (Michel 2011: 319). As a result, the cuneiform written remains found at Kaman-Kalehöyük are exceptional, especially given the scarcity of tablets found at small sites and from the western reaches of the Kızıl Irmak basin, and obviously, outside of Kültepe-Kanesh. Scholars have suggested that the tablets found at Kaman-Kalehöyük are similar to those found in level Ib at Kültepe-Kanesh (Yoshida 1991, Omura 1994) and were found in III-c building level 6 while removing a wall.

These fragments are important to the current study for a few reasons. First, finding these rare cuneiform tablet fragments at Kaman-Kalehöyük may not only signify Kaman-Kalehöyük's participation in expanding interaction networks but also perhaps the existence of local literary specialists such as scribes or translators who could create and decipher tablets. This is important, not just in terms of creating new specialized social roles, but because the ability to read or write, or even an association with literate peoples, was often the restricted domain of certain members of society. Second, the rarity of tablet fragments recovered in 2nd millennium BC central Anatolia suggests that some social groups at Kaman-Kalehöyük had differential access to foreign peoples or objects. Third, the tablet fragments may also suggest that some social groups at Kaman-Kalehöyük were engaged in sufficiently complex economic transactions that there was a need to write/record those transactions or communicate the nature of the transactions to someone from another site or region. And finally, the tablets may suggest that someone at Kaman-Kalehöyük was literate, though we of course don't know if the person(s) were Anatolian or Assyrian.

Figures 33A-B: Kaman-Kalehöyük MBA Cuneiform Tablet Fragments (courtesy S. Omura).

One of the tablets is nearly complete on one side, highly damaged on the other, and contains fourteen lines of writing that include human names and references to silver, barley, and wheat (Figures 33A-B). The human names present on the tablet are Ata ("leather dresser"; aŝkāpu) and Hapuaŝu, neither of which are identified as Assyrian names; they contain Indo-European factors that are more reminiscent of later Hittite and Luwian usage, possibly indicating the use of these tablets by central Anatolian indigenes (see Vernet and Vernet 2014, Yoshida 2002, 133 lines 10.13; Omura 2002: 5). References to units of measure typically used for grain were also identified on the tablet; for example, *ša-ar-ša-ra-na* approximates *šaršarannum / šarašrannum*, and means an "Anatolian vessel of standard size used as a capacity measure of half or one-third of a jar [*karputum*]" (II, Ib; Assyrian, Anatolian (Ibid.). According to Dercksen (2007), *šaršarannum / šarašrannum* is possibly a reduplicated form of the Hittite *a*-stem *šarra* – "portion, share", (which is cross-referenced with the word *ša/era/ešrannum* in Kt k/k 100, with the absolute state *še-re-ša-ar* in lines 11.13; see Dercksen 2007: 38; Sallaberger 1996: 117).

Recognizing the contextual and accompanying relative dating challenges associated with finding cuneiform fragments mixed in a wall, their appearance and translation indicate at least indirect contact with Mesopotamia and participation in a widespread interaction network. In conjunction with other material remains, the tablets also support the contention that there were substantial differences between the Kaman-Kalehöyük EBA and MBA, although the drivers for such change is unknown.

Archaeobotanical Research

Archaeobotany, the study of archaeological plant remains, helps researchers understand how people engaged with their physical landscapes. Botanical remains can provide information related to how plants may have been used in ancient economies as well as in social interactions. An evaluation of archaeobotanical research on Kaman materials can provide insight into the foods that were available at the site in a given time period, and how consumption patterns, agricultural and pastoral activities, and culinary encounters may have changed over time. Botanical studies can also shed light on ancient medicine practices, crafting, and materials used in architectural structures (McClatchie 2023).

The archaeobotanical research from Kaman-Kalehöyük is best understood when EBA and MBA patterns are juxtaposed. Analyses of excavated plant remains at Kaman-Kalehöyük formally began in the 1990s, continued with some measure of consistency for about a decade, and included hand sorting of earth samples as well as flotation (Fairbairn 2002, 2004, 2005; Kennedy 2000; Letts 1995; Nesbitt 1993, 1995). The initial focus of botanical evaluation was to develop a foundational understanding for each of the main strata and food storage protocols at the site. Not surprisingly, botanical studies related to the EBA and MBA at Kaman-Kalehöyük are limited in both volume and scope, but they do provide some evidence for potential diachronic shifts in the site's economic organization, and all are extracted from sectors in the north trenches in close proximity to my contexts. In all periods, wheat (and chaff), barley, emmer, einkorn, wood, and dung were identified.

The profiles of four published EBA samples analyzed in the field from 2002 to 2005 are summarized in Table 3 (Fairbairn 2002, 2004, 2005). One whole earth sample, drawn from a burned layer in Sector IV, was comprised almost entirely of six-row hulled barley. The second sample – the first of three published flotation samples – came from general building fill in Sector III of the north trenches adjacent to my study areas. It included a large proportion of charred wood remains mixed with dung, along with a variety of grains and seeds. These remains have been interpreted by Fairbairn as being part of the construction materials of a mud-brick and wood building. Further analysis of dung remains from the sample yielded barley grains and bread wheat, along with weeds from both dry and wet areas, all consistent with what the local landscape could support. A single lentil was identified.

Another EBA flotation sample, drawn from a hearth feature in Sector III, was predominantly comprised of six-row hulled barley and dung, and contained small amounts of straw and wood along with dry weeds. Of particular interest is the appearance of a grape pip, which is the earliest evidence for its use at Kaman-Kalehöyük, and raises questions related to whether it was imported from more suitable climates, or if it was locally produced (Fairbairn 2002). The last EBA flotation sample was drawn from general room fill in Sector IV and was consistent with finds from the other samples. It contained a high concentration of wood, remains of bread wheat, and six-row hulled barley, in addition to traces of dry and wetland weeds, and a single grape seed (Fairbairn 2004).

The staple range of MBA botanical remains at Kaman-Kalehöyük is similar to earlier and later periods, but with some notable exceptions. Pulse crops included bitter vetch, lentil, pea, and chickpea. While lentils were present in periods before and after the MBA, bitter vetch was not identified in the EBA, and peas and chickpeas were not present in samples again until the Iron Age (Fairbairn 2002: 207).

Table 3. Archaeobotanical Finds at Kaman-Kalehöyük

Identification	**Vernacular**	**EBA (IVb)**	**MBA (IIIc)**	**Old Hittite (IIIb)**
Triticum aestivum	Bread wheat	**	*****	****
Hordeum vulgare	Hulled barley	*****	**	**
Triticum di/monococcum	Emmer/Einkorn	*	***	*
Vicia ervilia	Bitter vetch		*	*
Lens sp.	Lentil	*	*	*
Pisum sativum	Pea		*	
Cicer arietinum	Chickpea		*	
Vitis sp.	Grape	*	*	*
Crataegus sp.	Hawthorn		*	
Cucurbita sp.	Dryland weeds	Present		
	Wetland weeds	Present		
	Dung	Present	Present	Present
	Wood	Present	Present	Present

(Adapted from Fairbairn 2002: relative abundances: low = * or **, medium = ***, high = ****+).

In terms of fruits and other remains, grapes, dung, and wood were present in MBA samples as well as in previous and subsequent period samples; however, hawthorn was identified in the MBA, and there is a stark absence of dry and wetland weeds when compared to the EBA. The absence of weeds in the MBA may indicate a change in building construction technique or source material, animal fodder requirements, animal herds, and/or grazing locations. Last, finer analysis of animal dung suggests that bread wheat and hulled barley were the predominant sources of animal feed in the MBA (Fairbairn 2004).

Cereals included bread wheat, hulled barley, emmer and einkorn. Of note, while emmer and einkorn were present in all periods, in the MBA these glume wheats were found in unusually large quantities relative to other strata, including samples (S044) drawn from Room 150 (Nesbitt 1993; Fairbairn 2004), the same room that yielded 26 skeletons and bronze weaponry. Additionally, there is a higher proportion of bread wheat compared to the earlier period, and less barley, a pattern also observed in a similar diachronic evaluation at Kültepe-Kanesh (Fairbairn 2014: 191). In conjunction with the absence of weeds, the decline in barley may also indicate a change in economic organization during this time, possibly related to alterations in herd composition or a shift in focus from more pastoral to more agricultural activity. More data is required to better evaluate these potential shifts in botanical remains.

A hand collected sample from Room 151 (S046) of the MBA was composed almost exclusively of einkorn, while a second sample (S045) from Room 150 contained high concentrations bread wheat, lemmas, remains of charred cloth, and thread fragments (Fairbairn 2004: 109). Based on the weaving patterns identified, the burned textile remains may have been either from grain storage sacks, insulation coverings for walls or floors, or even clothing donned by the deceased in the same context (Ibid.). The unique finds in the MBA samples may indicate changes in cereal preference, or even differences in consumption patterns by status, assuming Rooms 150 and 151 were parts of buildings inhabited by more elite residents.

In summary, the EBA and MBA at Kaman-Kalehöyük present intriguing profiles that with additional studies may prove consistent with inflections in other lines of evidence. While bread wheat, and emmer and einkorn were all present in the EBA samples, barley was up to five times more prevalent in the evaluated samples (Fairbairn 2002: 207). Furthermore, in his 2002 analysis that synthesized all prior archaeobotanical work completed at Kaman-Kalehöyük, Fairbairn noted nearly up to three times more emmer and einkorn in the MBA when compared to samples drawn from both earlier and later deposits at the site (Ibid.). The patterns identified by Fairbairn are intriguing because Zeder (1991: 50) has suggested that wheat production is primarily focused on human consumption; whereas, barley is predominantly intended for non-human animals. Others have found the same to be true. For example, in a review of late 3rd millennium Ur III textual and archaeobotanical data, Adams suggested that a shift from wheat to barley could indicate an increased focus on fodder cultivation that could support the requirements of larger herd sizes (1981: 149-151). Therefore, if Adams' observation was correct, a shift away from barley in favor of wheat may indicate a decrease in fodder cultivation, which may suggest either a change in the location where animals are kept, or less focus on herding activity and more of a focus on human consumption. If these patterns hold true as additional samples at Kaman-Kalehöyük are evaluated in the future, then these archaeobotanical results may indicate a decrease in pastoral activity and an increase in agrarian or other non-pastoral activity.

Overall, while these archaeobotanical finds provide some understanding of the botanical profiles for each period at the site, they require larger sample sizes and must be contemplated in conjunction with patterns in other material remains, such as faunal data, which can provide complementary insight into potential dietary changes over time.

Summary

While the archaeological data presented in this chapter may ultimately depict the differences between the EBA and MBA occupation levels, it is not without caveat. As discussed on several occasions throughout this paper, the volume of EBA excavated material represents a fraction of that which has been unearthed from the MBA. While the fauna from the EBA and MBA loci evaluated in this study are located in adjacent trenches near the top of the mound, more EBA excavated material and subsequent analysis is needed to better evaluate all of the potential site-wide diachronic changes noted in this chapter. For example, given the extensive material recovered from the

MBA, it is unlikely that any handmade ceramics will be found. However, given the relative paucity of EBA deposits excavated to date, it is possible that EBA deposits excavated in the future may yield some wheel-made ceramics.

In closing, the patterns observed in material remains at Kaman-Kalehöyük, coupled with textual translations of the MBA, both suggest that local communities changed both economically and socially between the EBA and MBA, and may have adjusted their economies to supply those who participated in the Anatolian – northern Mesopotamian exchange system with food and other animal by-products. Despite multiple lines of evidence that indicate changes took place at Kaman-Kalehöyük from the EBA to the MBA, corroborating faunal analyses are absent. This diachronic zooarchaeological study of the animal economy at Kaman-Kalehöyük provides a means to assess whether local Anatolian economies actually did reorganize in the 2nd millennium BC, and whether they made different herding decisions to accommodate an increase in the proportion of the plateau's population that was less focused on raising herd animals for themselves.

CHAPTER 5: PREVIOUS FAUNAL RESEARCH AT KAMAN-KALEHÖYÜK

Three pertinent faunal studies conducted at Kaman-Kalehöyük predated this evaluation, and as of the writing of this paper, represent the only faunal analyses conducted on small rural sites of the EBA and MBA in central Anatolia. As such, they have served as the foundation for current interpretations of economic and social change that took place at Kaman-Kalehöyük during these periods. These studies provide excavation and contextual insight, and also serve two additional functions, providing both baseline reference points and supplementary data for this current study (Hongo 1996; Atici 2003, 2005).

Hongo's 1996 pioneering study at Kaman-Kalehöyük generated phase-specific baseline faunal data and patterns, especially for the MBA and thereafter, laying a diachronic foundation from which to study each period at the site more comprehensively (Table 4, below). Also, her review teased the reader in each chapter with thought-provoking questions for future inquiry related to socio-political and economic change over the long occupational sequence at Kaman-Kalehöyük and in central Anatolia *in toto*. On the whole, Hongo's data set provided a descriptive jump-station from which all future zooarchaeologists at the site could begin to apply anthropological theory to better understand the dynamics at a relatively small, local, and rural, yet important site on the north-central Anatolian plateau. Also invaluable to the current study were Hongo's commentary and discussion points related to comparisons between Kaman-Kalehöyük and Kültepe-Kanesh. Hongo's sampling strategy was to draw "enough" fauna from carefully chosen contexts to establish diachronic profiles of each main occupation, following the assumption that if bones were chosen from stratigraphically sound features, they would present a reasonable representation of the entire faunal sample (Meadow 1980).

Hongo's fauna were derived mostly from three different types of contexts in north trenches (sectors 0, I, III, IV, V, and VI), and included: a) fill above floors in well-defined rooms, b) fill from outside surfaces adjacent to defined architectural features, and c) pits where the original top and bottom were clearly identifiable (Hongo 1996: 54-55). While all sediment at the site was run through a one-centimeter dry sieve, Hongo conducted a flotation experiment to ensure sample integrity. Based on her findings, she deemed recovery bias at the site was very low. Hongo chose NISP tabulation versus MNI for a variety of reasons (Ibid.: 59-61), recombined bone fragments that were subject to post-depositional breakage, and grouped those fragments that were clearly related to the same animal in ancient times (e.g., refitting teeth to mandibles and maxillae, articular ends to shafts, etc.). In these instances, bone remains were often glued back together to assist potential future analytical inquiry, and were counted as one specimen. Although data tabulation was comprehensive, Hongo did not include any statistical tests of proportional significance either diachronically or synchronically in her review.

	Hongo 1996		Hongo 1996	
	EBA Count	**Percentage**	**MBA Count**	**Percentage**
Aves sp.	-	0.0%	1	0.1%
Bos taurus	7	10.6%	191	22.1%
Bos primigenius	0	0.0%	0	0.0%
Canis sp.	11	16.7%	20	2.3%
Carnivora	1	1.5%	4	0.5%
Cervus sp.		0.0%	2	0.2%
Equus sp.	1	1.5%	7	0.8%
Felis sp.		0.0%		0.0%
Felis catus		0.0%		0.0%
Gallus gallus		0.0%	1	0.1%
Homo sapiens		0.0%		0.0%
Lepus sp.		0.0%	7	0.8%
Mustela sp.		0.0%	2	0.2%
Ovis sp./Capra sp.	28	42.4%	422	48.9%
Rodentiae sp.		0.0%	1	0.1%
Shell		0.0%		0.0%
Snail		0.0%		0.0%
Sus domesticus	18	27.3%	203	23.5%
Testudo graeca		0.0%	2	0.2%
Vulpes vulpes		0.0%		0.0%
ID	66	100.0%	863	100.0%
Unid	121		1,560	
Total	187		2,423	

Table 4. Hongo (1996) Kaman-Kalehöyük EBA and MBA Faunal Relative Abundances.

Overall, Hongo observed that approximately 90% of her assemblage was comprised of domesticated animals. Sheep, goat, cattle, and pig bones formed the bulk of the analyzed material, with a relatively small number of equid and canid remains rounding things out. Wild animals were uncommon at Kaman-Kalehöyük according to Hongo, noting that remains of large and medium size wild fauna were rarely encountered (Ibid.: 82).

Though Hongo's EBA faunal sample was small, some 187 total fragments, of which just over 35% were identified to the species, genus, or family level, her MBA assemblage was comprised of 2423 fragments, of which she also identified approximately 35% to the same level of specificity. Of particular interest to this study, despite Hongo having characterized her summary results as demonstrating gradual change over time (and highlighted issues resulting from her EBA sample size), some indicators suggested that there was, in fact, a change in faunal patterns, and at Kaman-Kalehöyük, from the EBA to MBA. These indicators are discussed below. A brief overview of the primary domesticated animals at the site also revealed some patterns hinting at material differences over time.

Hongo found domesticated cattle (*Bos taurus*) in all stratigraphic levels, and although noting a wide range of bone size variability in measurement data, she did not categorize any remains as belonging to wild breeds. Cattle comprised approximately 10% of Hongo's EBA sample, and climbed to more than 20% in the MBA, potentially suggesting an increase in one or more of the following: traction needs for farming, cattle byproducts, reverence for the animal, social value of cattle, and/or desired beef consumption.

Considering sheep/goat (*Ovis sp./Capra sp.* or OVCP) remains, Hongo noted an increase in their importance over time from the late EBA (42%) through the 2nd millennium BC (49%). In Hongo's evaluation of kill-off patterns of sheep/goat, a mixed herding strategy was identified in both the EBA and MBA, which emphasized a combination of milk, wool, and meat (Hongo 1996: 129, 132). While Hongo saw an increase in sheep/goat remains over time, the ratio Hongo identified as cattle versus sheep/goat increased from the EBA to the MBA from 1: 4 to 1: 2.5. Overall, Hongo observed "…a sudden drop in the proportion of sheep and goats to cattle in subphase IIIc…" suggesting a shift in production focus (Ibid.: 79).

Pig (*Sus domesticus*) remains constituted approximately 25% of Hongo's sample from both the EBA and MBA and showed little change in relative abundance over time (27% to 24%). However, Hongo's data showed that a high proportion, 40-50%, of pig teeth found in both EBA and MBA contexts were from very young animals (Hongo 1996: 131). This high proportion of juvenile pigs, is not unexpected, since pigs are typically slaughtered at younger ages (under 12 months) prior to breeding ages.

In Hongo's study, equids comprised approximately 1% of the samples evaluated in each period. Hongo combined all equid (horse, ass, and mule) remains into a single category due to the similarities in the morphologies of horses and mules and the difficulty in distinguishing long bones among the three. She noted that equids are usually kept longer than other domestic animals because they are: a) not typically slaughtered for meat until old age (Ibid.: 72), b) often owned by more elite members of a population, and c) typically less abundant than other domesticates. Based on results from other locations, and the exchange activity described in MBA cuneiform texts, Hongo anticipated that donkeys dominated the equid remains in the EBA, with horses growing in relative importance over time (Ibid.: 73).

In addition to changes in relative animal abundances, Hongo also noted some variation in butchery patterns over time. The author noted substantially higher proportions of bones bearing evidence of butchery in all MBA contexts versus other periods (4-6% versus 1-2%), and an increase in "heavy" cut and blow or chop marks by sharp implements, especially on cattle (Ibid.: 154). Hongo speculated that this pattern might be due to: sampling of areas that were more frequently used for cooking or preparing food, differential access to new bronze technology, a change in ethnic composition of the site, or the introduction of foreign butchery practices (Ibid.: 102-103).

Overall, Hongo observed no hiatus in occupation from the EBA through to the MBA, and noted that diachronic change at Kaman-Kalehöyük was gradual and likely resulted from indigenous developments within the framework of a localized pastoral economy (Hongo 1996: i and 46). While I agree with Hongo's suggestion that local change could have resulted from "internal factors", Hongo's data yielded trends, in combination, that hinted at more socio-economic change from the EBA to MBA at

Kaman-Kalehöyük than the word "gradual" conveys. Recognizing the need for more EBA data, Hongo's study pointed toward potential changes from the EBA to the MBA that included different herd compositions, different kill-off decisions, and changing consumption strategies, with some sustained patterns. First, changes in the ratios of cattle to sheep/goat (Ibid.: 79) suggested movement away from pastoral activity toward a more agricultural way of life (Redding 1993; Zeder 1991). Second, a noteworthy change in butchering technique isolated in the MBA (Hongo 1996: 102-103, 152-153) could indicate the emergence of new technology, new learned disarticulation techniques, new specialists, new food or meat preferences, or the emulation of, or actual introduction new people. And third, the high proportion of very young pigs in all periods from the EBA to the Iron Age (Ibid.: 131) is consistent with intensive pig husbandry (likely Cluster 2 or 5 in Slim and Çakırlar 2023: 51) and household consumption of pigs as protein supplements, alternate locations for the consumption or discard of older pigs, and/or the rearing of pigs as dietary insurance against poor crops (e.g., see Özdoğan 1999 on Hallan Çemi). In sum, relative abundances and butchery patterns from the EBA to MBA signal a reorganization of the animal economy, while continuities in the range of fauna represented and the prevalence of young pigs, speak to the maintenance of local tradition.

Two other Kaman-Kalehöyük faunal analyses were conducted by Atici (2003, 2005), and though synchronic in nature, they provide incremental insight into the Kaman-Kalehöyük EBA, and further augment my data set (see Table 5). Atici's 2003 preliminary study sought to outline foundational relative abundances of taxa, while adding to Hongo's work. Faunal samples were drawn from three types of contexts: two exterior features, three pits, and fill from one room. Of the 2,232 specimens analyzed, 17% (or 384) of them were identified to the species or genus level. Three main domesticates, namely, sheep/goat (61.7%), cattle (16.7%) and pig (14.8%) made up over 93% of the identified specimens in the assemblage.

In a later study (2005), Atici analyzed 4,717 specimens; 2,859 were from strict EBA (Phase IV-b) contexts and the remaining 1,858 were from the EBA to MBA "Transitional Period" (Phase IV-a). I have removed the materials from the transitional period from this summary since they are outside of the scope of this evaluation. The results of both Atici's 2003 published work and his 2005 analysis of EBA (Room 287) and the EBA to MBA transitional period room features (Rooms 104 and 240) from Sector III yielded a similar range of fauna, but with some potential proportional differences. Of the 2,859 specimens analyzed from the EBA in 2005, Atici identified 482 to the genus level. In this study, sheep/goat constituted 49.8% of the identified specimens (compared to 61.7% in the 2003 study), pig increased to 25.5% (from 14.8%), cattle represented 16.4% (versus 16.7%), and collectively these domesticates made up 91.7% of Atici's fragments (almost the same as the 2003 study).

EBA	Atici 2003		Atici 2005	
	Count	Percentage	Count	Percentage
Aves sp.	6	1.6%	1	0.2%
Bos taurus	64	16.7%	79	16.4%
Bos primigenius	0	0.0%	0	0.0%
Canis sp.	11	2.9%	12	2.5%
Carnivora	1	0.3%	-	0.0%
Cervus sp.	-	0.0%	1	0.2%
Equus sp.	2	0.5%	1	0.2%
Felis sp.	1	0.3%	-	0.0%
Felis catus	-	0.0%	1	0.2%
Gallus gallus		0.0%		0.0%
Homo sapiens	-	0.0%	1	0.2%
Lepus sp.	3	0.8%	16	3.3%
Mustela sp.	-	0.0%		0.0%
Ovis sp./Capra sp.	237	61.7%	240	49.8%
Rodentiae sp.		0.0%		0.0%
Shell		0.0%		0.0%
Snail		0.0%	1	0.2%
Sus domesticus	57	14.8%	123	25.5%
Testudo graeca	-	0.0%	4	0.8%
Vulpes vulpes	2	0.5%	2	0.4%
ID	**384**	**100.0%**	**482**	**100.0%**
Unid	**1,848**		**2,377**	
Total	**2,232**		**2,859**	

Table 5. Atici (2003, 2005) Kaman-Kalehöyük EBA Faunal Relative Abundances.

Added to its descriptive contribution, Atici's 2005 analysis sought to test whether Kaman-Kalehöyük occupied a position of power in the EBA as a centralized locale of elite regional non-food producing specialists. To do this, Atici compared findings to theories which suggest that in unregulated pastoral economies, one should expect deposited fauna to reflect the full range of age and body part diversity. In his estimation, Atici found both cases to be true, noting the presence of all caprine age groups and a wide range of body parts (2005: 123 and 126). Atici's interpretation of faunal remains led him to suggest that in the EBA, Kaman-Kalehöyük's economy was self-sustaining with a low degree of specialization. And, similar to Hongo, Atici concluded that herding patterns reflected a mixed strategy focused on meat, milk, and other by-products. Atici found that his faunal data was consistent with the "…site's function as a village with an unregulated and decentralized subsistence strategy throughout the EBA" (Atici 2005: 119) where "…production, distribution, and consumption of animal resources seem[s] to have occurred without specialized mechanisms" (Atici 2005: 126).

Overall, Hongo's initial diachronic evaluation of faunal patterns from the EBA to MBA, and Atici's synchronic EBA study of the Kaman-Kalehöyük animal economy both helped lay the foundation for the current study. Their foundational studies allowed me to ask questions related to whether the local Kaman-Kalehöyük population, or its economic organization, were impacted by the seasonal presence of Old Assyrians at the onset of the MBA on the plateau, to what degree the animal economy was specialized in each period, and whether faunal remains could provide insight into the relative degrees of social inequality at Kaman-Kalehöyük in both the EBA and MBA.

CHAPTER 6: FAUNAL REMAINS AS SOCIAL FACTS

“*The Assyrians apparently bought what they ate and drank, together with olive oil, the firewood and other products they needed, from the local population, probably through the intermediary of local traders” (Veenhof and Eidem 2008: 148).*

Many scholars, including Alcock (2005), Hayden (2001), and Lightfoot (2005) agree that systematic research on material remains related to burial practices, domestic architecture, ritual activity and foodways, all provide a powerful base from which to better understand interactional networks. Food, inclusive of drink, is a great source of information from which to study inter-cultural entanglements because it simultaneously resides in both the biological and socio-cultural realms, the former as a physiological need, and the latter as a process that reflects spatio-temporally specific, yet dynamic, social structures.

Foodways, in particular, have been studied by anthropologists for more than 130 years, and the range of topics has increased tremendously since Mallery’s 1888 publication about “Manners and Meals”. Pioneering works on Zuni breadstuffs by Cushing (1920) and Kwakiutl salmon recipes by Boas (1921) paved the way for the emergence of a structuralist view of food and eating (Levi-Strauss 1965 and Douglas 1966), which led to Goody’s (1982) pivotal work at the intersection of cooking, cuisine, and class. In addition to more traditional food ethnographies, more modern scholarship has expanded to cover broader anthropological themes. Researchers have articulated food and eating with: gender hierarchies (Whitehead 2000), value configurations of specific types and categories of foods such as meat (Harris 1985), resource insecurities (Mtika 2001), ritualized activity (Dietler 2010), and identity configuration (Weismantel 1989). Scholars also have shown how foodways are inextricably tied to social change (Albarella, et. al., 2017). For example, Lentz (1999) studied inflections in interclass rivalry and imitation, market exchange sphere integration, and migration activity. Jing (2000) showed how more centralized decision making and policy development by the Chinese government affected dietary habits. Leach (1999) articulated the interplay of emerging technologies with food processing and consumption patterns. Others have studied how the ritualization of food and eating can foster inclusion and solidarity (Dietler and Hayden 1991), reinforce (Whitehead 2000) or refute (Lindenbaum 1986) hierarchical relationships and concepts, maintain ethnic boundaries (Mahias 1985), and reaffirm or transform social ties in both physical and cosmological (Weismantel 1989) spaces. Still others have evaluated how regular access to the cuisines of different ethnic groups can stimulate consumption shifts (Lockwood and Lockwood 2000), how the migration of people into foreign lands influences preexisting local consumption patterns (Goody 1998), and how war and other conflicts can be an agent of dietary change (Mintz 1996). In sum, eating is a social act, foodways are fluid social processes, and both are social facts, which not only link domestic and political economies but also play an active role in structuring action in the world by continually instantiating perceptions of social identity, similarity, and difference (Dietler 2010: 184).

As a result, we need to consider how local foodways may be changed by intercultural entanglements due to factors such as the introduction of novel food processing technologies, shared meals, inter-marriage, foreigners requesting specific foods, or new demands that may have been placed on preexisting production strategies. In this study of the impact of intensified interactions with Assyrians on the local Anatolian economy, I will consider both local production and consumption practices and the ways in which they may have changed as locals became familiar with and/or were exposed to new foodways.

In archaeological settings, foodways and eating patterns are represented primarily by botanical remains, residues in vessels and cooking pots, and animal bones. Analysis of excavated seeds, unearthed fauna, and more recently, human bone isotopes provide excellent media for reconstructing and better understanding foodways and consumption patterns, as well as how they may have changed over time. In particular, faunal remains are critical to studies of ancient cross-cultural interactions since animal bones are durable and well-represented in archaeological deposits. Additionally, bones provide a very information rich and accessible media for studying the intensity of specialized production strategies, consumption patterns, political economies, exchange systems, ritual, and social differences, distances, or inequalities (Albarella, et. al. 2017; DeFrance 2009; Russell 2012; Sherratt 1981 and 1983; Zeder 1988). Faunal remains speak to the multiplicative, repetitive, and culturally-specific interactions between humans and other non-human animals. They also potentially inform us about both symbiotic and predatory relationships between humans and other living organisms.

In this study, I push beyond traditional zooarchaeological economic models and ask whether temporal changes in herding strategies at Kaman-Kalehöyük coincide with, or are reflective of, social stimuli such as new exchange items or actors, the presence of new identities or social groups on the plateau, the development of new categories of social inequality, or the reinvention of a new social hierarchy. In the context of the Middle Bronze Age Anatolian – Mesopotamian inter-cultural encounter, this type of analysis can help us test to see if people at Kaman-Kalehöyük made decisions about their herds or animals at either the site or domestic level in response to a new social landscape.

Following Lightfoot's (2005) study of California Indians and how he found fauna to be useful in documenting both economic and social change in cross-cultural contexts, I attempt to expand our thinking to encompass a wider range of ethnographically derived interpretations for faunal patterns, even at the risk of attaining unprecedented equifinality. Lightfoot's systematic evaluation of 18th and 19th century contexts in Native California inter-cultural encounters is a powerful example; it pulled together a multitude of data sources, including written and faunal remains, as well as ethnography, to balance the biases contained within each line of evidence. In a similar fashion, drawing on studies related to animals' social importance, I balance macroeconomic production models and interpretations with some alternate social explanations for certain faunal patterns.

Specialized Economies and Faunal Remains

A common feature of hierarchical societies is some degree of specialization, defined as “the production of certain goods which are consumed by social units other than the social unit that produced them” (Wattenmaker 1987: 114). In addition, numerous archaeological studies have demonstrated that more urban populations often relied on food surpluses produced by rural communities (Wattenmaker 2009: 116). This process in Southwest Asia is detailed in early 3rd millennium BC texts that have revealed that animals and their by-products were sent from less hierarchic or more producing areas to centers “on a regular basis, partially as tax or tributary payment” (Ibid.). As a result, oscillations of demand at a center could precipitate changes in production strategies at attached or subordinate peripheral sites, which then may ultimately impact local consumption patterns. This type of recursive relationship in a regional system is likely to be reflected in the range, magnitude, and age distributions of animal species present at non-center sites that are supplying a higher proportion of members of society in more administrative centers who were less focused on producing food than their more rural counterparts.

When discussing the possible relationship between a regional center and its more rural "attached" communities, one of the central questions is to what extent the peripheries are involved in the economic support of those people in the center who are less focused on herd management or producing food for themselves (for a recent EBA study from the Levant, see Gaastra, Greenfield, and Greenfield 2020). This relationship can be studied by looking at the degree to which each site is dependent upon each other for the exchange of goods – physical goods (including food), services, and/or information. In concert, as new more administrative "professions" or sociopolitical roles develop or the percentage of those people performing them increases, a greater number of people are less focused on food producing activities, requiring others to produce food surpluses for their consumption. If, for example, the northern Mesopotamian non-food producers who took up residence on the central Anatolian plateau in the 2nd millennium BC were reliant on local suppliers for sustenance, as the opening quote of this chapter suggests, then it's possible that preexisting food production schemes needed to change in order to generate surpluses that could support them.

In hierarchical societies, consumers may be provided with food through redistribution, "market" or barter exchange, or through tributary payment directly between producers and consumers. It follows then, that the redistribution of meat or other secondary products should be reflected by some degree of patterning in both producer and consumer sites, especially when one site is subordinated to, and pays tribute of some sort to another location.

Faunal studies of the exchange between more urban or administrative centers and their less hierarchic neighboring areas have generally focused upon three variables: 1) the range of species present and the relative importance of different animal species (Wattenmaker 1987); 2) the culling patterns of the prominent mammalian domesticates (sheep/goat, cattle, and pig) as indicated by tooth wear and long bone fusion data (Payne 1973, 1985; Payne and Deniz 1982; Silver 1969); and 3) body part distributions of the main vertebrate species (Maltby 1985; Wattenmaker 1987; Zeder 1984, 1988).

Two examples of zooarchaeological studies help us better understand what we might expect in terms of faunal patterning. In Southwest Asia, Zeder (1984) suggested that, as direct contact between pastoralists and consumers declined, non-food producing consumers were provided with an increasingly limited range of animal species. And, in another study, Wattenmaker (1987) showed that species variation is expected to be more limited in a highly specialized economy where a smaller percentage of the population is engaged in animal husbandry; whereas, in economies which are more focused on individual household units that raise animals for their own consumption, a wider variety of species may be represented.

If Kaman-Kalehöyük was paying tribute to a local seat of power, in the zooarchaeological record we may see an absence of prime age animals at the site, and/or the absence of the best cuts of meat if Kaman-Kalehöyük was a peripheral site sending those cuts to a center. Also, since social stimuli and new structures often impact production and consumption patterns, if shifts in local populations occurred, or changes took place in local social hierarchies, we may see inflection points in diachronic patterns of Kaman-Kalehöyük's faunal remains.

In this study of Kaman-Kalehöyük fauna, I reviewed zooarchaeological remains to determine what degree of economic specialization existed prior to, and during the period of more intensified interaction and exchange activity between the Anatolians and Mesopotamians. Higher degrees of specialized production, aimed at creating surpluses for exchange, are likely to occur in a more highly integrated regional economy. Although little is known about the degree of specialized production at Kaman-Kalehöyük in the EBA, using later 2nd millennium BC Old Assyrian texts and limited archaeological evidence, scholars have suggested that in the MBA (the period immediately following the EBA) central Anatolia was, in fact, a highly integrated regional economy with far reaching interaction spheres (Larsen 1976: 249; Özgüç 1983: 319). As a result, I expect the Kaman-Kalehöyük fauna to demonstrate a high degree of specialized production in the Middle Bronze Age, although the expected level of economic specialization in the Early Bronze Age remains enigmatic.

One of the most reliable methods for determining pastoral specialization practices is estimating age at death, or reconstructing mortality profiles to determine how closely herds are managed in terms of ages at which they are slaughtered. By estimating age at death, using ethnoarchaeological examples, we move away from identification and counting and closer to the interactions between humans and non-human animals via animal husbandry practices. Culling patterns are derived from the state of epiphyseal fusion of long bones (Silver 1969) and mandibular eruption and tooth wear stage (Payne 1973; Slim and Çakırlar 2023). Applying these analytical processes can tell us something about "…[the possible reasons for] keeping of animals in captivity by a human community that maintains total control over their breeding, organization of territory, and food supply" (Clutton-Brock 2012: 3). Herding decisions provide us with information about a location's, or a people's subsistence strategies, surpluses, level of specialized production, degrees of social wealth and inequality, and the overall socio-economic organization of a given (area of a) site at a given time. Although the "age at which animals are slaughtered depends on a range of factors, such as the relative value of different products, on the characteristics of the stock, and a range of environmental factors" (Payne, 1973: 281), "kill off" patterns are one of the best sources we have for reconstructing specialized production strategies (Albarella 2017: 7-8). Although the actual age at which the fusion of the diaphyses and epiphyses of long bones takes place can be influenced by many factors and stresses, the process is relatively consistent for sheep/goats, cattle, and pigs. Long bone fusion data are most effective when combined with dental data. For example, in a recent study of 22 archaeological pig assemblages across Anatolia, Slim and Çakırlar (2023) developed six different mortality profiles to assist in interpreting the relative intensity of a site's exploitation of different pig age groups. And, in Payne's pioneering work (1973), based on modern sheep specimens from three Turkish towns, he proposed “kill off” patterns that reflected Anatolian sheep and goat husbandry practices focused on one of three specialized production goals: meat, milk, or wool. Raising animals for one of these particular purposes, or tribute, normally leads to marked changes in the mortality patterns and sex ratios we find in faunal remains. As a result, these strategies can tell us both the degree to which a community, such as Kaman-Kalehöyük, was involved in the specialized production of surpluses, as well as potentially help us better understand whether particular animals or their byproducts were exchanged locally or over long distances, in the form of tribute or otherwise.

By combining osteological (Silver 1969) and ethnoarchaeological analyses (Payne 1973), several culling patterns have been developed that closely resemble optimal herd structures for certain sheep/goat production strategies (e.g., Crabtree 1990; Mudar 1988; Stein 1987; Wattenmaker 1987). One caveat to consider when using these optimal structures is that these patterns represent perfect herd compositions for singular herding goals, though most often herds are raised for multi-dimensional exploitation. Utilizing age data, the following patterns may be expected for certain animal production and herding strategies:

- in self-encapsulated economies, where animals are both produced and consumed locally, such as those where each household is raising its own animals or where animals are consumed in the community that raises them, mortality profiles should include all age classes (Wapnish and Hesse 1988: 84);

- in a consuming economic structure, animals often are acquired from pastoralists. If consumption was focused on meat, I would expect to find a large proportion of prime meat aged animals (e.g., for ovi-caprids, animals between 1.5 and 2.5 years). Alternatively, if a site's economy was focused on wool production, mortality profiles should include a larger proportion of older animals (for ovi-caprids, more animals 6+ years of age). Last, if milk consumption was taking place, I would expect to find a large proportion of the zooarchaeological remains to be from very young animals (more than half of ovi-caprids mortality should be 12 months of age or younger);
- producing economies will yield the remains of neonatal mortalities and accidental and disease-related deaths, as well as older animals removed from the breeding stock (Crabtree 1990: 162).

Countless studies have shown that faunal remains can provide us with information related to site level production strategies that may suggest a given location supplied goods like food via animals to another location. As a result, in societies like those in Southwest Asia where sheep and goats are prevalent, we may suggest that: in highly integrated regions with hierarchically organized societies, herding strategies may include wool production, supply of certain animals or body parts to centers via exchange activity (barter) to support a more administratively focused population, dairy production, or possibly the export of animals for tribute as part of a broader political economy. In less integrated, less hierarchic, or less specialized societies, strategies may be more generalized, aimed at holistic animal utilization, providing meat, wool, and other byproducts such as hides and fibers to the local community, while also emphasizing herd maintenance (Stein 1987). The specialized production of large-scale surpluses, such as wool, can indicate the involvement of a site in a larger interaction or exchange network; whereas, the surplus production of prime aged animals is consistent with models of participation in a tributary economy. In the zooarchaeological record, a stark absence of prime-aged animal kill-off patterns coupled with low species diversity, as well as a heavy concentration of older animals, may suggest that younger animals were exported as a form of tributary payment. Conversely, the presence of animals in all age categories suggests that a site consumed its own animals, rather than supplying any other site with prime aged stock, especially in the case of sheep and goats (Wattenmaker and Stein 1986). And, if a site was a dependent of a political center, then we would expect to find evidence that the settlement made tributary payments derived from local resources, which may have included animals.

Utilizing these heuristics as a basis for interpretation, we may begin to draw some inferences about whether faunal samples from sites like Kaman-Kalehöyük signal a change or an intensification of certain specialized production strategies, particularly when comparing the late Early Bronze Age to the beginning of the Middle Bronze Age. We can also evaluate whether or not Kaman-Kalehöyük engaged in a tributary economy in either period and perhaps even estimate the magnitude of that enterprise. Texts and archaeological remains from the Middle Bronze Age depict Anatolian kingdoms as centralized seats of power located at larger sites that controlled the smaller sites located within their geographic sphere of influence. If Early Bronze Age kingdoms operated similarly to those of the Middle Bronze Age, then we may find in both periods that powerful Anatolian polities extracted food supplies from smaller local sites, such as Kaman-Kalehöyük, to support an administrative class that was less focused on raising their own animals.

Like all zooarchaeological analysis techniques, age at death data has its limitations, and requires at least five biases to be considered. First, it is very difficult, if not impossible, to separate archaeologically recovered sheep and goat teeth, although the animals might have been used for very different purposes in the biotic world. Second, more precise aging can be conducted on more complete mandibular remains; however, it is more common to find single loose teeth than a more complete lower jaw bone with multiple teeth still in place. A third issue is fragmentation. Payne proposes that at least one half of a tooth must be present in order to "age it". Yet his wear patterns are progressive, and often times many stages of wear overlap with only a single lobe changing, which is particularly true for second and third molars. Also, the absence of a particular age group may be interpreted in one of two ways: a) either the products yielded by that group are not consumed by the inhabitants of a given site, and/or b) what is produced by the missing age group is sent away to another part of the site, or to another site altogether. Last, and perhaps most importantly, the modeled production patterns Payne proposed are singular in nature, and rarely would an entire community engage in one type of production yield, especially in cases where sheep and goats are a primary source of food (Reitz and Wing 2008: 245).

One specific critic of population profile reconstruction, Roger Cribb (1987), used simulation models to make zooarchaeologists aware of the possible problems in making inferences concerning ancient animal populations based solely on kill-off patterns. After viewing both sampling problems and logical difficulties, Cribb's main contention was that static archaeological populations and their living counterparts have a much more complex relationship than assumed by more modern models based on kill-off patterns and survivorship curves. After performing numerous simulations, Cribb noted that only in exceptional circumstances – a catastrophic kill-off situation – may truly representative samples be detected. Problems with faunal pattern evaluations may be derived from formation processes, sampling problems, and problems of herd splitting or mixing. Cribb contended that we must be aware of the limitations of our data, especially "equifinality" defined as a concept whereby multiple pathways lead to the same result. When utilizing mortality data, zooarchaeologists should be mindful of the impacts to their data that may influence the assemblage, including: seasonal changes, temporary setbacks such as epidemics, changes in growth rates, and major shifts in herding strategies. What if animals did not enter the herding system until 1 or 2 years old? What is clear from review of Cribb's contrarian view, is that while a robust analytical technique, "age at death" techniques have their limits. Employing multiple faunal analysis techniques, such as body part distribution, relative abundances, and isotope analysis, can help us form a more complete picture of the diet and subsistence strategies employed at a given site. And, of course, corroboration with other patterns in material remains provides still greater credence to our interpretations.

Social Inequality, Foodways, and Faunal Remains

Scholars across a variety of disciplines have focused on the study of social differentiation, distance, and inequalities for close to one hundred years. In the first half of the 20th century, social scientists like Childe (1930), Wittfogel (1938), and Steward (1949) advanced an evolutionary approach to social inequality positing that it resulted from forms of ecological and economic processes, and contending that increasing levels of agricultural intensification shifted social structures away from egalitarian ideologies. These researchers believed that early hierarchical civilizations were located in rich fertile areas where large numbers of rural peoples could be fed and where large surpluses of food could be generated to support non-food producing specialists, ultimately allowing a certain segment of society to control resources and live in relative "luxury". Some, like Childe, also argued that technological developments, such as bronze-working, led to better farming tools, which in turn led to greater efficiency in terms of generating surpluses and ultimately increasing social differentiation among various members of society. Still others, like Fussell (1966), took these ideas further, suggesting that more intense specialized production led to a division of agricultural labor tasks such as gardening, grain production, and pastoralism, which then drove changes in gender relations and the further evolution and expansion of hierarchies. In sum, these perspectives collectively led to a view that increasingly complex production economies (e.g., foraging, then horticulture, and finally, agriculture) caused greater degrees of social distance.

In the thirty years that followed the work of these evolutionary theorists, numerous case studies rendered these deterministic models incomplete and confirmed that agricultural production is not a necessary precondition for unequal or hierarchically organized social structures. Case studies showed a high degree of cross-cultural spatio-temporal variability in social inequity and led to a reassessment of the evolutionary model. As a result of this corpus of work, social inequality was reconfigured by scholars as its own dynamic cultural process, one linked to, but not causally related to, modes of food production (Price and Feinman 1995; Trigger 2003).

For example, by leveraging both ethnographic and archaeological material in an evaluation of the prehistoric Southwestern United States, Plog (1995) argued that staple food surpluses were a condition of, but insufficient to fully explain, the emergence of inequality. In an effort to better understand how social inequality was “financed” (Ibid.:

196; Earle 1991), Plog advocated for a more holistic view of inequality, and identified a missing dimension in environmental models. This missing dimension was the role social relations played in configuring culturally specific social inequalities (Ibid.: 191). Plog stressed the point that environment, economy, politics, ritual, and social relations are not discrete variables to be studied in isolation, but rather represent a complex brew of commingled or interrelated cultural components, sometimes operating as integrative forces, and other times as divisive ones (Ibid.: 193). Noting that mobilization of labor was a critical piece of the puzzle in generating surpluses and protecting stored wealth, Plog unpacked how this may have occurred. He found that agricultural intensification led to leadership, and that feasting, gift-giving, and sharing in times of shortages demonstrated success while also serving as a mechanism for generating and sustaining followership. The recruitment of followers then could be transformed into labor pools, which could in turn be mobilized for other production activities, such as building new public structures or generating still greater surpluses. In these cases, Plog notes that followers would help secure and defend land holdings, or surpluses, in times of conflict. The mobilization of labor to execute tasks on behalf of another then contributed to institutionalizing social inequities and was associated with political power.

In another tentacle of his study, Plog found that regional and interregional exchange activity was more intense when agricultural yields were strong and surpluses could be generated, and that exchange activity was less intense during seasons of poor harvests. He also found that the use of non-local, uncommon (prestige), or other “valued” goods, were correlated with long-distance exchange and also with local political authority. Control of the flow of these “valued” goods was cited as a common mechanism for existing or emergent leaders to attract and recruit new followers (Feinman 1992: 180; Plog 1995: 200). Thus, political power, and social distance, could not only be increased but also sustained by controlling the flow of “valued” goods. This ability to control the flow of valued goods is one of the reasons that many sites in prehistoric contexts are located on, or in close proximity to, exchange routes. In sum, Plog found that social differentiation and the “financing of social inequality” took place through the accumulation of wealth via a complex combination of intensified exchange activity, control of highly valued goods, internal/external conflict, the attraction and attachment of people to social groups, increased agricultural activity, and higher levels of surplus generation.

With studies like Plog’s serving as a foundation, scholars have continued to explore the interrelated components, which collectively contribute to the emergence and oscillations of social inequality. And fortuitously, they have expanded their agendas by placing emphasis on a few additional topics. Some researchers have turned their attention toward understanding the links among status differentiation, leadership, and management of resources (Chesson 2015; Frangipane 2007; Richardson 2016). Others have broadened their analyses of social differentiation not only to explore how social inequality persists through time, but, germane to my study, also to better understand the variation and dynamism in the factors impacting the relative degrees of social inequality over time.

Recognizing that there are societal imbalances among a population's members across a variety of dimensions such as wealth, prestige, health, and productiveness (Peterson and Drennan 2018: 40), some scholars have adopted a definition of social inequality that embraces differences that "…create and reproduce systemic inequalities in the life chances of populations over time…" (Holton 2015: 61). This definition is coupled with a dimension of temporal persistence, or transgenerational durability (Tilly 1998). Building on work done by Lenski (1966) and Tilly (1998), Kohler and Feinman contend that social inequalities and imbalances "…result from the interpersonal interactions of individuals shaped by the constraints of resources, technology, and institutions, including stable social systems promoting inheritance of wealth from one generation to the next" (2018: 5). In agreement with Plog (1995), they recognize that inequalities emerge, reify, or transform through interconnected social processes, which can take many forms ranging from the individual to the societal, and from the kin group to the state. They also agree that understanding social inequality requires a focus on resources and the ways that resources are owned, controlled, exchanged, and inherited.

By leveraging comparative ethnographic evaluations by Borgerhoff Mulder et. al. (2009) and Smith et. al. (2010), researchers have split the concept of "wealth" into three types: embodied (body weight, grip strength, practical skills, and reproductive success), relational (social ties in food sharing networks), and material (land, livestock, house, household goods). The distinction of wealth types is relevant to the study of Kaman-Kalehöyük for two reasons. First, it is important because Smith et. al. found that material wealth was the most important basis of wealth in agricultural and pastoral societies and had a higher probability of intergenerational transmission. These findings are consistent with Southwest Asian ethnographies written by Bates (1973), Barth (1961), and Kramer (1982) on three different societies in Turkey and Iran. Second, evidence shows that the Kaman-Kalehöyük economy was agropastoral in both the EBA and MBA. And, since material wealth in agropastoral societies is typically based on such things as livestock (Grossman and Paulette 2020 and Stiner, Özbasaharn, and Duru 2022 on caprines as vehicles of wealth), the Kaman-Kalehöyük faunal remains evaluated in this study open the door to better understanding changes in degrees of social inequality from the late EBA to the early MBA.

Founded on works ranging from Lenski (1966), Johnson and Earle (2000), to Flannery and Marcus (2012), current research has focused on five interrelated factors affecting the degrees of inequality in archaeological contexts: resources and modes of production, population size, political complexity, technology, and institutional variability (Kohler and Smith 2018). The first four factors have enjoyed a great deal of academic attention, and the fifth factor hearkens to Plog's question of how social inequality is financed (1995: 196; also see D'Altroy and Earle 1985; Earle 1991: 1-15). Scholars now include concepts of institutional resource procurement in their research (Blanton and Fargher 2008). They have also effectively reconstituted the notion that if the economic underpinnings of autocratic or collective regimes effect concentrations of their material wealth and social power, then the ways in which these concentrations are “funded” is the key to understanding social inequality (Smith, Kohler, Feinman 2018: 19).

In a recent volume, quantitative evidence from nine case studies focused on identifying disparities in wealth found that, with few exceptions, greater levels of inequality were positively correlated with intensified agricultural activity, with population increases (measured in terms of region, settlement, and density), with higher levels of political complexity, and with technologies that enable the acceleration of wealth concentrations (Smith, Kohler, Feinman 2018: 14-20). This volume held interest for me because it tested certain prevailing assumptions across multiple regions and time periods. For example, one case study showed that increases in political hierarchy in the Hohokam were not accompanied by increases in wealth inequality. In another example, data showed that Teotihuacan exhibited very low levels of inequality, despite being one of the largest capital cities of ancient Mexico. Other case studies were consistent with current interpretations. In Chaco Canyon and at Cahokia, researchers found expected high levels of inequality. And, in the Aztec period in Mexico, studies found that larger settlements had higher levels of inequality than villages.

This corpus of literature related to social inequality in the archaeological record is critical to my evaluation of Kaman-Kalehöyük materials for several reasons. First, it articulates that modes of production and social inequality are two interrelated but very different lines of inquiry. Second, the great majority of archaeological study completed on 2nd millennium BC contexts has focused on the political economy, placing less attention on more social inquiries. As a result, this study seeks to balance the equation, placing equal emphasis on monitoring diachronic inflections in both economic and social structures. Third, Kaman-Kalehöyük is a perfect candidate for studying social inequality because both textual and archaeological material are available to address the factors scholars have found to affect the degree of social inequality in ancient contexts. For instance, if an agricultural focus or exchange activity intensified at Kaman-Kalehöyük, if new local or non-local populations entered the economic system in central Anatolia during the 2nd millennium BC, or if new technologies were conceived or introduced allowing the generation of increased surpluses of certain goods, we might then expect to see increased levels in social inequalities when compared to the earlier period. Or, if patterns in archaeological evidence at Kaman-Kalehöyük, after the arrival of Assyrians on the plateau, point toward increased political hierarchies or administrative control, then the probability of there being an associated increase in the social distances or inequalities among its residents might be higher. Finally, if Kaman-Kalehöyük residents reconfigured their herd compositions over time to more intensely focus on certain preferred animals or byproducts, we might see increasing levels of specialization, creating greater dependencies on other specialists for certain goods, together increasing the probability of differential access to these certain goods, especially pronounced in times when those goods were scarce.

Scholarship has shown that social inequality is “financed” through a combination of mechanisms including social relations, intensified production, generation of surpluses, increased exchange activity, the control of resources, and the mobilization of labor. Other studies showed that one of the most important ways to evaluate social inequality in the archaeological record of agropastoral societies is through careful study of material wealth (houses, household goods, and livestock). But the question remains: how do leaders use or control material wealth, in the form of livestock, to reinforce political inequalities or to expand them? Leaders can maintain or create social inequalities through the manipulation of, or differential access to, certain types of animals and animal products (DeFrance 2009: 122). For example, a display of social inequality in the form of pomp and power might be a military victory celebrated with a parade of animals, or the acquisition of new herds as spoils of conquest or through gifts. These are great examples of social differentiation but difficult to detect in the archaeological record. A more archaeologically accessible marker of social difference is privileged access to certain kinds of animals, in the form of ownership, of foods, or other derivative goods.

One of the best ways to study inequalities in foodways is through the evaluation of consumption patterns, which manifest archaeologically in the quantity or quality of animal bone body parts recovered from specific parts of a settlement, species diversity, and/or butchery techniques (Albarella, Rizzetto, Russ, Vickers, and Viner-Daniels 2017). In this study, I monitored patterns in each of these faunal categories to complement data of relative species abundances and mortality profiles. Studies have shown that consumption patterns are intimately linked to changes in technology, population composition, expansionist activity, ritual behavior, and/or social differentiation (Gifford-Gonzalez 1993; Lyman 1987, 2001; Yellen 1977). As a result, archaeologists have relied on consumption patterns to study variations in social identity (Binford 1978, 1981); gendered activities in prehistoric contexts (Stein 2012), multi-ethnic households in colonial contexts (Stein 2005, 2012), and in social inequality, emphasizing wealth, prestige, and status (DeFrance 2009: 106, 122).

Skeletal frequencies, or body part distributions, are important data points not only for monitoring changes in inter- and intra-site exchange, but also in providing rich data for characterizing differences in consumption patterns among unequal social groups (Reitz and Wing 2008: 213). For example, from an inter-site perspective, if a site was focused on local production and consumption, we might expect to find all of the body parts of the animals represented in approximately the same frequency as they are found in a natural population (Crabtree 1990). If certain segments of society were being supplied with selective or preferred body parts, there may be a skewed distribution.

And, if animals were brought to a special butchery or food preparation location, we may expect to find clusters of butchering and preparation waste, such as cranial and lower limb bones, in these dismemberment areas. But studies like Grantham's (2000) evaluation of modern Druze villagers of the southern Levant showed that goat crania are highly prized and associated with high status. Grantham's findings remind us that archaeological patterns are as varied as the spatio-temporal contexts that are studied, and that interpretations strengthen only with corroborating evidence. From an intra-site perspective, if differential access to certain body parts and/or consumption preferences did exist among different subsegments of the population, as the Kültepe-Kanesh texts suggest, we may expect to find divergent patterns in more "elite" versus "non-elite", or possibly even Assyrian versus Anatolian contexts. For example, in an "elite" household, we might expect to find a higher prevalence of meat-bearing elements, such as upper limb bones (Jackson and Scott 2003; Wattenmaker 1994; Zeder 1991).

Patterns in skeletal frequencies are not sufficient to explain social change when viewed in isolation. Brain's pioneering studies of taphonomic processes showed that patterns in recovered faunal material will vary depending on the structure of the bone (e.g., higher specific gravity is highly correlated with likelihood of survivorship in the archaeological record) and its relative resistance to post-depositional forces such as weathering (2007: 7). As a result, skeletal frequency data is especially accretive to our interpretations of cultural phenomena when evaluated in conjunction with other zooarchaeological observations, such as range of species present, mortality patterns, and elemental modification. For example, greater faunal diversity, or a broader range of species present, along with relative importance of various wild animals, can indicate relative intensities of social differentiation or inequality. Of course, knowing that findings are as varied as the cultures studied, confirmation may require still more supporting evidence.

Complementing a wide body of sociocultural anthropology scholarship (e.g., Goody 1982; Harris 1985; Levi-Strauss 1965, 1988) related to the importance of food and foodways as they relate to social dynamics, Nerissa Russell has argued that "in addition to nutritional and economic factors… [animal remains] …are quite likely to be influenced by the prestige or wealth value of the animal [perhaps creating social inequality]; [or] by bridewealth, sacrificial or feasting requirements; [or] by taboos and ethnic or other food preferences" (2012: 395). For example, in well understood contexts, Jackson and Scott's (2003) research of the Mississipian and Zeder's (1991) study in Mesopotamia demonstrated that the "luxury of variety" is the privilege of the elite (DeFrance 2009: 127). And while Lev-Tov and McGeough (2007) identified the greater use of wild animals as predominantly an elite activity in the Levant, Pohl (1994) found that non-elite Mayans engaged in opportunistic hunting of smaller animals, and Kirch and O'Day (2003) found that non-elite Hawaiians consumed rats. Since skeletal frequencies are spatio-temporally variable, when considering whether the 2nd

millennium BC textual interpretations correctly assume that Mesopotamian consumption followed local Anatolian convention, one should view the results of this analytical technique in combination with relative abundance and mortality data.

In addition to factors discussed above, such as consumption of prestige animals or desirable elements (e.g., heavy meat bearing femurs), high status or different groups of people can distinguish themselves from others by "…butchering patterns, styles and intensity of butchering, as well as evidence for cooking methods, such as roasting versus boiling" (DeFrance 2009: 122). In hierarchic societies, studies related to status differences have shown that "non-elite" butchering practices were very efficient and precise, focused on meat maximization strategies, extracting every possible useful part of the slaughtered animal (Kirch and O'Day 2003; Luff 1994; Marcus, Sommer, and Glew 1999; Zeder 1991). Conversely, more elite contexts have been characterized by less aggregate butchering waste, meat wastage, less bone fragmentation, and in association with non-utilitarian items (Crabtree 1991; DeFrance 2009: 124-125; Jackson and Scott 2003).

Methodologically, there is also value in recording the type and location of butchery cut marks as well as the taxonomic frequency with which they are found on specific body parts. By monitoring the size, depth, and angle of butchery marks, both synchronically and diachronically, we may detect differences in the technologies or methods used to slaughter animals (Seetah 2006). Uniform patterns within a certain period or over time may represent consistent technology usage or technique and/or little social differentiation or intensified specialization. Conversely, divergent patterns may suggest status differences, a change in population composition, the introduction of new technologies, ethnic preference, or of specialized butchering activity.

Unfortunately, zooarchaeological markers of status or social inequality are culturally and temporally specific, and "…there are no universal correlates" (DeFrance 2009: 123). As such, studies of animal consumption that look at multiple variables, such as species abundances, mortality profiles, and body parts are more powerful than those that look at a single criterion such as the types of animals consumed in various parts of a site. In combination, data drawn from these analytical methods can help us not only to reconstruct the economic organization at sites like Kaman-Kalehöyük prior to arrival of the Mesopotamians on the Anatolian plateau, but also to better understand how local social inequalities may have changed due to the intensified inter-cultural interactions that took place.

Approaching an Anthropological Zooarchaeology

While true that through the distributions of animal species abundances and non-human animal ages at death we may learn about a wide range of topics from environmental change to tributary economies, food is what "may be called 'embodied material culture'…created specifically for destruction through the transformative process of ingestion…[and has]… an unusually close relationship to the person and to both the inculcation and the symbolization of concepts of identity" (Dietler 2010: 184). Thus, animal bones as an archaeological representation of food can provide us with insight into fluid concepts of self and personhood (Watts 2013).

Zooarchaeological interpretations of "what animals meant" to a people or society tend to be seen through the lens of our own culture versus the actual ones the faunal remains represent and thus, how humans have cognitively configured or "valued" non-human animals in ancient settings is hard to reconstruct. Without question, however, non-human animals played an integral part in society because "…over the millennia, humans have lived in a symbiotic relationship with a wide diversity of animals, and their partnerships have been centered on much more than physical [nutritional] resources" (Clutton-Brock 2012: 9). Furthermore, as Russell states, "hunting and herding do not exhaust human-animal relationships" (2012: 7), and "social factors are as significant as taphonomic factors in shaping animal bone assemblages" (Ibid.: preamble).

Beyond food and calories, countless anthropological studies have shown that animals contribute to or create social "value" in many ways – as clothing (wool/hides), shelter (bones), protection, tools, traction, transportation, and also, in ritual, trade, warfare, companionship, prestige or power displays, bridewealth, feasting, etc. (Dietler 2010; Fagan 2015; Hayden 2001; Russell 2012, Sherratt 1981 and 1983; The Animal Studies Group 2006; Wolfe 2003). Russell (2012: 298) argues that anywhere domesticated animals are kept demands that we consider that they are associated with some form of wealth, which she defines as “things that can be reexchanged” (after Lemmonier 1993: 136). In her view, wealth via animals is only derived when the animals possess value beyond being simply food objects. The point in raising this topic of “animals as wealth” in the context of zooarchaeology is simple – when animals are raised for social exchanges, reserved for ritualized use, or for other non-caloric reasons, decisions on the herds’ age and sex structure can differ if they are raised primarily for economic reasons. For example, during the late Early Bronze and early stages of the Middle Bronze Age at Kaman-Kalehöyük, certain species may have been valued as displays of politico-economic power or social status, for their role in creating, reifying, or transforming social relations, or for their use in ritualized contexts. Ethnographic accounts, especially when combined with textual evidence, iconography, and archaeological studies of ritualized contexts serve to articulate the social value of non-human animals beyond caloric contribution. In combination, these references help articulate how non-human animals are active participants in, and inextricably woven into, the social fabric of local populations (Grossman and Paulette 2020).

For example, Schneider’s (1980) East African ethnographic study showed that when animals are used as items of exchange in cultural practices beyond food consumption, they may be kept to full maturity, since animals used in non-food exchanges are not actually eaten. Here, older animals are passed back and forth as symbolic “gifts”. This “gifting” means animals would be slaughtered at a later age than would be expected on the basis of optimization for meat or milk. This, in turn, means that zooarchaeologically, we may observe mortality patterns skewed toward older animals, assuming that they were used for traction or wool production, when in fact they may have been used in the exchange of "wealth" or gifts between groups of people, perhaps in the form of bride-wealth payment or peace offering. The suggestion here is that older animals may be used in social or ritualistic exchanges because younger animals keep herds viable.

While Schneider's work is a wonderful illustration of the social value of animals, and suggests patterns we may observe in Kaman-Kalehöyük zooarchaeological deposits if animals were used as "gifts", ethnographic accounts from Iran and Turkey provide further insight into the social role non-human animals played in geographies more proximate to Kaman-Kalehöyük. Studies related to the pastoral Yomut Turkmen of northeastern Iran (Irons 1975), at the west central Anatolian village site at Yassihöyük (METU 1965), the Yörük of southeast Turkey (Bates 1973), the Basseri nomads of southwestern Iran (Barth 1961), as well as at the central western Iranian village of Aliabadi (Kramer 1982) have all documented wealth systems whereby herd size led to the ability to access or acquire more land. In these ethnographies, landholdings were correlated with larger households, associated with magnanimous social acts, and articulated with social power. These studies also demonstrated that differential access to, or consumption of, meat is not always a direct indication of one's economic or social wealth. For example, Kramer showed that horses were isolated to the "wealthiest" households, cattle indicated land ownership and were used in ritual contexts, and donkeys pointed to a more labor-intensive lifestyle (1982: 28, 67).

These ethnographies alerted me to three important elements for my work with Kaman-Kalehöyük fauna. First, they communicated a broad set of observations related to the aggregate social value of herd animals. Second, they provided specific ways to identify wealth via faunal analysis. And third, they demonstrated the interpretive power of leveraging a wide range of reference points to better understand archaeological deposits, including ethnographic analogue, written materials, folklore, and other categories of archaeological material remains. This approach to interpretation yields a more expansive, more holistic, evaluation of material remains when attempting to explain what "animals meant" in more ancient contexts. These ethnographies also drove home the points that there are no universal correlates between animals and wealth, and that animals are raised and valued for a variety of reasons beyond serving as sources of protein.

Lastly, corroborating zooarchaeological studies have also focused on the social importance of animals (Clutton-Brock 2012; Pawlowska 2020), especially in ritualized contexts (Baird, et. al. 2012; Boessneck and Shäffer 1986; Dietler and Hayden 2001; Forstenpointer 1993; Hamilakis and Konsolaki 2004; Greenewalt and Payne 1976; Jing and Flad 2005; Lentacker, et. al., 2004; Stane and Bejenaru 2004; Twiss 2008; Twiss and Russell 2009; Wilkens 2004). For instance, in southwest Asia, as early as the Neolithic, evidence presents itself for the symbolic value and social importance of non-human animal species (Arbuckle 2013; Grossman and Paulette 2020; Magness-Gardiner and Falconer 1994; Pawlowska 2020; Russell 2012: 41-44). These types of studies are important to my work because they speak to the social relevance and value of certain fauna, and how local populations may have cognitively configured them.

Toward a More Holistic Analysis

In this chapter, I have covered a range of topics that impact the fauna we uncover, analyze, and attempt to understand within a broader social context. The discussion of identification/metrics, followed by mortality profiling, and skeletal frequencies emphasized the need to triangulate with multiple zooarchaeological analytical techniques. Both a review of specialized production in the form of pastoral herding strategies and a discussion of social inequality were included not only to suggest that changes in production schemas took place due to new demands and regimes of value, but also to drive home the point that while animals have traditionally been considered as playing a role in subsistence economies, alternative more social interpretations of the data are equally important. Throughout this chapter I also discussed how non-human animals are active members in the fabric of society.

In this diachronic zooarchaeological study of the intensified Anatolian-Assyrian interactions of the 2nd millennium BC, I looked at faunal data through both economic and social lenses. First, I evaluated the Kaman-Kalehöyük data set to see if herd owners reconfigured their herd composition in response to new demands, which may have been placed upon them as a result of more formalized interactions with the Assyrians. And second, I monitored faunal patterns over time to see if the intensified interactions between these societies coincided with a change in the degree of social inequality at Kaman-Kalehöyük in the MBA. Leveraging the combination of ethnographic studies of material “wealth”, translations of written documents, review of other archaeological remains from the site, and by employing multiple faunal analysis techniques, this anthropological zooarchaeology study is intended to expand our interpretive frameworks of the non-human animal contributions to society in 2^{nd} millennium BC central Anatolia.

In closing, one area that cannot be emphasized enough is the absolute necessity to review patterns in all available archaeological artifact types when reconstructing (pre)historic ways of life. “To achieve the goals of zooarchaeology, faunal data [and interpretation] must be combined with other biological, inorganic, archaeological, and documentary evidence” including artwork, other iconography, emerging analysis techniques (e.g., isotopic analysis), architecture, and other artifact categories (Reitz and Wing 2008: 345). Given the known biases inherent in the discipline’s protocols, clearly paramount is that we must add as many reference points to our toolkit as possible. As Kramer (1982) stressed in her ethnoarchaeological study of the Aliabadi, a single line of evidence, or category of data, such as animal bones, is not enough to build a convincing case. For example, I’d be much more likely to convince you that a group of people were engaged in a specialized economy focused on wool production if relative abundance patterns, body part distribution, and age profiles of sheep and goat were contextually contemporary with iconography depicting looms, and were found in association with caches of spindle whorls in "workshop" like architectural contexts. As a result, this study followed a more holistic approach to interpretations of the Kaman-Kalehöyük material.

The key point I wish to emphasize is that people keep or slaughter animals for reasons beyond the need for food or other economic goals, and we, as zooarchaeologists, need to be well versed in the ethnographic record, textual studies, the breadth of faunal research from which we may draw insight, as well as the variation both within the current and historical local landscape and beyond. We may therefore consider zooarchaeological "social value" as an important yet elusive fourth order of faunal pattern evaluation – after identification, counting, and economic interpretation – one of critical importance – recognizing there may be a wide range of social implications and explanations for certain faunal patterns observed in the Kaman-Kalehöyük 2nd millennium BC data.

CHAPTER 7: FAUNAL ANALYSIS CONTEXTS, PROTOCOLS, AND RESULTS

Kaman-Kalehöyük zooarchaeological data in this research inquiry were drawn from excavated fauna not yet analyzed, as well as from published material. In selecting samples to include in this study, I sought fauna from Kaman-Kalehöyük deposits that: a) were stratigraphically sound within each time period; b) would provide a representative sample of the various excavated context types such as interior floors, exterior surfaces, and trash pits; c) had reasonably comprehensive field notes; d) augmented sample sizes of material analyzed by other scholars to account for more variation (e.g., previous EBA faunal studies included one room, four pits, and two exterior fill deposits; this study added two more rooms, two more pits, and five more exterior fill deposits to the EBA assemblage); e) were from fill deposits close to living surfaces both inside and outside of architectural structures and thus likely contemporaneous with them, and f) came from the central part of the mound to increase the likelihood that elite contexts were included in the limited EBA samples. Based on the relatively small size of Kaman-Kalehöyük, and the limited information we have about EBA architectural remains, I assumed that most of the EBA fauna came from non-elite contexts. However, since elites and public structures are often located toward the center of the EBA settlements, the bones from this part of the site could have come from elite contexts.

Due to the very small number of definitive EBA building structures excavated at the time of this study, options for analysis were limited to the north trenches (Sectors

IV-V-VI). As a result, all EBA samples analyzed here came from this part of the site, which is located at or near the center of the mound. As discussed in Chapter 4, architectural remains from the EBA are sparse. EBA remains are either buried very deeply beneath later deposits (in some instances over 10 meters), or in other cases, cut by them, and very badly damaged. As of the end of the 2015 excavation season, only three architectural structures from the EBA were preserved on two sides or more, making the evaluation of the fauna vis-à-vis other artifacts recovered in these areas even more critical to our understanding the period.

The areas from which EBA materials are drawn in the north trenches at Kaman-Kalehöyük are located at some of the highest points of the site, and are the most difficult to access from the base of the mound due to the relative steepness of the northwest and northeast corners of the mound (see Figure 7 for topographic map). New EBA deposits (Kaman-Kalehöyük IV-b) were selected from well-defined contexts (in Sector IV) and were excavated during the 2014 and 2015 field seasons. I was fortunate to be able to participate in all aspects of extraction, recovery, sieving, sorting, and recording of these contexts. All sediments excavated from EBA contexts were dry-sieved at the site immediately upon extraction using a 1-centimeter screen (see Figure 8), and sieving was followed by further hand-searching. Previously published EBA data used in this study were drawn from contemporaneous contexts in an adjacent grid, Sector III (Atici 2003, 2005), also located near the top of the mound.

The MBA deposits analyzed here were mostly drawn from Sector V at Kaman-Kalehöyük, which was excavated in 2006, and were from exterior fill deposits close to surfaces contemporary with associated architectural remains. The exception is a single context, fill just above the living surface in Room 429, excavated from Sector VI, which was unearthed in 2013. Although I did not participate in the recovery of the MBA materials from 2006, Dr. Omura, the Kaman-Kalehöyük site director since 1986, confirmed that remains analyzed here were sieved and sorted following the same protocol as that discussed above for EBA contexts. Additional MBA data were derived from published analyses of material also from deposits in the north trenches (Sectors IV-V-VI), located at some of the highest and most defensible locations at the site, and which followed the same excavation protocols as previously outlined (Hongo 1996: 56). Published data came from fill close to living surfaces in four interior contexts ("rooms") and eight pits associated with MBA building levels 6 through 12 (Hongo 1996: Appendix, Tables 5.2-5.5). The new contexts I evaluated in this study complement Hongo's work by adding data from one more room and eight exterior fill deposits adjacent to these rooms. Together, Hongo's published data coupled with new data provide a more balanced view of faunal patterns across all types of deposits.

Faunal analysis was completed on site in the Kaman-Kalehöyük Zooarchaeology Laboratory located in Central Turkey, where a comparative collection comprised of both modern and archaeological samples is housed. In addition, several animal bone atlases were consulted to assist in identification. I utilized a recording system, which was an amalgamation of those developed by Richard Meadow, Gil Stein, Patricia Wattenmaker, and countless others from whom I was fortunate to learn and work alongside. All data elements and measurements are housed in an excel workbook for future research; detailed data recorded in this study are provided in Appendix 2. Skull, vertebral, rib, and other miscellaneous fragments that could not be identified, or could only be identified to class of animal, were grouped according to relative size categories whence diagnostic features were undetected or unavailable (e.g., small, medium, large mammal). Fusion data were recorded for all relevant specimens as being either unfused or fused. I noted evidence of butchery, burning, pathologies, bone-working, and carnivore gnawing when present, and paid special attention to specimens from wild taxa in the assemblage. In addition, measurements were taken for all mammalian appendicular elements when possible, following von den Driesch (1976).

The remainder of this chapter is organized into several sub-sections. First, I provide an overview of my Kaman-Kalehöyük faunal analysis data and results from both the EBA and MBA periods. Then Kaman-Kalehöyük fauna were evaluated using six different zooarchaeological criteria: range of species, relative abundances, skeletal frequencies, mortality patterns, butchery and burning patterns. In each section I provide brief commentary for how observed faunal patterns align with my hypotheses related to changes in the degrees of production specialization and social inequality at Kaman-Kalehöyük from the EBA to the MBA. I close this chapter with a brief discussion of my findings.

Kaman-Kalehöyük Faunal Analysis: Data and Results

A total of 11,886 fragments were included in this analysis, of which 6,827 were from EBA contexts, and 5,059 were from MBA loci, respectively (Table 6). Of the 11,886 fragments included in this evaluation, 7,701 were drawn from published accounts (Hongo 1996; Atici 2003, 2005) and enhanced by an additional 4,185 fragments analyzed in the field specifically for this study. Across published and newly analyzed data, approximately 27% of the total fragments included in this study were identified to the species, genus, or family level (22% in the EBA and 34% in the MBA).

		EBA			**MBA**			
		ID	UNID	TTL	ID	UNID	TTL	Total
Nicola-2015	Count	558	991	1,549	861	1,775	2,636	4,185
	% ID	36.02%			32.66%			
Hongo-1996	Count	66	121	187	863	1,560	2,423	2,610
	% ID	35.29%			35.62%			
Atici-2003	Count	384	1848	2,232				
Atici-2005	Count	482	2377	2,859				
	% ID	17.01%						
Kaman-Kalehöyük GT		**1,490**	**5,337**	**6,827**	**1,724**	**3,335**	**5,059**	**11,886**

Table 6. Kaman-Kalehöyük EBA and MBA Fauna

(ID = Identified; UNID = Unidentified; TTL = Total; GT = Grand Total).

In the paragraphs which follow it is important to note that the analytical techniques employed in this study and associated interpretations rely on diachronic comparisons of the relative proportions of species, skeletal frequencies, and the mortality distributions of certain taxa. As a result, in advance of evaluating faunal remains in relation to my hypotheses, one caveat associated with relying on percentages and “closed arrays” requires mentioning.

The main challenge of using a “closed array” lies in the interpretation of diachronic change. In a closed array, and when using percentages to monitor for change over time, when one species increases in relative terms over time, another must go down. However, an increase in the proportion of a particular species over time does not necessarily mean that particular species was more important or more highly valued in one of the periods. Interpreting the increasing proportion as more important or valuable is only one possible explanation for what may have been the case in ancient times. Similarly, a decrease in the proportion of a particular species over time does not necessarily mean that particular species was less important or less valued in a given period. This interpretive caveat is especially important when samples are compared using only one zooarchaeological analytical technique, (for an early study, see Bate 1937). Interpretive bias can be moderated by employing multiple analytical techniques to see if faunal patterns are consistent with certain interpretations of the data (e.g., calculating the densities of bone recovered per cubic foot of sediment), and also by recognizing the concept of archaeological equifinality (see Chapter 6 and Cribb 1987), which means that there are multiple pathways to the same result. As stewards of zooarchaeological data we need to not only consider the depositional biases which may influence what we unearth, but also carefully think through the ancient behavioral factors which may have contributed to the variations in species richness or diversity represented in each period in our samples (after Plog and Hegmon 1993: 490).

The range of factors influencing archaeological deposits requires faunal analysts to word their observations about diachronic change very carefully, recognizing that observed changes in relative importance do not always equate to changes in actual importance of a species in any period. Being mindful of the variability inherent in comparing relative proportions of faunal specimens over time, in the paragraphs which follow I discuss patterns identified in the Kaman-Kalehöyük fauna across multiple analytical techniques.

The “Overall Sample” table below shows the range, counts, and relative frequencies of the animals identified in each period (Table 7). Review of the data shows that the range of taxa observed was consistent with Hongo’s (1996) and Atici’s (2003, 2005) findings of the EBA and MBA periods, and was nearly the same in both periods. Minor variations in the range of taxa between EBA and MBA data sets are likely the result of context variation and sample size. In terms of wild taxa, snail and fox (*Vulpes*) specimens were found only in EBA contexts, while mustelids, rodents, and one possible fowl (?*Gallus*) fragment (see Hongo 1996: Appendix, Table 4) were identified only in the MBA. Since the MBA predates domesticated chicken (*Gallus gallus*), and during this time period other junglefowl have only been identified in deposits from far southeast Asia, this single specimen may be a different species than what Hongo identified, an unidentified bird, or could indicate that the context where it was recovered might have been disturbed by a deposit from a later period.

Overall Sample				
	EBA	EBA	MBA	MBA
	Count	%	Count	%
Aves sp.	7	0.5%	21	1.2%
Bos taurus	245	16.4%	355	20.6%
Bos primigenius	1	0.1%	-	0.0%
Canis sp.	43	2.9%	56	3.2%
Capra sp.	41	2.8%	33	1.9%
Carnivora	2	0.1%	4	0.2%
Cervus sp.	3	0.2%	8	0.5%
Equus sp.	5	0.3%	12	0.7%
Equus caballus		0.0%	2	0.1%
Equus asinus		0.0%	4	0.2%
Felis sp.	11	0.7%	2	0.1%
Gallus gallus	-	0.0%	1	0.1%
Homo sapiens	1	0.1%	2	0.1%
Lepus sp.	19	1.3%	7	0.4%
Mustela sp.	-	0.0%	2	0.1%
Ovis sp./Capra sp.	785	52.7%	808	46.9%
Ovis. Sp.	49	3.3%	70	4.1%
Rodentiae sp.	-	0.0%	1	0.1%
Shell	1	0.1%	4	0.2%
Snail	1	0.1%	-	0.0%
Sus domesticus	266	17.9%	329	19.1%
Testudo graeca	5	0.3%	3	0.2%
Vulpes vulpes	5	0.3%	-	0.0%
ID	1,490	100.0%	1,724	100.0%
Unid	5,337	0.0%	3,335	0.0%
Total	6,827	0.0%	5,059	0.0%

Table 7. Kaman-Kalehöyük Overall Aggregated Sample.

Tortoise humeri were recovered in both periods in very small numbers along with some shell. Though the Black Sea native tortoise, *Testudo graeca,* is relatively common throughout the peninsula, its presence, along with shell fragments, could indicate participation in interaction spheres which extended to coastal areas. Lastly, regarding domesticates, the identification of two horse specimens (*Equus caballus*) in the MBA may represent their first appearance at the site.

Of specific interest, among the *Bos* remains, a relatively uncommon EBA specimen was identified as auroch or wild ox *(Bos primigenius)*. All other identified fragments were identified and recorded as domesticated cattle (*Bos taurus)*. The auroch fragment was recovered from Sector IV in the north trenches (Provisional Layer 108), and it was immediately recognized as an aberration among the grossly smaller examples of more common domesticated cattle. Morphologically, the contours and overall characteristics of this single distal metapodial fragment were exceptionally similar to domestic cattle in the laboratory comparative collection, but it was much larger and more massive, and approximately double the size of even the largest domestic metacarpal and metatarsal specimens in the lab. For reference, a complete fused adult modern cattle metapodial from the Kaman-Kalehöyük comparative collection weighed 261.5 grams. The EBA auroch specimen fragment identified here was approximately 1/5 the size of a complete metapodial, and weighed 140.5 grams; both visual inspection and its mass suggest that this bone was calcified and smoothed, either by human handling or taphonomic factors.

While many of the typical metapodial measurements and faunal characteristics (Flannery 1969: 303-308; von den Driesch 1976) could not be determined due to the nature of the auroch specimen’s fragmentation, I gleaned as much data as possible from this anomaly to maximize the opportunity to examine it. A sketch of the fragment was made, along with a reconstruction of what the complete distal end might have looked like (Figure 34). The depth of the one preserved condyle measured approximately 42.82 millimeters (1.69 inches), and the single condyle's width was 22.95 millimeters (0.9 inches). These measurements were nearly double the size of all domesticated cattle metapodials (metacarpal and metatarsal) in the Kaman-Kalehöyük comparative collection (Figures 35 and 36).

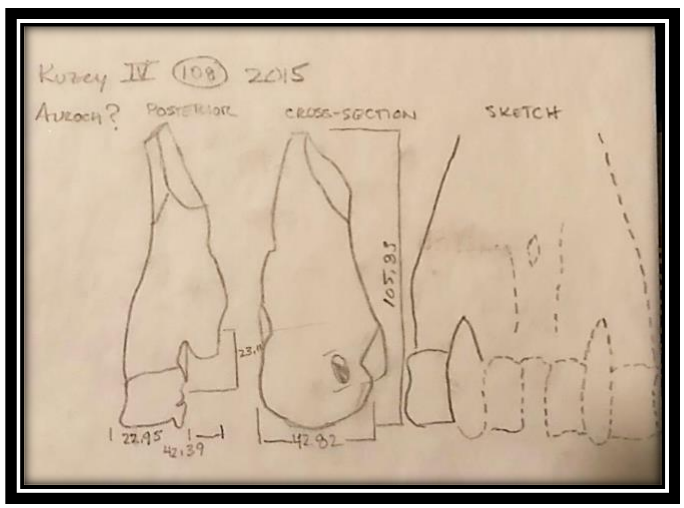


Figure 34. Kaman-Kalehöyük *B. primigenius* Metapodial Schematic

(units: millimeters, J. Nicola, in field 2015).

Figure 35A-B. Kaman-Kalehöyük *B. primigenius* metapodial (L) compared to Kaman-Kalehöyük *B. taurus* metapodial (R).

Figure 36A-B. Kaman-Kalehöyük Modern Cattle (*B. taurus)* and Auroch (*B. primigenius)* metapodial (L); Kaman-Kalehöyük *B. primigenius* scale (R).

Two modifications to the bone were noted: one possible cut mark on the shaft which appeared very light and fine, and a modern chip related to a blunt blow near the distal end, likely from an excavator's trowel or shovel. In both plantar and distal views, the specimen was extraordinarily large compared to other *Bos* archaeological or the modern cattle metapodials in the Kaman-Kalehöyük comparative collection (Figures 35-36). Intrigued by this anomaly, and lacking in-field comparatives, upon return from the field, I conducted further investigation of auroch remains at the Field Museum of Natural History in Chicago. In their lab I was able to review archaeological examples of *Bos taurus* and *Bos primigenius* metapodials from several other excavated sites in southwest Asia, including: Jarmo, Dehsavar, Amuq, Kabeh, and Sarab (Figures 37-38). I used my in-field schematic, measurements, and photographs to further analyze the Kaman-Kalehöyük specimen relative to these other archaeological examples and confirmed that its overall condition, size, and morphology were consistent with the Field Museum auroch specimens.

Figure 37. Left to right: Kabeh (*B. taurus*), Sarab (*B. primigenius*), and Jarmo (*B. primigenius*).

Figures 38A-B:
A: Left: Top to bottom: Kabeh (*B. taurus*), Sarab (*B. primigenius*), Sarab (*B. primigenius*)
B: Right: Top: Kabeh (*B. taurus*); Bottom: Jarmo (*B. primigenius*).

In summary, apart from the EBA auroch specimen, no other patterns stood out with regard to the range of species present in either the EBA or MBA, with the exception of a possible introduction of horses and a wider range of bird sizes in the later period. Evaluation of the range of species in each period did not yield any clear evidence suggesting that production or consumption strategies changed over time. While the uncommon EBA auroch specimen may indicate the continued role of hunting or presence of wild cows in small numbers at Kaman-Kalehöyük during this period, recent research suggests that aurochs became less important from 6400 BC onwards in Anatolia when domesticated cattle began to appear in ritual and other special deposits (Pawlowska 2020: 4, 16). Given this shift in social importance toward domesticated cattle, and the time frame of this study, it is unlikely that the auroch specimen recovered in my Kaman EBA sample is reflective of hunting activity.

An Overview of the EBA and MBA Faunal Assemblages from Kaman-Kalehöyük

In terms of the sample's relative proportions, sheep/goat (*Ovis sp./Capra sp.* or OVCP), cattle (*Bos*), and pig (*Sus*) comprised over 85% of identified remains in both the EBA and MBA. This narrow range of domesticates is typical for Anatolian zooarchaeological assemblages, and may be associated with production specialization, which is a common feature of hierarchical societies. In order to detect specialized production in each period, I evaluated the relative mix of the primary herd animals identified in each of the EBA and MBA along with the mortality profiles of those animals. While changes in the mix of animal relative proportions may indicate a change in production focus such as a shift from pastoral to agriculture activity, as discussed in Chapter 6, complementary patterns in ages at death of sheep/goats can shed light on whether: a) specialized production schemes existed in each period, b) there may have been a tributary economy in the EBA or MBA, and/or c) the goals of the people who raised certain animals may have changed over time. If age distributions yield concentrations of any particular animals, ages of animals, or secondary products, such as wool, then then this data might suggest the presence of specialized production. Together, evaluation of relative proportions, relative ratios of key domesticates (sheep/goats, cattle, and pigs), and mortality patterns help shape our understanding of the core agro-pastoral economy of Kaman-Kalehöyük.

We can see in Table 7 that the relative abundance of certain species appear to shift over time, but those small changes in proportions are likely a function of sample size versus potential shifts in the local economy. Of note, while a greater sample size is required to confirm the significance of the proportional change in equids (*Equus sp.*) over time, current data show a tripling in the count of equid remains from the earlier to the later period. Upon review of the relative proportions of just sheep/goat, cattle, and pig, current data suggests changes in the relative ratios of these primary food animals when comparing the EBA to the MBA (Table 8). In the MBA, there are decreases in the number of sheep/goats per cattle, sheep/goats per pig, and a near doubling of sheep relative to goats. The potential implications of these mixture changes are discussed later in this chapter.

Primary Domesticates	EBA	MBA	Change
Sheep/Goat: Cattle	3.6	2.6	Decrease
Sheep/Goat: Pig	3.3	2.8	Decrease
Sheep: Goat	1.2	2.1	Increase

Table 8. Kaman-Kalehöyük Primary Domesticate Ratios by Period.

In terms of other taxa in the assemblage, sample sizes were small. As a result, it would be premature to draw conclusions from diachronic changes in bird (*Aves*), hare (*Lepus*), or cat (*Felid*) abundances. Current data, does however, hint at some interesting preliminary patterns. First, most “bird” remains were long bone fragments of medium to large size, and were identified in increasing numbers from the earlier to the later period (21 specimens in the MBA and 7 in the EBA). Nineteen hare (*Lepus*) specimens were identified in the EBA, and seven were found in the MBA. Lastly, a total of eleven felid specimens were identified in the EBA compared to two in the MBA. More data are needed to confirm any diachronic shifts in these taxa.

Skeletal Frequencies

In my analysis of skeletal frequencies, bones from various sections of the skeleton were placed into four categories. In cases where highly fragmented teeth were identified, I consolidated fragments which were clearly from the same maxilla or mandible and counted them as one element. Diachronic changes in body part distributions were evaluated for the three main domesticates in the Kaman-Kalehöyük sample, namely, sheep/goats (OVCP), cattle (*Bos*), and pigs (*Sus*). I was unable to augment my EBA data with previous EBA faunal studies since published data combined body part distributions from two sub-periods (Atici 2005: 124, Table 5) that I consider separate occupational phases in this analysis; however, I was able to include published MBA data in this evaluation (Hongo 1996: 94-97, Tables 8.1-a to d). Patterns were evaluated in each period and over time by employing a categorization protocol derived from DeFrance (2009), Wattenmaker (1998) and Zeder (1991). The four categories used to allocate body parts in this study were: head, axial, upper/lower limb. Elements were allocated as follows (parenthetical is typical type of activity associated with each section of the skeleton):

Head (butchery):	Crania, Maxilla, Mandible, Horn, Teeth
Axial (consumption):	Atlas, Axis, Hyoid, Vertebra, Rib, Innominate[14]
Upper limbs (consumption):	Scapula, Humerus, Radius, Ulna, Femur, Tibia
Lower limbs (butchery):	Astragalus, Calcaneum, Metacarpal, Metatarsal, Carpal (12 to 16 bones)/Tarsal (10 to 14 bones), Phalanges (24+ bones)[15]

These groupings allowed me to view change through time in the proportions of different parts of the skeletons of animals and monitor for changes in higher versus lower caloric and meat bearing element proportions.

Following Zeder (1991: 96), I also compared sheep/goats and cattle skeletal distributions in each period to "standard" expected skeletal distributions. Zeder's "standard" distributions represent ideal cases, and assume that if all elements of a carcass are "…deposited in a single place and each element has the same chance of being preserved and recovered intact, the part distribution computed on the recovered bones should match the standard distribution" (1991: 97). By comparing Kaman-

[14] After Zeder (1991: 84): innominate/pelvic bones were grouped as "axial" since they are easily kept with the rest of the axial skeleton when animals are disarticulated.
[15] Count ranges in parentheses for bovids (sheep, goat, cattle) and pigs, with pigs representing the higher counts.

Kalehöyük proportions of skeletal parts to Zeder's standard distributions, "…part distributions similar to the standard are assumed to indicate use of the whole animal" (Ibid.). Of course, given that Zeder's standards are ideal distributions of body part remains, I expected that the Kaman-Kalehöyük distributions would differ from them in most cases. As a result, while evaluating diachronic differences in the Kaman-Kalehöyük body part distributions, the "standard" is used as an additional reference point to identify patterns in the analyzed EBA and MBA fauna. Since Zeder's "standard" body part distribution was derived for sheep, goat, and cattle skeletons, but not pigs, I did not use Zeder's protocol in my evaluation of pig body part distributions.

The goals of my skeletal frequency analysis were threefold: to establish a preliminary baseline skeletal distribution for each of the three main taxa in each period, to review patterns relative to Zeder's "standard" expected distribution to understand if all parts of the animals were utilized, and to compare those patterns over time to see if there were any changes in proportional distributions. In the following tables I highlighted data whenever Kaman-Kalehöyük body part proportions differed by five percent or more from Zeder's "standard" skeletal distributions (e.g., 34.0% and 29.0% differ by five percent).

Sheep/Goat Skeletal Frequencies

Compared to the expected standard distribution, Table 9 shows that in the EBA there were fewer head remains (25%), the expected proportions of axial remains (39%), and a slight over-representation in limb fragments (36%). There is a lower proportion of low meat bearing lower limbs and extremities that are often used only for marrow or discarded entirely during the butchering process. In addition, since all deposits at Kaman-Kalehöyük are passed through a 1 centimeter mesh dry screen, the lower-than-expected proportions of head, teeth, and lower limb specimens in the EBA were intriguing and may suggest that some carcasses were butchered elsewhere, or that cranial and foot remains were consumed, discarded, or deposited elsewhere.

	Standard	**EBA Count**	**EBA %**	**MBA Count**	**MBA %**	**Ratio (MBA/EBA)**
HEAD	34%	81	**25%**	277	34%	1.37
AXIAL	35%	125	39%	158	**20%**	0.51
LIMB	31%	115	**36%**	368	**46%**	1.28
UPPER		73	23%	146	18%	0.80
LOWER		42	13%	222	28%	2.11
TOTAL	100%	321	100%	803	100%	

Table 9. Kaman-Kalehöyük Sheep/Goat Skeletal Frequencies by Period.

A closer look at EBA limb proportions revealed an interesting possible pattern. In the EBA there was a high proportion of sheep/goat upper limb elements (23%) relative to lower limb elements (13%). Instead of the near 2: 1 ratio (upper to lower) observed here, if carcasses were butchered, processed, and consumed in these loci, I would have expected at least a ratio of 1: 2 (upper to lower), since there are more than 50 elements in the lower limb bone grouping compared to 6 in the upper limb grouping (for comparisons refer to the opening paragraph of the Skeletal Frequencies discussion). While the sheep/goat skeletal distribution observed in this evaluation was consistent with higher-than-expected sheep/goat meat consumption in the EBA, a greater sample size is required to confirm this pattern.

In the MBA, sheep/goat head remains (34%) matched standard proportions (34%), while axial remains were much lower than the standard (20%), and limb bones were much higher than standard proportions (46%). Within the limb category, the ratio of upper to lower limbs matched more closely to expected patterns for full carcass butchering, processing, and consumption. The MBA pattern was consistent with full carcass processing and consumption in the excavated contexts, but also suggests that some portion of axial meat was processed, consumed, or discarded elsewhere.

In sum, while both the EBA and MBA deposits at Kaman-Kalehöyük reflected a full range of body parts, indicating the presence and butchering of whole animals in both periods, the potential shifts in all categories of skeletal remains over time suggest that somewhat different activities may have taken place in these loci. For example, in the EBA body part distributions suggest that whole animals were slaughtered, more meat-bearing elements of sheep/goat (axial and upper limb) were consumed or deposited in in these contexts, and that lower meat bearing extremities were deposited or distributed elsewhere. In the MBA, while the distribution of body parts suggests continued consumption and processing of full carcasses, the reduction in more meat bearing axial and upper limb elements may signal a change in meat consumption, preference, or distribution. The lower proportion of higher meat bearing axial and upper limb elements in the MBA may have coincided with the emergence of new exchange activity and increased specialization where these meaty portions were distributed to elites or certain other members of the Kaman-Kalehöyük community. A greater sample size, and further evaluation of patterns in body part distributions of other taxa combined with mortality and butchery/burning analysis results of all three taxa will help better understand these observations in sheep/goat skeletal remains.

Cattle Skeletal Frequencies

In both periods, despite potential differences in proportions from the "standard", the presence of all cattle skeleton parts suggests that some whole animals were processed and consumed at Kaman-Kalehöyük during the EBA and MBA. Deviations in cattle body part distribution from the standard if full carcasses were processed and deposited in the study loci were intriguing, but require more data, especially in the earlier period (Table 10).

	Standard	EBA Count	EBA %	MBA Count	MBA %	Ratio (MBA/EBA)
HEAD	34%	13	**17%**	108	33%	1.95
AXIAL	35%	44	**58%**	57	**18%**	0.30
LIMB	31%	19	**25%**	159	**49%**	1.96
UPPER		7	9%	54	17%	1.81
LOWER		12	16%	105	32%	2.05
TOTAL	100%	76	100%	324	100%	

Table 10. Kaman-Kalehöyük Cattle Skeletal Frequencies by Period.

In the EBA, the current sample size is very small (n = 76), so observations are preliminary. Nevertheless, current data suggests that in the EBA head remains were half of the standard expectation, axial remains were more than 1.5 times greater than expected results, and limb bones were underrepresented. In the EBA, lower proportions of head and limb remains, and a much greater proportion of axial elements, may indicate that some meat bearing cattle elements were processed and/or consumed in the study loci. Their presence, along with teeth, indicate that cattle were indeed butchered at the site. The higher proportion of axial specimens, however, may simply indicate greater levels of cattle rib or vertebral fragmentation, and therefore, may tell us more about deposition patterns or taphonomic factors than consumption. A larger sample size is required to draw any further conclusions.

In the MBA, compared to standard distributions, head remains were as expected, axial remains were about half of the expected proportion, and limb bones were represented more than 1.5x higher than the standard. The low proportion of meat-bearing axial remains relative to head and limbs suggests that people in these contexts consumed some meat and may have distributed other meat bearing elements to people who lived elsewhere at the site or beyond. Given the relatively low proportion of meat-bearing axial remains in the MBA sample, it is possible that meat from this part of the skeleton was the privilege of certain members of the Kaman-Kalehöyük community that may not have resided in the study loci.

Diachronic ratios of head, axial and limb remains show that from the EBA to the MBA the proportion of cattle head and limb bones nearly doubled while there was a very large decrease in axial elements. This shift over time suggests that cattle trunks (axial remains) may have been consumed far less frequently in the study loci relative to meat bearing upper and lower limbs. This shift also may indicate a change in access to more highly valued caloric sources or a change in consumption preference, perhaps coinciding with a change in local leadership or increased levels of social inequality. A finer evaluation of metapodials in a future analysis will help determine if the high proportion of specimens from lower extremities indicates more of a preference for marrow (breakage of the bone shafts) or an increase in butchery debris. Overall, while some diachronic differences appear in the current data set, a greater sample size is needed in order to better understand any shifts over time.

Pig Skeletal Frequencies

	EBA Count	EBA %	MBA Count	MBA %	Ratio (MBA/EBA)
HEAD	44	56%	145	51%	0.90
AXIAL	5	6%	25	9%	1.36
LIMB	29	37%	117	41%	1.10
UPPER	16	21%	39	14%	0.66
LOWER	13	17%	78	27%	1.63
TOTAL	78	100%	287	100%	

Table 11. Kaman-Kalehöyük Pig Skeletal Frequencies by Period.

In the EBA, despite a relatively small sample size (n = 78), head remains of pigs were identified in EBA contexts nearly nine times more frequently than axial bones (Table 11). In addition, EBA limb bone proportions suggest a disproportionate share of higher meat bearing upper limb remains relative to the very dense lower limb bones (foot) than expected. Future inquiry is required to better understand the relative proportions of all EBA pig remains.

In the MBA, a similar pattern was observed to that of the earlier period, but with a larger sample size. Head remains were highly represented, axial elements continued to be very low, and limb bones were highly represented. In the MBA, the ratio of upper to lower limb bones is more consistent with full carcass processing, and may indicate less of a focus on the consumption of upper limb meat bearing elements. A focused future study on butchery and burning data may shed light on whether foot bones were cooked and/or consumed in the MBA. A greater sample also is necessary to evaluate any differences in pig body part distribution patterns between the EBA and MBA.

Overall, the presence of all pig skeletal remains in both periods suggests that pigs were butchered and consumed at Kaman-Kalehöyük. And, since pig skeletal part distributions by area of the body were similar in the EBA and MBA, this small sample of pig data suggests the continuity of pig butchering and consumption practices at the site over a long period of time (Figure 48).

Mortality Profiles and Survivorship Curves

Given the character of the faunal remains in this sample, some of the most meaningful data for this diachronic analysis came from sheep/goat tooth wear. Cattle and pig tooth wear and long bone fusion sample sizes were small, especially in the EBA, and our understanding will benefit from future inquiry. In this study, earlier analyses of caprine and pig teeth from Kaman-Kalehöyük are referenced but not aggregated with new data. Since the sample sizes of EBA sheep/goat and pig teeth analyzed in two studies were not provided (Atici 2003, 2005), they could not be added to my results. A second study combined fauna from EBA and MBA layers so was not useful for this study, which compares kill-off patterns from the EBA and MBA periods (Hongo 1996: Appendix Table 11.3). I determined the ages of death from skeletal specimens using Meadow's zooarchaeology reference manual (unpublished, 1975 and 1994; also see Silver 1969).

Sheep/goat tooth wear stages and associated patterns were evaluated using Payne's (1973) ethnoarchaeological studies of modern Turkish flocks (Payne and Deniz 1982). Pig remains were aged and interpreted using Meadow's reference manual, an expansion of Hongo and Meadow's 1998 work (Lemoine, X., M. Zeder, K. Bishop, and S. Rufolo 2014), and a study which derived its heuristic from an evaluation of 22 Anatolian zooarchaeological assemblages (Slim and Çakırlar 2023: 51).

Sheep/Goat Mortality

Figure 39A (Left): Kaman-Kalehöyük Sheep/Goat EBA Mandible;
Figure 39B (Right): Kaman-Kalehöyük Sheep/Goat MBA Mandible.

In this analysis I derived sheep/goat mortality profiles from long bone fusion data and tooth wear patterns. I evaluated twenty-two sheep/goat mandibles and/or mandibular teeth in the EBA, and thirty-nine specimens from the MBA. As reflected in

Figures 39A-39B, teeth in the Kaman-Kalehöyük sample were relatively well preserved in both periods, and provided excellent data from which to estimate kill-off patterns.

Age distributions were evaluated within each period to establish the culling pattern, and then results from the EBA and MBA were compared (after Crabtree 1990; Mudar 1988; Stein 1987; Wapnish and Hesse 1988; Wattenmaker 1987; Wattenmaker and Stein 1986). In Chapter 6 I discussed Payne's study which found that if a herd owner's goal was optimal meat production, slaughter of most males took place between 18 and 30 months; however, if sheep/goats were kept for both meat and milk, optimal culling of surplus animals occurred at either 6-9-months under favorable environmental conditions or 24-36 months when less favorable. Payne also found that when herds were focused solely on milk, then after 12 months there was a gradual decline in all herd age groups. Last, if surplus wool production was a primary production focus, then more adults would be present, with modest reductions in sheep/goat ages until after 72 months, when steeper drop offs in age groups occurred and the remaining 45% of the herd was culled (Ibid.: 283-284). In short, these heuristics suggest that ovi-caprid kill-off patterns at Kaman-Kalehöyük would skew older when production was more focused on fibers and surplus wool, and younger when more focused on meat and milk. If, however, Kaman-Kalehöyük herd owners were focused on increasing sheep/goat herd size, as was the case for the Yörük, Basseri, and Aliabadi's (see Chapter 6), an alternate pattern might emerge. If increasing herd size was the goal, then I would expect a full complement of age groups and a higher proportion of females of reproductive age, fewer males relative to females across all age groups (e.g., a male to female ratio of 1 to 5, and even fewer males beyond the maximum meat yield age range of 24-36 months), a median herd age of approximately 36 months, and very few livestock over 60 months of age. Deciphering ancient herd compositions, however, is not that simple, as various mixtures of herding strategies may lead to the same archaeological result.

Payne reminds us that "…flocks are not usually kept for a single product or production goal, particularly in subsistence economies…[and that herding strategies depend]…on the relative importance of the different products…" (1973: 282). Since caprines produce a variety of products such as milk and fibers, and can be exploited for meat consumption as well, I expected the Kaman-Kalehöyük EBA and MBA faunal samples to be consistent with patterns of multiple herding strategies and goals, but ones that may have shifted or intensified over time. In terms of the data, if sheep/goats were raised at the site, I would expect to find animals present in all age groups, including some very young animals who may have died due to natural causes. If sheep/goats were raised at Kaman-Kalehöyük and their meat was consumed at the site, I expect data to show animals across age groups including some animals killed in the prime meat age range (1-2 years). And, if sheep/goats were raised at the site and kept alive for breeding, milk, and/or fibers/wool, some older animals should be identified in the Kaman-Kalehöyük faunal profile. Fusion and tooth wear data were used to evaluate the Kaman-Kalehöyük fauna in each period and to see if the data suggested any pattern differences over time.

In the Kaman-Kalehöyük sample only 51 fragments were preserved well enough to determine the state of epiphyseal fusion of certain bones, so drawing any conclusions is premature. Even this small sample size, however, demonstrates that sheep/goats were present across multiple age groups (Table 12), suggesting the raising, keeping, and culling of animals for a variety of reasons.

Fusion Data	**EBA**		**MBA**	
	Unfused x < age	**Fused x < age**	**Unfused x < age**	**Fused x < age**
c. < > 12 months	**1**	**3**	**2**	**4**
c. < > 18 months	**4**	**3**	**6**	**7**
c. < > 24 months	**1**	**1**	**1**	**0**
c. < > 30 months	**4**	**2**	**3**	**0**
c. < > 36 months	**5**	**0**	**2**	**2**
Total	**15**	**9**	**14**	**13**

Table 12. Kaman-Kalehöyük Sheep/Goat Long Bone Fusion Data (after Silver 1969 and Meadow 1975).

Though informative, the challenge with fusion data is that it tells us if certain animals were younger or older than certain ages, but it does not provide information as to how long an animal lived. For example, unfused fragments tell us that an animal has not yet reached a certain age; whereas, fused specimens tell us that an animal has reached a certain age, though we don't know how long that animal lived past that point. Since fusion data only provides a broad view of the age ranges present in the Kaman-

Kalehöyük sheep/goat sample, and since the sample sizes in this study are so low, findings are best reviewed in conjunction with tooth wear data, which is more precise in terms of determining ages at death.

Recognizing that mortality data of the current study may shift with a greater sample size, the mean age of the Kaman-Kalehöyük EBA mandibular specimens was approximately 45 months (Table14). Of the 22 EBA mandibular specimens which provided age data, teeth from sheep/goats in the 6-12-month age category and animals ranging from 2 to 8 years were identified. Remains from animals under 6 months of age, 1-2 years old, and 8-10 years old were absent from the sample (Table 13 and Figures 40-41).

OVCP	**Count**		**Percentage**		**Mortality**		**Survivorship**	
Wear Stage	**EBA**	**MBA**	**EBA**	**MBA**	**EBA**	**MBA**	**EBA**	**MBA**
AB (0 - 6 m)	0	0	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
C (6 - 12 m)	5	5	22.7%	12.8%	22.7%	12.8%	77.3%	87.2%
D (1 - 2 y)	0	11	0.0%	28.2%	22.7%	41.0%	77.3%	59.0%
E (2 - 3 y)	3	2	13.6%	5.1%	36.4%	46.2%	63.6%	53.8%
F (3 - 4 y)	5	4	22.7%	10.3%	59.1%	56.4%	40.9%	43.6%
G (4 - 6 y)	4.5	16	20.5%	41.0%	79.5%	97.4%	20.5%	2.6%
H (6 - 8 y)	4.5	1	20.5%	2.6%	100.0%	100.0%	0.0%	0.0%
I (8 - 10 y)	0	0	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%
Total	22	39	100.0%	100.0%				

Table 13. Kaman-Kalehöyük Sheep/Goat Wear Stages – Attrition by Age (after Payne 1973).

The presence of remains in the 6 to 12-month age group is consistent with the raising of animals at Kaman-Kalehöyük since some portion of very young animals often die of natural causes regardless of herd production goals. The identification of animals from the 2 to 3-year age group suggests meat from sheep/goats was consumed at the site, but perhaps beyond prime meat age, potentially due to less favorable environmental conditions. And, the presence of older animals at Kaman-Kalehöyük suggests that milk and fibers/wool were also part of the EBA herding strategy (Figures 40-41). These findings are consistent with previous EBA faunal studies that suggested a "mixed" herding strategy (Atici 2003; 2005) where animals were raised, consumed, and exploited at the site for a combination of milk, meat, and fibers/wool.

One observation I found interesting in this limited sample was that none of the Kaman-Kalehöyük EBA sheep/goat mandibular specimens fell within the 12 to 24-month mortality age group. Because of the small sample size, it's not possible to say with certainty what this means. The absence of specimens from this age group in the Kaman-Kalehöyük EBA could mean that sheep/goat meat was consumed by the residents of the study loci beyond the prime meat age range (typically between 18 and 30 months). It could also mean that prime meat bearing sheep/goats in the 12 to 24-month age range were consumed elsewhere or by others at Kaman-Kalehöyük who had more access to these prime-meat aged animals. Or, it's possible that prime meat yield animals were shipped off to a different location altogether, possibly as a form of tribute or tax. In sum, both fusion and mortality data from the EBA deposits are consistent with a mixed sheep/goat herding strategy where animals were raised and used at Kaman-Kalehöyük for meat, milk, and fibers/wool yields.

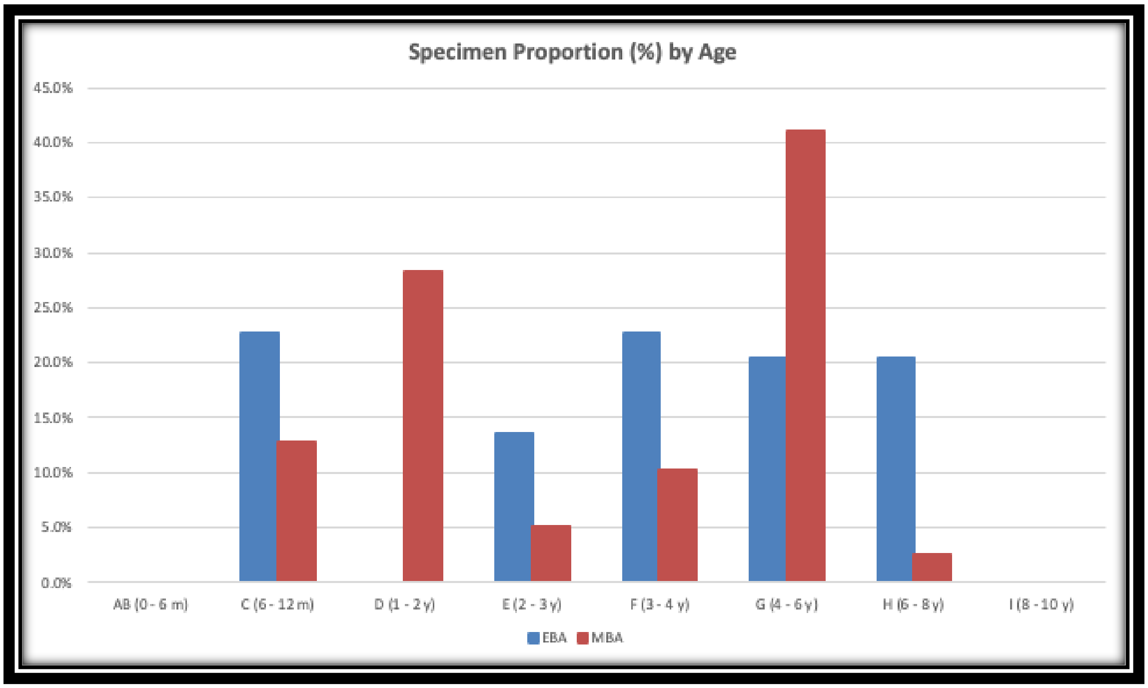


Figure 40. Kaman-Kalehöyük Sheep/Goat Mortality Proportion (%) By Age (after Payne 1973).

Sheep/goat fusion data from the MBA was similar to the EBA in that specimens were present in multiple age categories which suggested animals were raised and kept at the site and were exploited for multiple reasons (Table 12). Two specimens from animals older than 36 months confirmed that sheep/goats ranging from very young through to adulthood were kept at Kaman-Kalehöyük in the MBA. Because the MBA fusion data sample size is relatively small, and, as aforementioned, because fusion data only provides greater or less than ages, tooth wear patterns provided more insight into Kaman-Kalehöyük's herd composition in this later period.

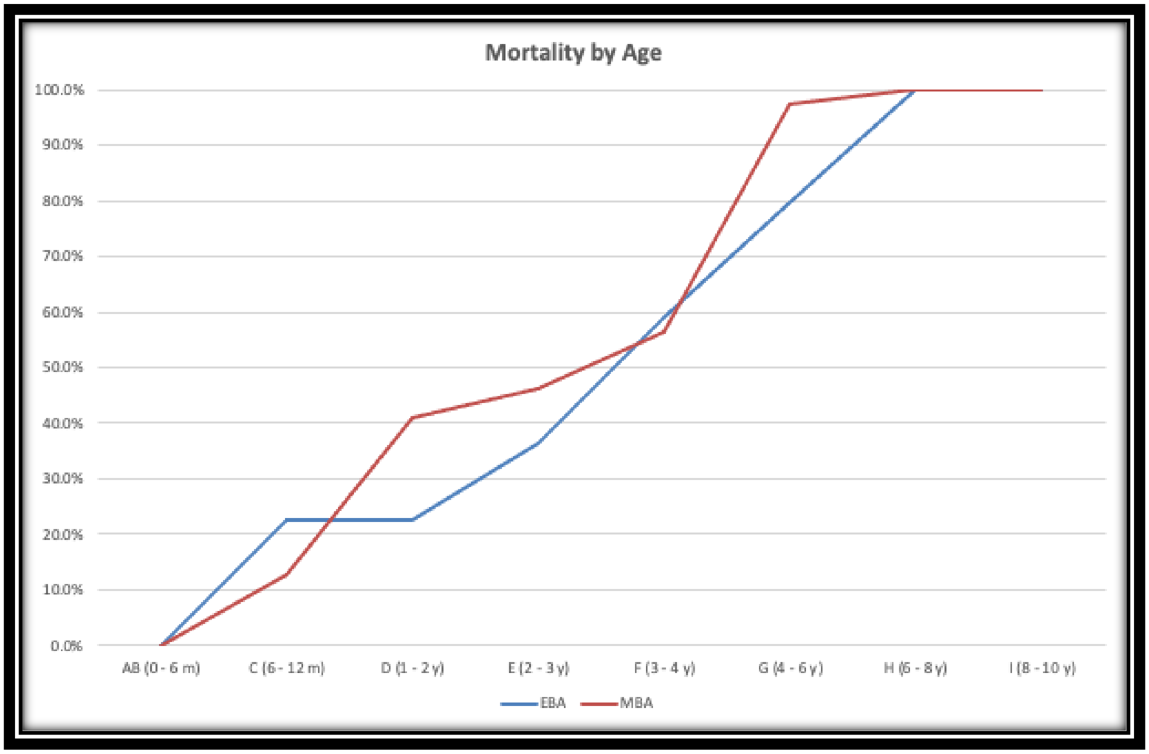


Figure 41. Kaman-Kalehöyük Sheep/Goat Mortality Curve (after Payne 1973).

The MBA sample size of sheep/goat mandibular remains that provided wear stage data was larger than that from the EBA, though still relatively small. The 39 specimens from MBA contexts yielded a mean age of 39 months (Table 13 and Figures 40-41). The mean age of the MBA sample more closely matched expectations of pastoral strategies focused on increasing herd size, which, as discussed earlier, yields a mean herd age of approximately 36 months. MBA tooth wear data, like that from the

EBA, demonstrated the presence of a wide range of animals from very young to very old, suggesting continuity of a mixed herding strategy in the later period as well. The Kaman-Kalehöyük MBA tooth wear data, however, showed two potential concentrations in specimens from specific sheep/goat age groups that require mentioning as well as validation with a larger sample size (Figures 40-41).

The first pattern I found interesting in the Kaman-Kalehöyük MBA data was the concentration of sheep/goats aged between 12 and 24 months (n = 11, 28%), which represented a departure from the earlier period where no specimens were identified in this age category. Remains in this age category suggest not only that Kaman-Kalehöyük sheep/goat herds in the MBA were raised and slaughtered for their meat, but also that some people at the site had access to this prime-meat in the MBA. This shift in mortality data from the earlier period hint at a possible higher demand for prime-aged sheep/goat meat in the MBA, or differential access to certain animals or their meat, potentially associated with Assyrian traders and/or a newly emerged local elite class. However, the sample size is far too small to draw any conclusions.

The second pattern I found interesting in the current data was the concentration of the Kaman-Kalehöyük MBA sheep/goat specimens identified as belonging to the 4 to 6-year-old age group (n = 16, 41%), and the single specimen (2.6%) that was aged 6 years or more (Table 13 and Figures 40-41). The concentration of animals in the 4 to 6-year age group demonstrates that in the MBA sheep/goats were kept at Kaman-

Kalehöyük into adulthood. And, while we cannot say at this point, if current data is confirmed with an increased sample size in the future, the concentration of animals in the 4 to 6-year-old age group may indicate that Kaman-Kalehöyük herd owners in the MBA were more focused on exploiting sheep/goats for their milk and fibers when compared to the EBA. A greater sample size is needed to draw any definitive conclusions related to this potential concentration.

In short, pending future study, the MBA sheep/goat mortality profile observed in this study hinted at four possible themes. First, the mean herd age of 39 months appears to have approached expectations for strategies of increasing herd size (target ~ 36 months). Second, current fusion and tooth wear data suggested a wide age range of sheep/goats were raised and kept at the site for multiple reasons. Third, the concentration of 1-2-year-old animals in the MBA is consistent with models of local access to, and consumption of, prime-meat aged animals. And, finally, the possible increased proportion of 4-6-year old animals who were slightly older than optimal meat yield age may represent the consumption of animals beyond prime-meat age and/or a focus on the surplus production of dairy products and fiber/wool yield.

Diachronically, MBA data was consistent with some observations made in review of the EBA data set and divergent in others. In both periods, data was consistent with models that suggest sheep/goats were raised and kept at Kaman-Kalehöyük (age groups included very young animals and spanned multiple age categories), consumed there (1-

3-year-old animals), and exploited at the site for their milk and fibers (4-6-year-old animals).

There were three potential shifts in the data between the periods that would benefit from a larger data set. First, in the current data set the mean age at death in the MBA was 39 months compared to 45 in the EBA, which may suggest that some sheep and goats were slaughtered at earlier ages in the MBA. If this pattern holds true, the slaughter of younger animals in the MBA may reflect a desire to increase herd size (versus herd maintenance, which is always a goal), where the expected mean age of the herd is approximately 36 months. Second, the concentration of teeth from 1-2-year-old animals in the MBA was consistent with the local consumption, use, and slaughter of prime meat yield aged stock. While this age group was unrepresented in the sample from earlier period, the presence of these prime meat stock specimens in the MBA means that at least some members of the Kaman-Kalehöyük population had access to the meat of young animals in the later period. If the patterns observed in the current data set are supported in future analyses, then the concentration of remains in this prime-meat age group could indicate differential access to certain animals or types of meat, or a newly emerged preference for this type of meat. And third, the potential higher concentration of 4-6-year-old sheep/goats in the MBA may indicate that more animals were kept at Kaman-Kalehöyük for reasons other than meat in the later period, such as for the surplus production of milk and fibers. Future investigations focused on sheep/goat survivorship are needed to further evaluate these initial observations.

Cattle Mortality

Age estimates from long bones, tooth eruption, and cattle tooth wear patterns that could be aged were uncommon in the EBA, and data from earlier EBA faunal studies were unavailable. As a result, detailed comparisons between cattle age data from the EBA and MBA could not be made. Fusion and tooth eruption data from the EBA (n = 7) and three teeth where ages could be determined showed the presence of cattle in age groups from under 12 months to more than 36 months. A single mandibular tooth (P4) suggested cattle were raised and kept to at least the later stages of sub-adulthood (< 36 months), if not longer.

In the MBA, the sample size of long bone fusion and tooth eruption data was larger than the earlier period (n = 21) and provided some insight into the role cattle may have played at Kaman-Kalehöyük. In the MBA all ages of cattle were identified from under 12 months (e.g., unfused scapula) to more than 42 months (e.g., fused distal femur). Seven teeth were preserved well enough to age based on wear patterns. Three of these cattle teeth fell in the "up to 3-year" range, while another three were 3+ years, and one was deemed to have come from a "very old" animal since it was worn down almost to the root.

These MBA findings are consistent with Hongo's 1996 study. In Hongo's evaluation of MBA fusion data (n = 32) cattle specimens were identified which spanned four age stages, namely, 6-12 months, 12-18 months, 24-42 months, and 42-48 months.

In this study 18 of the cattle specimens were from animals at least 12-18 months of age, while the remaining 14 fragments were evenly spread across the other age categories (Hongo 1996: Appendix Table 10.2-a). Regarding cattle tooth wear data, Hongo found that a substantial proportion of the specimens came from older animals. Of the twenty-nine cattle tooth specimens Hongo identified, fourteen of them (48%) had tooth wear patterns associated with animals 36 months or older and another nine (31%) were deemed "old" (1996: Appendix Table 11.3-a).

These combined MBA findings are important to this study because cattle may be kept to older ages if their social value was greater than their meat value, if beef was rarely consumed, if cattle were raised and bred at the site, or if cattle were highly valued for the regular contributions they provided to farmers as milk sources, or for plowing and traction. For example, if cattle carried high social value and were displayed by their owners as visual symbols of social inequality, and/or if they were used as peace offerings in repetitive ritual exchanges such as those between rival factions in order to prevent war, they may be kept to older ages. On the other hand, if cattle were primarily used for meat, I would expect mortality profiles to include more specimens in the 18 to 24-month range when they reach the ideal weight for slaughter, unless the tender beef of younger calves was preferred. Finally, if cattle were more valued for the role they played in allowing their owners to rent them or to cultivate crops and generate surpluses, I would also expect them to skew older (Gökçek 2004).

While there are many possibilities for why cattle might be kept to older ages, fusion and tooth eruption data provided some insight as to the role cattle may have played at Kaman-Kalehöyük. In both the EBA and MBA periods, the presence of multiple age groups in the faunal sample suggests that cattle were raised and consumed at the site. Also, in both periods the presence of remains from "old" animals suggested that cattle were raised and kept for multiple reasons. In summary, because a full complement of age ranges was identified in both periods, and especially in the MBA, it is likely that cattle were raised, kept, and exploited at Kaman-Kalehöyük for reasons beyond their meat yield, such as for milk, hides, traction, transport, plowing, or other social purposes (Sherratt 1981 and 1983).

Pig Mortality

Pigs conventionally have been considered primarily as a source of meat in zooarchaeological research (Zeder 1991: 30) though some scholars have argued that pigs were exploited in ancient contexts for a variety of reasons. For example, in a discussion of pig remains from excavations in Aegean and western Anatolia, researchers suggested that at some locations piglets were consumed year-round for their tender meat, while both piglets and adult pigs were slaughtered as a part of feasting (Slim, Çakırlar, and Roosevelt 2020: 316, 322, 328). This same study also mentioned textual evidence for specialized pig rearing in Anatolia, which sometimes focused on extracting their fat for use in perfume and medicine production (Ibid.: 317, 329; Alparslan 2013: 511). In short, research shows that pigs were important protein sources throughout Anatolia, and in certain instances also were raised for reasons beyond their meat yield (Slim and Çakırlar 2023). While this literature provides great insight into the variety of reasons for ancient pig husbandry, given the sample limitations in the current study I take a more conventional approach to evaluating pig data, viewing it in terms of how pigs may have been exploited for their meat at Kaman-Kalehöyük in each period.

Pigs are easy to raise and maintain, and they are a great source of supplementary protein. Pigs are easy to raise and maintain because they feed on almost everything and can be confined to small spaces. Pigs grow fast, reproduce quickly and in large numbers, and yield a large amount of meat in a short period of time. While the average newborn pig weighs just 1.4 kilograms, by six months of age pigs reach 100 kilograms, and by 18 months reach a maximum weight of over 160 kilograms (Redding 2015: 346). Given these characteristics, Redding has suggested in ancient contexts that the key "role of the pig was as a locally maintained inexpensive resource that households could rear to supplement other sources of protein" (Ibid.: 350).

Based on Redding's studies (1991 and 2015), if pigs were raised at Kaman-Kalehöyük for household consumption, we should find that each household kept no more than 1-2 sows. These sows would yield 20-24 piglets in a year, each of which could produce at least 80 kilograms of meat by 12 months of age. However, if all piglets were kept to one year old, each household would have more protein available than they were able to consume. Each household would also have a propagating pig population that would quickly overrun the household since pigs cannot be herded nor moved long distances like other domesticates such as sheep/goats, cattle, and equids. For these reasons, Redding has argued that when pigs are kept at the household level as a protein source, we may expect that: a) only a small number of adults are retained as breeding stock, b) young animals (less than one year) are slaughtered before they begin to consume food needed for humans and breeding pigs, and c) most pigs are consumed between 3 and 6 months, after weaning, but before the next litter arrives (1991: 25). At Kaman-Kalehöyük, I expected to find evidence consistent with Redding's patterns in both the EBA and the MBA, with perhaps an amplification in volume in the MBA if residents of the site needed to support the protein requirements of an increasing population on the Anatolian plateau.

My evaluation of Kaman-Kalehöyük pig mortality was based on a very small sample of epiphyseal fusion data, along with tooth eruption and wear patterns (Figure 54; protocol after Meadow 1975 and Hongo 1996). EBA data from earlier studies were unavailable. Data from a previous MBA study were combined with my data and evaluated in aggregate (Hongo 1996: Appendix, Tables 10.1 and 11.2).

In the EBA, based on relative size, a large number of very small pig long bone fragments appeared to be from animals under 6 months of age; however, only fifteen specimens in the sample had proximal and distal ends which could be used to determine the state of fusion of those bones (Table 14). Similarly, EBA pig tooth eruption and wear pattern data were also very limited (n = 6). Although eleven of the fifteen EBA pig long bone specimens (73%) were unfused and all likely from very young animals, and are consistent with Redding's expectations for household production, the extremely small sample of fragments with age-able characteristics from this period render any patterns as preliminary, at best.

Fusion Data	**EBA**		**MBA**	
	Unfused x < age	**Fused x < age**	**Unfused x < age**	**Fused x < age**
Stage 1 (c. < > 12 months)	**9**	**1**	**13**	**12**
Stage 2 (c. < > 24-30 months)	**1**	**1**	**18**	**3**
Stage 3 (c. < > 36-42 months)	**1**	**2**	**3**	**1**
Total	**11**	**4**	**34**	**16**
Tooth Wear	**EBA**		**MBA**	
	Count	**%**	**Count**	**%**
6 to 12 months	**2**	**33.3%**	**49**	**76.6%**
12 to 18 months	**0**	**0.0%**	**3**	**4.7%**
18 to 24 months	**3**	**50.0%**	**7**	**10.9%**
over 2 years	**1**	**16.7%**	**5**	**7.8%**
Total	**6**	**100.0%**	**64**	**100.0%**

Table 14. Kaman-Kalehöyük Pig Fusion and Tooth Wear Relative Aging by Period.

Sample sizes of pig bones with diagnostic features necessary for aging specimens were higher in the MBA than in the EBA, but counts were still limited. In the MBA, there were fifty long bone fragments which yielded fusion data and sixty-four teeth that could be aged using wear stage data. MBA fusion data suggested that at least 26% (13/50) and a maximum of 68% (all unfused elements, or 34/50) of pig specimens were from animals under 12 months of age. Since there is no indication that these remains were extracted from special or ritual contexts, it is likely that the maximum number of pigs under 12 months of age in the MBA fusion data is a closer reflection of the actual pig mortality profile. Assuming this is the case, then MBA fusion data were consistent with expectations for household pig protein production since most pigs were slaughtered before they reached full size or started to reproduce (Redding 2015).

Tooth wear data, as discussed earlier, which is more precise in terms of estimating age at death than fusion data, suggested that more than 75% of pigs were slaughtered by 12 months of age and that under 10% of animals were older than 2 years. Tooth wear data observed in this study were consistent with previous evaluations of Kaman-Kalehöyük MBA deposits (Hongo 1996: 131, Appendix, Table 10.2-f and Table 11.3-e) and also consistent with the raising and consumption of pigs at the household level. Overall, MBA pig fusion and tooth wear data collectively corroborate Redding's expected age distributions where pigs were raised and kept as a protein source and consumed at the household level.

The patterns observed in this study suggest that in the future as more Kaman-Kalehöyük EBA and MBA contexts are studied, analysts should closely monitor the relative age distributions of pig remains at the site to see if any diachronic changes took place. If high concentrations of young or small pigs are identified at Kaman-Kalehöyük across all context types, then pigs might have been consumed by all residents as a result of environmental circumstances or simply as a secure and consistent source of protein. If, however, concentrations of pig bones are identified in only certain deposits, then the likelihood increases that these remains may provide insight into differential resource access. In sum, though more data is necessary to more properly evaluate the role pigs played at Kaman-Kalehöyük, especially in the EBA, current evidence demonstrated that pigs were an important source of protein in both periods.

Butchery and Burning Patterns

In the current Kaman-Kalehöyük EBA and MBA sample, butchery was uncommon, and as a result, there wasn't enough evidence to provide a good understanding of how the carcasses of various animals were disarticulated. Across the small sample of cut marks identified in both the EBA and MBA, evidence of fine and shallow cut marks from sharp implements was identified across the main domesticates spanning all areas of the skeleton, including head (mandibles), foot (astragali), and limbs (Figures 42A-D and 43). This finding is in agreement with previous EBA (Atici 2005: 126) and MBA studies (Hongo 1996: 152). Hongo also identified a higher frequency of cut marks on cattle during the MBA and noted a potential shift from fine to heavy cut marks on cattle specimens over time (1996: 152-154). These patterns were not identified in the newly evaluated faunal remains.

Three patterns in the Kaman-Kalehöyük data set provided some insight into what might have occurred in both periods. First, the presence of cut marks on bones across the full complement of body parts is consistent with the local activity of disarticulation and processing of full animal carcasses in both the EBA and MBA (Figures 42A-D and 43). Second, the scarcity of cut marks on bones recovered in both the EBA and MBA may indicate the existence of butchers at the site who were very skilled at their craft. Third, the identification of fine cut marks coupled with the absence of deep or blunt cut marks in the sample also is consistent with the existence of specialists who were highly skilled in carcass disarticulation techniques. And fourth, the identification of fine cut marks from sharp implements is consistent not only with butchery expertise but also is consistent with the recovery of an increasing number of bronze blades in the MBA (Figures 26A-B and 43; see Hongo 1996: 102). In short, preliminary butchery patterns in the Kaman-Kalehöyük data suggest the presence of full carcass processing specialists at the site since skilled artisans would likely leave very few cut marks on bone given their mastery associated with disarticulating carcasses (Figures 42A-D).

With respect to burning, overall Atici noted no patterns in the EBA (2005: 126) and Hongo found no MBA patterns of burning on specific body parts or animals of specific ages, but did find that pits contained more charred specimens than other context types such as room fill or adjacent exterior deposits (1996: 114). In alignment with both Atici's and Hongo's findings, my evaluation of the data did not yield any notable patterns or trends in burn patterns over time.

Figures 42 A, B, C, D: Kaman-Kalehöyük Butchery.
Clockwise from top left: A) EBA Pig mandibles, B) MBA Canid mandible,
C) MBA Sheep/Goat astragalus, and D) EBA Cattle astragalus).

Figure 43: Kaman-Kalehöyük Butchery – Long Bone Fragments.

Faunal Summary and Discussion

So long as animal and animal by-product demands of dependent non-food producers are met, and are not in conflict with the production or procurement of other important resources, there is no reason to expect a change in herd management strategies in more rural areas (adapted from Zeder 1991: 85).

Zeder's perspective resonated for me in this analysis because, despite an overwhelming body of evidence that suggests that major social and politico-economic changes took place on the central Anatolian plateau from the EBA to the MBA, prior to this study we did not know if or to what extent rural production economies and social hierarchies at places like Kaman-Kalehöyük were impacted by more intensified interactions with the Assyrians from northern Mesopotamia. If Zeder's expectation was correct, and there was no change in herding strategies at Kaman-Kalehöyük over time, then findings would be consistent with one or more of at least five interpretations: a) the intensified exchange activity between the Anatolians and Mesopotamians in the 2nd millennium BC was less far-reaching than cuneiform translations have suggested and did not impact herd management activity and local economies in the countryside; b) as a rural producing site, Kaman-Kalehöyük was able to accommodate new demand requirements for animals or animal byproducts which may have resulted from an increasing proportion of the population it supported that was less focused on food production; c) local and/or northern Mesopotamian regimes of value for certain animals, animal body parts, or secondary products were of the same type and of similar volume in the EBA and MBA; d) minimal changes took place over time with respect to local hierarchies, emulative schemes, the need for surplus production, or consumption preferences; or, e) Kaman-Kalehöyük continued to operate as a locally focused economy over time, remaining independent, insulated, and detached from any existing or emergent hierarchical structures in the 2nd millennium BC which may have required Kaman-Kalehöyük to support the demands of a burgeoning administrative class or foreign consumption preferences. In sum, if no new regimes of value emerged in the 2nd millennium BC, and the preexisting herd management strategies employed at rural producing sites like Kaman-Kalehöyük were able to accommodate variations in demand volume or preference for certain animals, meats, or derivative products, then patterns in faunal remains should remain unchanged over time. If, however, demand for new types of animals or animal byproducts in the 2nd millennium BC could not be accommodated by preexisting herd management strategies at Kaman-Kalehöyük, or if new value configurations emerged in the later period, then we would expect a modification in at least some animal herd management strategies, and some differences in faunal profiles when comparing remains from the EBA to the MBA. Because of these open questions, the findings of this faunal study fill a critical void in late 3rd and early 2nd millennium BC central Anatolian scholarship.

Kaman-Kalehöyük faunal remains suggested a mixture of similarities, differences, and opportunities for future inquiry when comparing the EBA to the MBA (Table 15). Of the faunal variables evaluated in this study, all categories would benefit from larger sample sizes. Much more data are required to evaluate body part / skeletal frequencies, butchery and burning, and cattle mortality patterns, the range of equid species at the site, and whether pigs were raised for more than meat. There appears to be little change in the role sheep/goats played over time, though their age profile seems to have changed. Current data suggests that cattle may have played a larger role in the Kaman-Kalehöyük economy in the MBA compared to the earlier period, but a larger sample size is needed to better understand what role they played.

		EBA	MBA
Fauna - Range	Auroch	yes	no
Fauna - Abundances	Sheep/Goat	785 / 52.7%	808 / 46.9%
(count / proportion)	Cattle	245 / 16.4%	355 / 20.6%
	Pig	266 / 17.9%	329 / 19.1%
	Equid	5 / 0.3%	18 / 1%
Fauna - Mortality Patterns	Sheep/Goat	mean 45 months; no 1-2 year olds	mean 39 months; high 1-2 and 4-6 year olds
	Cattle	Sample too small	Sample too small
	Pig	Majority under 12 months	Majority under 12 months
Fauna - Body Parts	Sheep/Goat	More axial and upper limb bones	More head and lower limb bones
	Cattle	More axial, less lower limb bones	More lower limb, less axial bones
	Pig	More upper limb bones	More lower limb bones
Fauna - Butchery	Body Parts - Sheep/Goats	Sample too small	Sample too small
	Body Parts - Cattle	Sample too small	Sample too small
	Body Parts - Pig	Sample too small	Sample too small
Fauna - Burning	Body Parts - Sheep/Goats	Skewed axial	Even distribution
	Body Parts - Cattle	Sample too small	Sample too small
	Body Parts - Pig	Sample too small	Sample too small

Table 15. Kaman-Kalehöyük Faunal Analysis Results Summary.

Recognizing the caveats and interpretive variability inherent in comparing relative proportions of certain species over time, in the next chapter I discuss how faunal patterns observed in this study across multiple analytical techniques align with my two interrelated, but different, hypotheses related to the degrees of economic specialization and social inequality in each period. As we have seen throughout this study, until now research on these topics has yielded an incomplete view of the impact that intensified 2nd millennium BC interactions between local Anatolians and northern Mesopotamians had on local rural economies. And, while a great deal of philological evidence pointed toward noteworthy modifications in the degrees of production specialization and social inequality on the north central Anatolian plateau in the MBA when compared to the EBA, until this study, corroborating archaeological material from this area was sparse and zooarchaeological evidence was lacking.

CHAPTER 8: KAMAN-KALEHÖYÜK FAUNA EVIDENCE AND EVALUATION OF HYPOTHESES

My first hypothesis, focused on the production side of Kaman-Kalehöyük's economy, was that the intensification of interactions and exchange activity in the 2nd millennium BC between central Anatolians and the northern Mesopotamians stimulated an increase in the degree of economic specialization at Kaman-Kalehöyük. Data were evaluated for any evidence that herd owners made different decisions in each period related to which animals to raise, their herd compositions, and their choices related to kill-off patterns of those herds. Changes in production strategies help us better understand how Anatolian rural locations, like Kaman-Kalehöyük, may have organized their pastoral economies in order to support new demands that arose from more formalized long-distance exchange activity with Mesopotamia in the 2nd millennium BC.

My second hypothesis, more focused on the consumption side of Kaman-Kalehöyük's economy, placed a different lens on observed faunal patterns at the site in terms of differential access to, and consumption of, certain animal species, ages, types of meat, or other animal products. This hypothesis posed that the degree of social inequality at Kaman-Kalehöyük increased from the Early Bronze Age to the Middle Bronze Age as interactions between Anatolians and Old Assyrians intensified. Both hypotheses were evaluated in terms of the diachronic proportional changes observed in the Kaman-Kalehöyük faunal data across the following variables: range and relative abundances of taxa, mortality patterns, body part distributions, and the butchery and burning of specimens.

Hypothesis One: Intensification of Production and Increasing Economic Specialization

In Chapter 2 I discussed how local herd owners at production sites in the countryside, like Kaman-Kalehöyük, might have made different decisions about the animals they raised, the mix of different species they chose to raise, and kill-off patterns of those animals, if changes in volume or type of demand for certain meats, animal byproducts, or non-edible secondary products could not be supported by preexisting strategies. Then, in Chapter 6, I discussed how some degree of economic specialization is common in hierarchical societies, and can manifest at the household, site, and/or regional levels. I discussed "attached communities" which may have supplied more administrative centers with food in the form of animals or meats, as well as how animals or foods might be vehicles of goodwill or payment in tributary economies (Wattenmaker 2009). Studies of the exchange between more administrative urban centers and their neighboring "attached communities" have generally focused upon three critical variables: range of species present and the relative importance of different animal species (Wattenmaker 1987); mortality patterns of sheep/goats, cattle, and pigs (Lemoine, Zeder, Bishop, and Rufolo 2014; Payne 1973, 1985; Payne and Deniz 1982; Silver 1969; Slim and Çakırlar 2023); and skeletal distributions of these three domesticates (Zeder 1984, 1988). Overall, while the Kaman-Kalehöyük faunal remains provided excellent data in which to evaluate these heuristics and the economic decisions made by herd owners at the site, both the EBA and the MBA samples are relatively small and would benefit from a larger sample size. In the following paragraphs, I compare faunal variables at Kaman-Kalehöyük before and during the period of intensified interactions between Anatolians and the northern Mesopotamians to see if evidence suggests changes in the local rural production economy. It is worth noting upfront that all of the patterns observed in this study are based on relatively small samples and will benefit from future faunal analyses.

Consistent with assemblages of hierarchical societies in the 3rd and 2nd millennia BC from other Anatolian locations, sheep/goat, cattle, and pig remains represented ~85% of the specimens identified in both the EBA and MBA periods. Yet, Kaman-Kalehöyük data suggested some possible shifts in their relative abundances and age profiles when comparing the earlier and later periods. These potential shifts hint at how the Kaman-Kalehöyük production economy and specialized activities may have changed from the EBA to the MBA.

To understand any potential diachronic shifts in the Kaman-Kalehöyük economy from the EBA to the MBA, it's important to briefly characterize the earlier period's economic organization. In the EBA, the proportions of sheep/goats to cattle suggested that Kaman-Kalehöyük's economy was focused on both pastoralism and agriculture. The range of bovidae ages from very young to very old demonstrate the raising, keeping, and slaughter of these animals at Kaman-Kalehöyük in both periods. The virtual absence of equid remains in the EBA suggested more limited and localized movement and exchange of goods. And, the consistent proportions and age distributions of pigs over time were consistent with the raising and slaughter of pigs at the household level for their meat yield.

In terms of sheep/goat mortality profiles, both EBA and MBA data exhibited a broad range of age groups from very young to very old, which were consistent with the raising, keeping, and slaughtering of animals at the site for meat, milk, fibers, and other products. Also, in the EBA prime-meat aged sheep/goats (1-2 years) were absent from the analyzed sample. The presence of very young and very old animals in the EBA coupled with the absence of prime meat aged sheep/goats suggests that animals in the prime age group may have been produced at Kaman-Kalehöyük, but not necessarily consumed there, or at least not by everyone. If this pattern holds true with an increased sample size, then these data may reflect Kaman-Kalehöyük's participation in a tributary economy where prime-meat-aged animals were paid as tribute to a local or regional seat of power (Maltby 1985; Stein 1987; Wattenmaker 2009; Zeder 1988).

Having provided a brief characterization of the EBA animal economy and which faunal patterns were consistent over time, I now discuss the observed differences between the periods. In the following paragraphs I summarize five types of faunal data or patterns which suggest potential modifications in production goals and /or economic specialization in the Kaman-Kalehöyük MBA relative to the EBA.

The first difference in the MBA data relative to that of the EBA which stood out was in the ratio of sheep to goats. Although both sheep and goats provide meat, milk, and fiber, there are differences between the two species. For example, sheep meat and milk are higher in caloric content, but goats reproduce faster and are more resilient during times of drought. Both animals provide fibers, though sheep gain weight faster and produce large wool yields. In the EBA sample the sheep to goat ratio was 1:2 and in the MBA the ratio was to 2: 1, suggesting a possible shift in herd composition focused on surplus wool production. An intensification of wool production may also indicate the existence of an integrated regional economy or a site's participation in a wider exchange network, especially if some locations in the network were dependent upon others for textile production of (Stein 1987).

Second, while absent in the EBA data, during the MBA a large proportion of prime meat aged animals were found in the sample. MBA data suggest that prime meat age animals were both raised *and* consumed at Kaman-Kalehöyük in the MBA. This potential difference may reflect a change away from the EBA tributary economy to a different type of tributary economy in the MBA or a more regionally organized or controlled production economy, possibly coinciding with a shift in the central Anatolian plateau's politico-economic organization in the early stages of the 2nd millennium BC.

Third, the proportion of 4 to 6-year-old sheep/goats appears to have increased in the MBA when compared to the EBA. An increase in the proportion of 4–6-year-old sheep/goats is consistent with an intensification of focus on the surplus production of some combination of milk and fiber. If this observation holds true with a larger sample size, surplus production of milk and fiber in the MBA may have arisen to support an increased population that was depending on production yields from sites in the countryside like Kaman-Kalehöyük or may have resulted from new demands associated with the increased participation in exchange activity with the Assyrians or others. An increase in the demand for milk and fibers also may have necessitated an increase in the number of specialists required to generate, store, control, manipulate, prepare, and distribute these new surpluses.

Interestingly, three bodies of research suggest that the culling of sheep/goats beyond prime meat age but before maximum fiber/wool yields may be associated with the desire for finer woolen textiles. First, Payne observed in his study of Turkish flocks that as quality of wool from older animals deteriorated, sheep/goats were increasingly culled at younger ages (1973: 281). Secondly, we know from an Assyriological study that Anatolians highly valued Mesopotamian produced textiles (Veenhof and Eidem 2008: 83 and 150). If, as Lassen (2010) has suggested, enterprising Anatolian artisans began to emulate and/or attempt to copy fine Mesopotamian textiles using local sheep in an effort to command high exchange values for their products, then production economies may have shifted to support this demand. Third, scholars of cuneiform research have suggested that certain sheep were more highly valued for their fleeces not only by Anatolians, but also by Assyrians (Albayrak 2003; Atici 2014; Gökçek 2004; Grossman and Paulette 2020). If Assyrians who took up residence on the central Anatolian plateau in the MBA valued certain sheep more highly, and were willing to agree to exchange terms more favorable to Anatolians who raised and owned these desired sheep, then Anatolian herd owners may have produced more of the sheep that were in high demand. In short, if certain sheep and/or finer wool was desired either by Anatolians and/or by the Assyrian denizens, not only would herd compositions evolve to accommodate this new demand, but new specialized roles focused on raising these animals for certain textile production might have emerged at Kaman-Kalehöyük in the 2nd millennium BC. Though more data is needed to evaluate these possibilities more adequately, the faunal and textual evidence evaluated in this study both suggest a potential increased focus on wool production in the Kaman-Kalehöyük MBA.

The fourth faunal pattern which differed between the periods was almost a twenty-five percent increase in the proportion of cattle specimens in the MBA when compared to the EBA. If true, these data suggest a change in the role cattle played in the local economy which may have been associated with new production demands for their milk or meat, and/or a greater emphasis on activities such as plowing, traction, and transport. For instance, if the proportional increase in cattle remains at Kaman-Kalehöyük during the MBA were associated with crop cultivation, then cattle may have been used to generate agricultural surpluses, which in turn could have supported an increasing population who were dependent on Kaman-Kalehöyük production because they were more focused on non-pastoral activities. For example, with an increased number of cattle enabling plowing and the short-distance movement of goods, Kaman-Kalehöyük farmers may have more efficaciously worked their fields and more quickly generated and stored agricultural surpluses. New jobs might have emerged focused on working with oxen, such as work trainers, yoke crafters, granary managers, or transport specialists. In addition, the availability of oxen for transport may have facilitated barter exchange beyond Kaman-Kalehöyük's immediate vicinity. Surpluses may have been used in exchange activities locally or over longer distances, or they may have been paid to a local seat of power that engaged in exchange activity, if Kaman-Kalehöyük participated in a new regional and/or tributary MBA economy. A larger sample size is necessary to more fully understand cattle age profiles in each respective period and if indeed there was an increase in cattle remains at the site over time.

The fifth and final noteworthy pattern I found in this analysis was in the number and types of equids in each period. Despite very small numbers, the increased count of equid specimens in the MBA compared to the EBA, and the identification of donkeys and horses in the MBA suggest the potential enablement of new aspects of the Kaman-Kalehöyük economy in the later period. While cattle may be used for plowing, traction, and methodical short distance transport, equids (donkeys or horses) are better suited for carrying humans, traversing longer-distances with heavy loads of goods (donkeys), faster transport of lighter loads of goods (horses), warfare (donkeys for supplies and horses for battle attacks), or for more timely communication of information over longer distances (horses). All of these activities, facilitated by equids, could have enabled Kaman-Kalehöyük to change the complexion of its economy in the MBA. The increased number of equids not only could enable larger interaction spheres, but the introduction of horses to Kaman-Kalehöyük might have also given rise to new specialized professions. These professions may have included donkey, mule, or horse trainers, stable keepers, the crafting of saddles or mechanisms to carry humans or goods on these animals, riders, warriors, long-distance specialists, or other types of exchange negotiators or peddlers of goods in non-local markets. In short, equids may have unlocked new dimensions of the economy both in terms of geographical expansion, transport, and specialized social roles.

In summary, EBA data suggested a higher proportion of sheep/goats relative to both cattle and pigs. There were very few equid specimens identified in the EBA which may indicate a more localized production focus, though the absence of sheep/goats of prime meat ages is consistent with Kaman-Kalehöyük's possible participation in a tributary economy. More data are needed to evaluate whether Kaman-Kalehöyük was indeed participating in a tributary economy, and whether the uneven distribution of sheep/goat ages was an intra or inter-site phenomenon.

Diachronic evaluation of faunal relative abundances yielded a slightly lower proportion of sheep/goats in the MBA compared to the EBA, and an increase in the relative abundance of cattle. Given these findings, the relative proportions of sheep/goat declined over time while relative proportions of cattle increased when comparing the EBA to the MBA. The proportional reduction in sheep/goats over time (or any other animals for that matter), however, does not mean that there was a change in the relative importance of sheep/goats to the Kaman-Kalehöyük economy in the MBA when compared to the EBA. The consistent representation of sheep/goats in both periods suggests a sustained role in the Kaman-Kalehöyük economy for sheep/goats from the late 3rd to the early 2nd millennium BC. While data show that sheep/goats played a consistent role in the Kaman-Kalehöyük economy over time, the proportional increase of cattle in the MBA compared to the EBA suggests a potential change in the site's economy in the later period. In addition, the concentration of sheep/goats of prime meat ages in the MBA – an age group that was absent from the current EBA sample – hints at a possible alteration in the Kaman-Kalehöyük economy in the later period. Finally, in terms of equids, only five specimens were identified in the EBA sample compared to eighteen in the MBA. While a larger sample size is needed to better evaluate which equids[16] were exploited and how at Kaman-Kalehöyük in each period, an increase in equid remains over time may indicate that donkeys and horses played a more prevalent role in the Kaman-Kalehöyük economy in the MBA compared

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[16] In a recent genome studies, researchers have suggested a wide variety of equids existed in Southwest Asia in the 3rd millennium BC, including "highly valued" kungas which were procured from Mesopotamia by Ebla and given as "gifts" to allies (Bennett, Weber, Bendhafer, et. al. 2023: 1) and wild asses (Özkan, Gürün, Yüncü, et. al. 2023).

to the EBA. More data from synchronic exposures in the EBA are needed to understand the role equids played at Kaman-Kalehöyük.

The potential increases in cattle remains, commensurate pig levels, possible concentrations of two sheep/goat age groups, and the greater proportion of sheep to goats in the MBA all suggest some changes took place in the Kaman-Kalehöyük production economy when compared to the EBA. These diachronic observations are consistent with an increased focus on surplus generation of milk, fiber, and wool in the MBA. Current data are also consistent with the local production and consumption of prime-meat age sheep/goats, possibly indicating a hybrid tributary economy where some animals were still moved on the hoof as tribute to another location, but some Kaman-Kalehöyük residents were allowed to consume the meat of these animals.

If future analyses demonstrate a shift in Kaman-Kalehöyük's herd composition that coincided with the arrival of the northern Mesopotamians on the plateau in the 2nd millennium BC, that shift may have occurred as a result of Kaman-Kalehöyük's desire to amplify their participation in intensified exchange activity with the Assyrians. Modifications in Kaman-Kalehöyük's economic organization during the MBA when compared to the EBA may also have occurred as a result of new demands on the preexisting Kaman-Kalehöyük economy resulting from the introduction of new regional power relationships where Kaman-Kalehöyük was attached to a center, or there was an influx of people on the plateau that demanded different foods or goods, and/or introduced new regimes of value for certain animals or animal byproducts.

Changes in the fauna data and patterns from the Kaman-Kalehöyük EBA to the MBA observed in this study are consistent with Assyriological studies that have suggested the existence of more specialized local Anatolian activities and professions in the MBA, many of which were associated with local surplus production and more intensified participation in exchange activity (Larsen 1976: 155; Veenhof and Eidem 2008: 220). Scholars have cited philological references to high levels of Anatolian specialization in the MBA, including social roles and leaders of the: threshing floors, storehouses, dogs, wine, markets, blacksmiths, mules, herdsmen, horses, and barley (Veenhof and Eidem 2008: 220-224). Interestingly, scholars also mention the role of the "*allahhinum*", an Anatolian official who was assigned by certain magnates and institutions the responsibility of overseeing a specific towns' economy and trade activity (Ibid.: 225). The emergence of an "*allahhinum*" at Kaman-Kalehöyük in the MBA may also have stimulated changes in the site's economy in the later period.

In sum, Kaman-Kalehöyük faunal data showed diachronic consistency in some herding strategies (sheep/goat and pig abundances), probable change in other aspects of the production economy (sheep/goat age distributions), and potential changes in others, such as equid exploitation (general equids identified in the EBA versus identified horses and donkeys in the MBA), and the role cattle played (cattle relative abundance). While faunal data related to the EBA economy at Kaman-Kalehöyük was more consistent with the local movement of goods, surplus production of older sheep/goats for milk, fiber, or wool, and participation in a tributary economy, MBA data was more consistent with local and non-local movement of goods, an intensified focus on sheep wool, the possible ability to transport goods over greater distances, more diversified sources of meat and dairy (via cattle), and participation in a more regionalized economy. While the diachronic differences between the EBA and MBA fauna at Kaman-Kalehöyük observed in this study are consistent with the introduction of new or intensified specialized activities in the later period, our nascent understanding of the EBA economy at the site requires more zooarchaeological data and focused future inquiries to more adequately evaluate any differences between the Kaman-Kalehöyük EBA and MBA production economy.

Hypothesis Two: Consumption Changes and Increasing Social Inequality

In Chapter 6 I discussed studies which demonstrated that changes in consumption patterns are often linked to changes in technology, population composition, expansionist activity, ritual behavior, the environment, cultural values, and/or social differentiation, among other factors (e.g., see DeFrance 2009; Gifford-Gonzalez 1993; Lyman 1987, 2001; Yellen 1977). As a result, careful evaluation of consumption patterns is critical to understanding variations in social inequality since differential consumption patterns are often correlated with differences in wealth, prestige, and status. Though consumption patterns are highly spatio-temporally specific, when variables are viewed collectively, aggregate trends can present compelling evidence for expansion or contraction in degrees of social inequality. In hierarchical societies, differential access to, ownership, or consumption of, certain animals, herds, specific body parts, or animal ages have been used to create, reify, or alter social distance among different groups of people (DeFrance 2009: 106, 122). There are several types of faunal data or patterns that are consistent with a rise in the degree of social inequality between the EBA and MBA at Kaman-Kalehöyük. In the following paragraphs, I summarize these data and patterns.

First, the identification of an auroch metapodial fragment from the Kaman-Kalehöyük EBA was one of the more interesting finds in this study. The single auroch lower leg fragment appeared calcified and smoothed from human handling and was perhaps kept by someone at Kaman for a long period of time. This find is interesting not simply because specimens are rarely found in Anatolian faunal samples post-domestication of cattle, but because it was found in a deposit near the center of the mound where elite members of society often reside, and because iconography from the later period suggests a possible association between aurochs and a ritual figure.

The auroch bone was found in fill in the immediate vicinity of a well-defined multi-room structure that contained a large number of remains representing a broad range of domestic production activities. These materials included: a number of small and large handmade storage vessels, three hearth pedestals, earthen loom weights, a golden earring, a grinding stone, and a bronze pin (see Chapter 4). Though requiring further analysis and more comparisons to other horizontal exposures, these findings suggest that the loci adjacent to where the auroch specimen was found might be part of an elite complex. If future analyses accept the hypothesis that these rooms were an elite context, this bone may have greater significance because large fauna and the rituals associated with them might be articulated with local cosmologies and social power. Further, because of the potential cosmological power embodied in animals like the auroch, any associations with aurochs may be the restricted domain of a select few members of society (Fagan 2015: 70-99; Kansa, et. al. 2009; McCarty 2009; Özbal 2006).

Intriguingly, at Kaman-Kalehöyük, the EBA auroch bone specimen is complemented by a baked clay stopper in the Şaluvanta-Anatolian style found in the MBA. This stopper depicts a long-robed ceremonial figure also seen at Kültepe-Kanesh, dubbed "the weather god", standing on top of a long horned bovid (Figure 32). If the clay stopper does in fact depict a god or other revered member of society associated with an auroch, then the auroch specimen identified in this faunal study may reflect differential access to the intrinsic or symbolic value of this specimen, which may have been reserved for certain members of the local social hierarchy (DeFrance 2009: 135 and Russell 2012: 41-44). Alternatively, since some studies suggest aurochs decreased in social importance after the Neolithic, it is also possible that the Kaman EBA auroch specimen had little social value (Pawlowska 2020: 16). The specimen simply may have been found by a resident of Kaman-Kalehöyük while engaged in farming activity or secured as a curiosity via exchange activity.

Additional lines of evidence which suggest rising degrees of social inequality at Kaman-Kalehöyük reside in the observed relative abundance differences in the MBA when compared to the EBA. Potential diachronic increases in sheep and cattle, and possibly equids, were demonstrated in my discussion of the data, and might have given rise to new or increased economic power to those who owned, controlled, or had access to these animals, the goods produced by these animals (e.g., surplus wool from sheep), the movement of the goods produced by these animals, and/or of food derived from them. For example, despite a small sample, current data suggests there are more sheep relative to goats in the Kaman-Kalehöyük MBA, which may signal a more specialized economy focused on surplus wool production. An increase in surplus wool, if controlled by a particular segment of society, can indicate an increasingly hierarchical social structure where certain members of society control the production of textiles or the artisans that create those textiles. An intensification of wool production may also indicate the existence of a more highly integrated regional economy or a site's participation in a wider exchange network, especially if more administrative locations were dependent upon less administrative locales for the production of textiles (Stein 1987). Furthermore, those who participated in exchange activities, either locally or more regionally, may have had the privilege of differential access to certain goods, information, and/or relationships.

The possible change in cattle and equid relative abundances over time observed in this study will undoubtedly benefit from an increased sample across a broader range of EBA and MBA contexts to more fully understand the respective roles those animals played at Kaman-Kalehöyük in each period. If future data confirm this study's findings that, in fact, there were more cattle and equids in the MBA relative to the EBA, these increases may reflect the emergence of new local "regimes of value" at the site. Ownership of certain animals, or a widening gap in differential access to goods such as cattle milk, to more desired cuts of meat from cattle, and/or the ability to travel via donkey and horse over greater geographies with or without goods may have been used to create or expand social distance among different cohorts of people at Kaman-Kalehöyük (see Miller 2003 on Harappa; Kramer 1982 on the Iranian Aliabadi; and, Gökçek 2004 for Kültepe-Kanesh).

For instance, one philological study of the Kültepe-Kanesh tablets found that cattle were not only bought and sold for meat and other secondary products, but that they were also "rented", presumably for traction and transport (Gökçek 2004). If some people in the MBA owned cattle and others rented cattle from these owners, and this was not the case in the EBA, then there is clear evidence of differential access to these animals which is consistent with an expansion of social inequality at this time. If certain people could not afford to own cattle and thus rented cattle, then the ability to own and rent cattle to others suggests the possibility of at least three levels of social inequality: cattle owners, cattle renters, and those who could neither own nor rent cattle. In sum, if Gökçek was right, an increase in cattle in the Kaman-Kalehöyük MBA may indicate disparities in control over cattle and land, akin to what Kramer (1982: 67) found in her ethnoarchaeological study of the Aliabadi village and as textual evidence from Mari suggests (see Chapter 6 and Allred 2006; Marciniak 2011; Sasson 2004: 206-207, 209).

During the MBA there is also a possible increase in the number and type of equids at the site. While smaller equids were identified in the EBA, smaller and larger equids, as well as donkeys and horses were identified in the MBA. This potential trend toward an increase in equids at Kaman-Kalehöyük over time may reflect increasing degrees of social inequality in the later period, primarily derived from the cost of maintaining certain equids (especially horses) relative to other domesticates, and because donkeys and horses provide their owners the means to move goods and information more efficiently over greater distances. The increase in the number and type of equid specimens in the MBA sample is consistent with greater access to locations outside of the immediate vicinity of the site, which may have enabled certain members of the Kaman-Kalehöyük community to not only travel, but also to expand their interaction networks and participation in exchange activity over longer distances (Algaze 2008: 66-67; Wright 2001: 127).

There are numerous philological references to the donkey caravans of the 2nd millennium BC that moved goods from northern Mesopotamia to locations throughout the Anatolian peninsula (Chapter 3 and Larsen 1976: 102). More intense participation in long-distance exchange would have provided those who owned or could rent equids with greater access to goods which were unavailable locally and may have been imbued with a foreign mystique and/or used as visual reminders of status differences (Helms

1988). Furthermore, as discussed in the evaluation of hypothesis one, while donkeys may be associated with traveling or transporting goods methodically over bigger geographical distances, horses, which were positively identified in the Kaman-Kalehöyük MBA sample, could expedite the transmission of information over longer distances because they are able to run two to four times faster than donkeys. This new capability is important in the MBA because, as we learned in Chapter 3 the 2nd millennium BC Anatolian landscape was characterized by fickle alliances among hundreds of polities that competed for land and resources (Bang and Scheidel 2013: 2015). As a result, the identification of horse bones in the MBA at Kaman-Kalehöyük could have coincided with the exaltation of certain social roles, such as messengers, scouts, couriers, or other long-distance specialists. If messengers and scouts, attached to political leaders interested in defending their lands, could quickly deliver critical information related to rival factions, then they might have been considered highly valued informants, and perhaps more privileged members of the Kaman-Kalehöyük society.

Since no horse specimens (of five equid fragments) were identified in the EBA and only two horse specimens (of eighteen equid fragments) were positively identified in the MBA, a larger sample size is needed to more satisfactorily evaluate how equids were exploited by the Kaman-Kalehöyük population in both periods. Focused synchronic studies would provide important data needed to determine if equid ownership in either period at Kaman-Kalehöyük was correlated with local concepts of wealth or if donkeys and horses served as identifiers of socioeconomic differentiation (see Barth's study of the Basseri of southwest Iran 1961: 73-74; and, Kramer's study of the Aliabadi of western Iran 1982: 67).

The next pattern which requires discussion is the potential difference in the mortality profiles of sheep/goats when comparing remains from the Kaman-Kalehöyük EBA to the MBA. These profiles are important since differential access to specific ages of animals and the uneven distribution of them can be an indicator of social differences (DeFrance 2009: 106, 122). First, sheep/goat mortality data suggested an overall shift toward the exploitation of younger stock in the later period. The mean age of sheep/goats in the EBA was 45 months compared to 39 in the MBA and there was a concentration of animals aged 12 to 24 months in the MBA whereas this age range was absent in the Kaman-Kalehöyük EBA. The latter absence may indicate that these prime-meat-aged animals were paid as tribute to a seat of power, while locals may have been allowed to consume animals who were slightly older. For example, if in the EBA Kaman-Kalehöyük was attached to a more administratively focused regional center that controlled the political economy of its hinterland, then prime aged animals might have been sent from Kaman-Kalehöyük for consumption in the center, while leaders located at Kaman-Kalehöyük might have enjoyed meat rations from older animals.

The high proportion of prime-meat-aged sheep/goat in the MBA suggests that at least some members of the Kaman-Kalehöyük population had access to and consumed these animals. The prevalence of 12–24-month-old sheep/goats in the MBA is consistent with an increase in the local consumption of prime meat at Kaman-

Kalehöyük. This change in consumption could have coincided with the emergence of a new local hierarchy that had new meat demands or preferences, increasing numbers of local elites who enjoyed differential access to prime aged sheep/goats, and/or the identification of an MBA elite complex in the study loci.

One possible explanation for the identification of so many prime-meat aged sheep/goats in the later period is that a new local hierarchy emerged at Kaman-Kalehöyük in the MBA that had privileged access to, and enjoyed the consumption of, the best cuts of meat derived from optimally aged animals (Wapnish and Hesse 1988: 84). This situation could have arisen if Kaman-Kalehöyük became more intensely attached to a regional power center that installed new leadership at the site to oversee it. This interpretation is consistent with Assyriological studies that identified the role of the "*allahhinum*" in the MBA (Veenhof and Eidem 2008: 225). As mentioned in the evaluation of hypothesis one, the "*allahhinum*" was a local official who was attached to a regional center and assigned to oversee a specific local economy.

Last, the potential increase in sheep/goats in the 4-6-year age group is consistent with a shift toward surplus production strategies focused on milk and fibers, or the local consumption of older animals. This is important when evaluating data for social inequity because herds may have been owned or controlled by certain members of the Kaman-Kalehöyük population. Just as the "*allahhinum*" may have been afforded the privilege of consuming prime-meat-aged sheep/goats, the same local official may also have had the power to shift Kaman-Kalehöyük's economy to focus on the surplus production of milk and fibers to support changes in regional demand for certain goods. For example, increased wool yields derived from 48 to 72-month-old sheep/goats could have helped Anatolians meet the local or non-local textile demands that resulted from intensified participation in exchange activity, which may have included the Assyrians. Alternatively, if prime-aged sheep/goats were consumed by a restricted cohort of Kaman-Kalehöyük residents, others, such as workers attached to a local leader, may have received meat rations from older stock.

I began evaluation of this hypothesis that the degree of social inequality increased at Kaman-Kalehöyük over time by sharing that in hierarchical societies differential access to, ownership of, or consumption of certain animals, specific body parts, or animal ages have been used by certain segments of societies in many instances across both the Old and New Worlds to create, reify, or alter social distance among different groups of people (DeFrance 2009: 106, 122; Jackson and Scott 1995 and 2003; Kirch and O'Day 2003). Throughout this section I discussed the differences and similarities I observed in the Kaman-Kalehöyük faunal data between the EBA and MBA in terms of relative animal abundances and mortality profiles. While the Kaman-Kalehöyük faunal data evaluated in this study are consistent with an increase in the degree of social inequity in the MBA when compared to the EBA, more data is needed to strengthen confidence levels in these patterns.

The fauna evaluated in this study afforded me the opportunity to provide an initial view of the relative degrees of social inequality which may have existed at Kaman-Kalehöyük in each period, and has raised many questions that are beyond the limits of the current data set. Overall, more EBA excavated material is needed, and more MBA synchronic studies of already excavated fauna are needed. These and other future studies will help scholars of the 2nd millennium BC Anatolian plateau better understand how animals, animal ages, and their skeletal parts were distributed in each period and how these distributions may have changed over time. By focusing future inquiries in these spaces, we will have a more robust data set in which to more fully evaluate any potential differences in access to, ownership, exploitation, and distribution of certain animals or age groups both within each period and over time.

Having evaluated faunal remains from both the EBA and MBA for evidence of increasing or changing degrees of production specialization and social inequality, in the final chapter I turn to three themes. First, I discuss the archaeological and textual evidence for degrees of specialization and social inequality in each period across the Anatolian plateau. Second, I summarize both non-faunal and faunal archaeological findings from Kaman-Kalehöyük in order to more holistically evaluate evidence for increasing degrees of specialization and social inequality when comparing the EBA to the MBA. I then place my findings in a broader discussion related to some prevailing interpretations related to the Anatolian countryside and the potential impact that intensified interactions with the denizens from northern Mesopotamia may have had on rural economies. And finally, I close with some considerations for future inquiry.

CHAPTER 9: HOLISTIC EVALUATION AND DISCUSSION

This archaeological comparison of central Anatolian society before and during the Assyrian venture into central Anatolia serves as a contribution toward a decades-long plea from Assyriologists for archaeologists to enhance philological interpretations of the 2nd millennium BC Anatolian-Mesopotamian interactions. This zooarchaeological analysis was conducted to accomplish three objectives. Building on previous synchronic faunal analyses at Kaman-Kalehöyük, I wanted to better understand how the animal economy at more rural producing locations like Kaman-Kalehöyük may have changed as interactions between Anatolians and Mesopotamians in the 2nd millennium BC intensified. Second, through faunal remains I sought to evaluate to what extent the degrees of economic specialization and social inequality at Kaman-Kalehöyük changed from the EBA to the MBA. And third, I wanted to conduct a more holistic diachronic evaluation by interpreting faunal analysis findings in conjunction with other archaeological remains to see if evidence across different types of excavated material were consistent with philological studies that suggested economic and social changes only took place at larger more administratively focused locations on the central Anatolian plateau during the early stages of the 2nd millennium BC.

Evaluation of non-faunal and faunal archaeological material from Kaman-Kalehöyük suggests that the intensification of 2nd millennium BC long-distance interactions and exchange activities on the Anatolian plateau coincided with economic and social change at the site. While current EBA archaeological evidence suggests that the Kaman-Kalehöyük economy was specialized with some degree of social inequality in the early period, current MBA data was consistent with an increase in specialized activities and professions, and expanding social differences relative to the EBA.

This chapter is organized into three main sections. First, I summarize what is known from the archaeology and texts about the central Anatolian EBA and MBA periods, followed by how certain aspects of society may have changed through time at Kaman-Kalehöyük. Second, for each of my two hypotheses I provide a brief summary of what I found in the Kaman-Kalehöyük faunal remains for each period. And finally, I present my findings when considering all lines of evidence available.

The Baseline: EBA Evidence for Specialization and Social Inequality

Until recently, in central Anatolia where Kaman-Kalehöyük is situated, EBA excavations were uncommon, and published accounts were relatively non-existent compared to other Anatolian regions (Schoop 2011: 166; Steadman 2011: 242). But in the past few years more publications have appeared, including research from plateau sites like Uşaklı Höyük (Mazzoni, D'Agostino, and Orsi 2019), Çadır Höyük (Steadman, Hackley, et. al. 2019), Resuloğlu (Dardeniz and Yıldırım 2022), Aşıklı Höyük (Stiner, Özbasaharn, and Duru 2022), and Büklükale (Matsumura 2020). Contributions from these sites, coupled with work from places like the Levant, have enhanced the depth of our understanding of the EBA. Studies have focused on a wide range of topics, including the geographical expanse of EBA interaction networks (Carter, et. al. 2023; Eddisford 2022; Greenfield, Greenfield, et. al. 2020; Steadman, Hackley, et. al. 2019; Türkteki 2020; Wilson 2021; Winters 2019), the isotopic signatures of metals and animals moving through EBA exchange networks (Dardeniz and Yıldırım 2022; Iserlis, et. al. 2023; Yahalom, et. al. 2023; Nurcan 2023; Kucukarslan 2023), specialized production and the relationships between urban and rural sites (Gaastra, Greenfield, and Greenfield 2020; Price, Makarewicz, and Chesson 2018), and concepts of wealth and social inequality (Stiner, et. al. 2022; Grossman and Paulette 2020; Pawlowska 2020). Collectively, the data we have from the EBA that predates the intensification of interactions between the Assyrians and central Anatolians in the MBA (Larsen 2015: 9) demonstrates the established existence of long-distance interaction networks, specialized professions, and social inequalities in the earlier period (Sagona and Zimansky 2009: 172-177; von der Osten 1937: 230-247; Yener and Vandiver 1993: 207-238; Yener 1994, 2000).

In the EBA, in terms of settlement size on the central plateau, archaeological survey data suggests the existence of hundreds of sites in the immediate environs of Kaman-Kalehöyük ranging from less than 1 hectare to over 10 hectares (S. Omura 1996: 135-192; 2006: 63-102; 2008: 45-92). This is an important piece of data because many 10+ hectare sites were found over 1000 years earlier in Mesopotamia, raising the question of whether larger sites in central Anatolia have yet to be uncovered or that they emerged later than in other locations. In four excavated sites on the plateau within a 200-kilometer radius of Kaman-Kalehöyük, EBA occupations at Acemhöyük, Alacahöyük, Alişar, and Kültepe-Kanesh grew to 30+ hectares; at these sites scholars have cited the identification of fortification walls and clearly defined residential, industrial, and administrative areas. The emergence of these large EBA sites, along with public architecture and defined activity areas within the sites, all provide evidence suggesting the local development of intra-site specialized activities, differentiated professions, and social inequalities (Yakar 2011: 69). Further, since Kaman-Kalehöyük reached a maximum size of 6 hectares, and had no lower town, it's existence alone provides evidence of a two-tiered site size hierarchy in the EBA.

Regarding long-distance interactions, evidence from as early as the PPNB showed the movement of central Anatolian sourced obsidian across more than 1,500 kilometers to modern Baghdad, by the 4th millennium BC lapis from modern Afghanistan was found in modern day Iraq, and by the 3rd millennium BC ceramic forms and styles suggest interaction networks reached from the Aegean to the Persian Gulf (Carter, et. al. 2023: 11; Collon 1990: 33; Goring-Morris and Belfer-Cohen 2020: 6; Hermann 1968; Huang 2018: 393; Steadman 2011: 251). These data attest to a wide interregional and multicultural interaction network that was in place long before the arrival of the Assyrians in Anatolia.

In addition to the existence of a hierarchical settlement system and broad geographic interaction networks, the number of bronze pins recovered in the EBA at certain sites over time may indicate a change in clothing types or styles. This trend coincides with the identification of caches of spindle whorls and loom weights at sites like Troy, which together suggests specialized textile production (Sagona and Zimansky 2009: 211). During the EBA there was also an increase in the volume of finer stylized metal objects, which were crafted in a variety of media including gold, silver, bronze, electrum, and lapis (Ibid.: 206; see Chapter 3). These findings provide EBA evidence of craft and metallurgical specialization and may also indicate social inequities in the form of differential access to certain styles or metals.

Caches of goods and differentiated burial patterns also provide additional evidence suggesting the existence of at least a two-tiered social hierarchy in the Anatolian EBA. Five different burial types have been identified, and include simple earthen pits as well as more elaborate chambered tombs (Rankin 1997; Sagona and Zimansky 2009: 212). Extramural cemeteries have been found at more than 15 sites on an east to west axis, many with similar ceramics, and with unevenly distributed goods. For example, Alacahöyük alone produced more than a dozen tombs containing more than 700 objects made of various metals, stone, bone, and textiles. Of these tombs, four different types of burials were found: those with tools, those with mace heads and weaponry, those with ceramics, and those with nothing (Gürsan-Salzman 1992: 91, 108-111, 150). These burial types suggest not only differences in professions or activities, but also suggest multi-tiered social hierarchies and social inequities as well. Lastly, in the Black Sea region to the north of Kaman-Kalehöyük, earthen pit burials are commonplace and many contain unevenly distributed goods, which is also suggestive of social inequality. No burials dating to the EBA have yet to be uncovered at Kaman-Kalehöyük; however, it is clear that a range of social structures were operating concurrently in the areas surrounding Kaman-Kalehöyük that likely influenced Kaman-Kalehöyük's residents.

Finally, 250 kilometers to the south of Kaman-Kalehöyük, excavators found furnaces, storage jars, crucibles and measuring cups, and demonstrated that large-scale mining and ore processing took place in the Anatolian EBA (Yener 2000: 104-105). Scholars have estimated that at Göltepe 115 tons of tin were processed from 4500 cubic meters of ore that was extracted from the nearby Kestel Mines (Sagona and Zimansky 2009: 201). Yener's work is important to this study not only because it provides evidence for large-scale specialized activity in Anatolia during the EBA, but also because it's an example of surplus production that was likely articulated with some centralized control and far-reaching interaction activity predating the arrival of the Assyrians in Anatolia.

While EBA excavated archaeological remains provide evidence for far reaching cross-cultural interactions over a large geographic footprint, specialization, and social inequality there is no clear evidence which demonstrates that these cross-cultural interactions served as the catalyst for local development or change. When current lines of EBA evidence are considered together, data suggests that Anatolian polities on the plateau already had hierarchical systems driving specialized economies of their own, independent of, and/or preceding any interactions with the Assyrians. Current EBA data is also consistent with a more focal model of development on the central plateau, whereby local polities, following their own agendas, continued their own non-linear pathways toward still more specialized and hierarchic structures.

The Middle Bronze Age: Evidence for Specialization and Social Inequality

The Middle Bronze Age represents a key phase of urbanization on the Anatolian plateau characterized by palaces, royalty, expansionist activity, strong kin-based economies, an intermixing of multiple cultures, and a fractionalized political landscape of competing territorial city-states (Atici, et. al. 2014: 1; Michel 2011: 313; Sagona and Zimansky 2009: 234). The MBA is marked by the first appearance of written documents[17] and figurative art on the Anatolian plateau, and during the early stages of the period, as long-distance exchange intensified, evidence suggests increasing degrees of specialization and social inequality, and regular politico-economic change at the local

[17] In addition to Kültepe-Kanesh, cuneiform tablets have only been found at the following sites: Boğazköy (72 tablets), Alişar (63 tablets), Kaman-Kalehöyük and Kayalıpınar (fragments), (Michel 2011: 319).

level (Dercksen 1996; M. Omura 1996; Özgüç 1968; Veenhof and Eidem 2008: 76-121, 147-167, 219-233).

In the Anatolian MBA, in terms of types and sizes of settlements, aside from Kaman-Kalehöyük which was 6 hectares, the 30+ hectare sites of the EBA were replaced with MBA centers with citadels alone approaching 30 hectares. Large sites at locations like Boğazköy, Alişar, Acemhöyük, and Kültepe-Kanesh had palatial-sized public architecture, fortification walls, and had upper and lower towns with defined living, storage, exchange districts, and workshop areas. For scale, Kültepe-Kanesh grew to over 170 hectares and one of the three palaces at the site dated to the MBA, "The Palace of Waršama", had forty-two rooms in just the northern section (Kulakoğlu 2011: 1014-1015). Current estimates suggest that at its height, Kültepe-Kanesh supported a population of fifty to sixty thousand (Kulakoğlu 2014: 85). What this evidence tells us is that just like in the EBA, centers existed in Anatolia, and hierarchies likely expanded. In terms of social differences, this MBA evidence suggests at least three different cohorts of people: those that lived in rural smaller communities like Kaman-Kalehöyük, those who resided in the lower towns of the large locations, and those who had access to the upper towns and citadels at the centers. The MBA excavation bias toward very large settlements, however, has left a gap in our understanding of how social and politico-economic organization at smaller and more rural communities in central Anatolia, like Kaman-Kalehöyük, may have changed as a result of increased interaction activities with the Assyrians at this time (Veenhof and Eidem 2008: 147-148).

Gradually, hand-made pottery of the EBA disappeared, consistent larger wheel-made forms were found throughout the plateau, and vessels with animal figures became common (Kulakoğlu 2011: 1014). These ceramics, along with caches of spindle whorls and loom weights as well as bronze weaponry appeared, suggesting the expansion of specialized professions. For example, at Kültepe-Kanesh, concentrations in lower town loci of cuneiform tablets and others with caches of spindles provide evidence for specialized economic activities and textile production. Also, concentrations of stone molds, melting pots, blow-pipes and bellows in certain loci of the lower town at Kültepe-Kanesh provide evidence of metallurgical specialization in the central Anatolian MBA (Ibid.: 1021).

Different types of burials dotted the Anatolian MBA landscape ranging from "simple with no goods" to elaborate tombs commensurate with those from the Ur III dynasty in Mesopotamia that included a range of uncommon local and non-local goods. At Kültepe-Kanesh, Acemhöyük, and other locations, large quantities of figural representations were found in graves, some with stylized human figurines made of ivory which not only provides evidence for long-distance interaction spheres, new craft specialists, and social inequities, but also the possible emergence of new local cosmologies. In addition, more finely made jewelry made in a variety of metals and non-metals, some with delicate filigree, appeared alongside the simpler forms from the EBA. Wider gaps in the uneven distributions of these goods in the MBA provide evidence for expanding degrees of social inequalities.

Lastly, one of the most striking differences in the central Anatolian MBA relative to the previous period is the emergence of the region's first archaeological expressions of administrative devices. These devices, rarely encountered in the archaeological record, allowed for the documentation of exchange activity, and often are associated with an increase in differential access to goods, amplified exchange activity, and expanding interaction networks. Stamp and cylinder seals, clay sealings, and bullae, reflecting technology used in Mesopotamia for more than a millennium, were found in the MBA, both in local and non-local styles. Cultural motifs included Old Babylonian, Old Assyrian, Syrian, and Anatolian styles. Interestingly, the motifs contained on the seals and in seal impressions are often artistic representations of distinctly Anatolian style, suggesting deeply entrenched local traditions (Collon 1990 and M. Omura 1996). The expressed combination of new technology and local motifs is important because it suggests interactions with an expanding group of cultural identities that may have influenced certain aspects of the indigenous societies of the central plateau, while the persistence of a local styles suggests more local control over newly introduced technologies.

When taken together, archaeological evidence from the Anatolian MBA intimates that an increasingly hierarchical and structured political system with expanding interaction networks emerged during the MBA on the central plateau along with new types of specialized professions and expanding degrees of social inequities (Laessoe 1963: 147-8; Larsen 2015: 133-158, 201-222, 243-265, 279-280; Michel 2011:

313-336). In terms of the Assyrians, unfortunately data from Aššur are limited; only a fraction of the site has been excavated and textual remains are few, so scholars have relied on inference drawn from later periods or from texts found at other locations, such as Mari, Ur, and Ebla (e.g., see Appendix 1).

The Old Assyrian Cuneiform Texts

Archaeological remains from the Anatolian MBA are complemented by decades of philological studies conducted on the thousands of cuneiform tablet fragments attributed to some 112 residences at Kültepe-Kanesh. While these studies are mostly concerned with the economic interactions which took place between the northern Mesopotamian Old Assyrians and Anatolians, they provide some insight into the Anatolian political landscape, the specialized roles which existed at that time, the associated social inequities that were at play during the 2nd millennium BC, and the types of animal-derived foods preferred by the Assyrians.

In Chapter 3 I discussed how textual translations attested to a regional structure of the local Anatolian kingdoms (*mātu)* in the MBA which mentioned larger more urban locations such as Hatti (Hattuš-Boğazköy), Kültepe-Kanesh (Kültepe-Kanesh), Purušhattum, and Wahšusana. These kingdoms, according to the texts, were led by a *ruba´um* (leader, mayor, king), who exercised broad control over the smaller communities within his/her territory. The texts provide strong evidence for the coexistence of multiple local state polities during the time of intensified exchange activity with Mesopotamia. This is important to this study because Kaman-Kalehöyük is located nearly equidistant from two identified centers (Hattuš-Boğazköy at 140 km and Kültepe-Kanesh at 188 km), and two other large sites (Acemhöyük at 145 km and Amkuwa-Alişar at 165 km), and the site may have been located within the territory of one or more of these, or other unidentified polities, like Wahšusana, during the MBA.

Assyriological studies also have suggested the existence of highly specialized local Anatolian activities and professions in the MBA, many of which were associated with local surplus production and more intensified participation in exchange activity, and all of which may have been connected to Assyrian trade (Larsen 1976: 155; Veenhof and Eidem 2008: 220). These professions, drawn from economic documents where people served as witnesses to transactions, also provide insight into social inequalities. Titles typically were associated either with palace administration or with the administration of towns under the control of certain centers like Kültepe-Kanesh. Scholars have cited philological references to MBA Anatolian social roles and leaders responsible for parts of the economy ranging from the threshing floors and storehouses, to blacksmiths, mules, horses, and barley (Veenhof and Eidem 2008: 220-225). Additional roles included priests, and those responsible for weapons, dogs, timber, of “the workers”, the interpreters, and slaves (Ibid.). The professions cited in the Kültepe-

Kanesh texts are complemented by other written sources as well, such as the Mari archives, which mention specialized food preparers and servers, vassals of various royal locations, and attendees of meals that included bodyguards, secretaries, scribes, diviners, and local administrators (Sasson 2004: 200, 204). Of all specialized and differentiated professions mentioned in the cuneiform translations, as discussed earlier, perhaps the most important one to this study is the role of the "*allahhinum*", an Anatolian official who was assigned by regional or palatial leaders the responsibility of overseeing a specific towns' economy and trade activity (Veenhof and Eidem 2008: 225). The possible emergence of an "*allahhinum*" at Kaman-Kalehöyük in the MBA not only may have contributed to changes in the site's economy in the later period, but also may help explain the differences observed between EBA and MBA archaeological remains which suggest expanding social inequities.

Aside from specialized professions and social differentiation, the texts also provide insight into which animal foods were preferred by the Assyrians in the MBA, who prepared them, and how they were procured. This information helps us better understand what local choices were made in terms of production and consumption and what pressures may have been placed on producing sites attached to centers. Translations suggest that sheep, cattle, and pigs – all staple animals in the economy – were consumed by the Assyrians, and that the Assyrians obtained whole animals, certain cuts of meat, and prepared foods from local sources (Albayrak 2003: 64; Atici 2014: 204; Gökçek 2004). Additionally, from Old Babylonian tablets we learn that

Mesopotamian stews were prepared by royal chefs (*nuhatimmu*) that included lamb, beef, pork, and deer (Bottero 1985: 37). It is interesting to note that goats were not often mentioned in the texts; whereas, sheep are often mentioned.

These same studies discuss the specialized rearing of cattle and pigs specifically for meat yield as well as for their oils, fats, and lard, all of which were available in various levels of quality. Researchers also have found evidence which suggests Assyrians preferred high meat bearing body parts (Atici 2014: 204-205). One of the more interesting aspects of the translations is that sheep were valued differently based upon their origin, fleece, anticipated meat quality, breed, and overall physical condition (Ibid.), and cattle were available for purchase or rent (Gökçek 2004: 69). If these translations are accurate, this evidence suggests that some sheep may have been raised by specialists specifically for high-quality meat yield, and that certain cattle were bred for plowing or traction. Last, texts mention that certain cattle (e.g., smaller, older, or diseased) commanded lower “prices”, hinting at social inequities via differential access to higher quality animals and meat (Ibid). In addition, preferences for more sheep meat relative to goats, or new preferences for certain cuts of meat from animals of certain age groups or quality, may have contributed toward a reorganization of local herds to meet these new demands. These data points derived from the textual translations provide insight into Assyrian dietary preferences, and are important to this study because zooarchaeological data from Aššur or other contemporary sites in northern Iraq are currently unavailable.

Having summarized the current archaeological and philological evidence for the EBA and MBA which contribute to our understanding of the differences between the two periods in the areas surrounding Kaman-Kalehöyük, I now turn to the non-faunal archaeological evidence found at Kaman-Kalehöyük from each period. I specifically review archaeological evidence from Kaman-Kalehöyük to better understand whether and by how much the degrees of specialization and social inequality at the site may have changed from the EBA to the MBA.

Comparing the Kaman-Kalehöyük EBA and MBA remains

When comparing excavated remains from the Kaman-Kalehöyük MBA to the EBA, current archaeological evidence suggests the possibility that substantial changes may have taken place at the site over time. Recognizing the need to excavate and analyze more EBA deposits, comparisons of current MBA remains relative to EBA remains at Kaman-Kalehöyük suggest increasing degrees of specialized activity and expanding degrees of social inequality.

Evidence for increasing degrees of specialized activity and professions over time spanned many artifact groups. In terms of ceramics, a shift from EBA hand-made to MBA wheel-made wares indicated the emergence of pottery specialization at Kaman-Kalehöyük. The site's first expression of administrative recording devices such as stamp and cylinder seals to memorialize and protect exchange activity suggested the presence of exchange specialists. The recovery of rarely found cuneiform tablet fragments containing names of actors and units of measure indicates that scribes, translators, or other literary and exchange specialists might have passed through or resided at Kaman-Kalehöyük in the MBA. Large increases in the volume of spindles and the emergence of more intricate metal and bone objects such as more finely made earrings and rings alongside simpler rope styles found in the EBA provide evidence for specialized adornment and metallurgical artisans. And, caches of bronze weapons and mass burials from the MBA suggest the existence of crafters of weaponry, warriors or those who used the weapons, and the leaders of the people who used the weapons.

This archaeological evidence is consistent with other 2nd millennium BC scholarship that has characterized the MBA with intensified specialization, expanding interaction and exchange spheres, and expansionist activity associated with competing territorial city-states. Kaman-Kalehöyük MBA data are also consistent with MBA philological studies which have described the emergence of a political economy where local seats of power, such as a vassal of a new centralized politico-economic regional center, presided and held sway over smaller communities in their territories (Bryce 1998: 24; Özgüç 1983: 319; Veenhof and Eidem 2008: 225). And, cylinder seals and Anatolian stamp seals using Mesopotamia technology, but bearing local Anatolian motifs, suggest not only expanding geographical interaction spheres, but also local control over exchange activity.

Non-faunal remains from Kaman-Kalehöyük also provide evidence for expanding degrees of social inequality when comparing the EBA to the MBA. In terms of ceramics, increases in the sizes and forms of vessels, such as those with wheat residues, are consistent with the accumulation of greater surpluses, and potentially differential access to certain goods. And, the recovery of a rare cup suggests that certain people at Kaman-Kalehöyük may have possessed, displayed, and/or used uncommon wares. If, for example, an *"allahhinum"* was installed at the site, an Anatolian official who was assigned by regional or palatial leaders the responsibility of overseeing a specific towns' economy and trade activity (Veenhof and Eidem 2008: 220-225), wares such as this cup might have been a privilege of that official role.

Administrative recording devices, such as stamp and cylinder seals, and cuneiform tablet fragments, found in the Kaman-Kalehöyük MBA also suggest expanding degrees of social inequality. The ethnographic record shows that both exchange specialists and those who can read and write are often associated with powerful leaders or elite members of society, and sometimes are revered by those who have less experience dealing with peoples or lands outside of their immediate residential vicinity (Bittman and Sullivan 1978: 214; de Laguna 1972: 465-456; Helms 1988: 82; Lienhardt 1954: 159; Sahagun 1959: 22; Townsend 1979: 31-32). Seals suggest social inequality since they are: typically associated with people who have the ability to generate surpluses, often considered family heirlooms that are passed down for many generations, frequently made of non-local material, used to signify ownership of certain goods, and are relatively rare in the archaeological record (Collon 1990: 9, 19, 33). These devices can signify expanding social inequities because they have intrinsic and symbolic value and are associated with larger quantities of exchange goods beyond immediate caloric or household-level needs, the control of goods or surpluses which are desired by others, the capacity to move goods over greater geographical distances, potential differential access to other people, and the ability to acquire goods that others cannot. Furthermore, the exchange specialists who are able to use administrative devices may occupy unique social roles. The rare recovery of cuneiform tablet fragments found at Kaman-Kalehöyük in the MBA suggests expanding social inequalities because they have only been found at four other sites in Anatolia, and the ability to read or write, or even an association with people who could, was often a domain of restricted access. The tablet fragments also might mean that certain social cohorts might have engaged in complex enough economic exchanges that writing was required to chronicle those transactions or communicate the details of the transaction to someone at Kaman-Kalehöyük or elsewhere. These fragments also intimate the possibility that certain Kaman-Kalehöyük residents had access to foreign people or objects, for exchange activity or otherwise.

Still more changes took place from the EBA to the MBA in terms of crafting. Modifications in the volume and style of spindles were detected, and more intricately worked bronze, gold, and bone were found. The increase in the quantities of newly styled spindle whorls recovered in the MBA is consistent with an intensified focus on surplus craft or textile production and potentially more personalized objects. Surpluses in crafts would afford the opportunity to those who controlled the goods to participate in exchange activity, and also suggests differential access to certain goods and volumes of goods, which also could drive increasing disparities among social groups. The more varied stylized spindles found in this period suggest that individuals were creating more personalized objects, perhaps signaling the increasing need or desire to visibly express one's status or identity via decoration.

In the MBA increasingly intricate crafting in metal and bone-working appeared as well. Gold filigree rings were found alongside the simpler band styles found in the EBA, along with more delicate stylized bone pins, and a wider variety of bronze pinhead patterns. The emergence of these new “fashion” styles not only indicated expanding degrees of specialized metal-working in the Kaman-Kalehöyük MBA, but also were likely associated with an expansion in degrees of social inequity. For instance, if differential access to finer woolen textiles and certain pin styles were reserved for more elite members of the Kaman-Kalehöyük social hierarchy, then the display of certain styles in public would serve to create and reify social distance between those who possessed them and those who did not. Clothing as a symbolic representation of social position is exemplified in the Mari archives where the king of Burundum requests a garment adorned with rare ostrich plumes (Sasson 2004: 217). The key takeaway here is that more elaborate garments or fashion styles may have become more important at Kaman-Kalehöyük as vehicles of social messages, conveying information related to identity, status, or wealth, especially if its population became more diverse in the MBA (Wattenmaker 1998: 13, 197).

And lastly, more archaeological evidence for the expansion of social inequality comes from the substantial volumes of bronze weaponry and mass burials found in the Kaman-Kalehöyük MBA. Daggers, blades, and spearheads were found together with human skeletons in contorted positions suggesting not only increasing levels of conflict among competing territorial city-states during the 2nd millennium BC (Bang and Scheidel 2013: 125), but also different social inequities via the attachment of followers to certain leaders (Bryce 1998: 24).

Collectively, these changes in the current archaeological evidence at Kaman-Kalehöyük were consistent with increased levels of specialization and many factors scholars have associated with increasing degrees of social inequality, including: intensification of exchange activity, differential access to and/or control of highly valued goods, greater levels of conflict, the attraction and attachment of people to certain leaders or social groups, and higher levels of surplus generation (D'Altroy and Earle 1985; Earle 1991; Plog 1995; Johnson and Earle 2000; Kohler, Smith, and Feinman 2018).

Having reviewed archaeological and textual data from the EBA and MBA at Kaman-Kalehöyük and in its environs, in the paragraphs which follow I discuss my faunal data and how they align to my two hypotheses. This brief overview of my findings shows how one rural economy may have been restructured as Assyrian traders became a presence on the Anatolian plateau in the 2nd millennium BC. I follow this section by discussing what the data tells us about the reorganization of the Kaman-Kalehöyük MBA community more broadly.

Two Hypotheses: Increased degrees of Specialization and Social Inequality

My first hypothesis posited that the intensification of interactions and exchange activity in the 2nd millennium BC between central Anatolians and the northern Mesopotamians stimulated an increase in the degree of economic specialization at Kaman-Kalehöyük. My second hypothesis posed that the degree of social inequality at Kaman-Kalehöyük increased from the Early Bronze Age to the Middle Bronze Age as interactions between Anatolians and Old Assyrians intensified.

The EBA baseline animal economy from rural Kaman-Kalehöyük indicates that people raised, bred, and consumed sheep/goats, cattle, and pigs, and occasionally hunted as well. Pig remains suggest that animals were raised, bred, kept, and likely consumed at the household level. Some equids were present at the site in the EBA, though the role they played in the earlier period is unclear. While this general faunal profile appears to have continued into the Kaman-Kalehöyük MBA, some potential differences in the animal economy at the site were identified over time. Current data suggests diachronic consistency in some herding strategies (pig relative abundances and a high proportion of sheep/goat remains), change in other aspects of the production economy (more cattle and sheep/goat age distributions), a possible change in equid species exploited at the site (smaller equids were identified in the EBA versus smaller and larger equids, horses and donkeys in the MBA), and potential increases of others (higher sheep to goat ratio). Recognizing the need for a larger sample size, the differences observed in relative abundance proportions and animal age group distributions between the EBA and MBA were consistent increasing degrees of specialization and social inequality in the MBA when compared to the earlier period.

More specifically, in the EBA, the absence of sheep/goats of prime-meat-yield age coupled with a potential concentration of older animals may suggest that sheep/goats were raised at the site and then prime meat aged animals were moved elsewhere on the hoof, possibly as part of a tributary economy. Evidence for a tributary economy in the EBA, predating the arrival of the Assyrians on the plateau, also suggests that Anatolian interactions with Assyrians did not spark local political centralization on the plateau. The presence of sheep/goats and cattle in older age groups suggests that sheep/goats and cattle were kept at Kaman-Kalehöyük and used for purposes other than meat consumption, such as exploiting these animals for traction or plowing, their dairy, wool, fibers, or hides (Sherratt 1981 and 1983). If supported with a larger sample size in the future, the absence of prime-meat-aged sheep/goats in the EBA also may indicate that the consumption of certain types of meat was reserved for certain groups of people, indicating some degree of social inequality.

Three important faunal themes stood out in the Kaman-Kalehöyük MBA sample. First, the possible increased proportion of cattle may indicate that diversified dairy and meat options were more readily available in the MBA when compared to the EBA. Second, while absent in the current EBA data set, the concentration of prime-meat aged sheep/goats in the later period may reflect a possible change in the local hierarchy at Kaman-Kalehöyük where certain people had privileged access to, and enjoyed the consumption of, the best cuts of meat derived from optimally aged animals (Wapnish and Hesse 1988: 84). Third, the most highly represented sheep/goat age group fell into the 4-6-year-old category in the MBA. Pending future analyses and a larger sample size, this potential concentration is consistent with one of two phenomena. The concentration of 4-6-year-old sheep/goats may indicate an increase in the local consumption of older caprines, which may also be reflective of a decline in food quality consumed by villagers. Or, the high representation of 4-6-year-old ovi-caprids may indicate a shift toward surplus production strategies focused on milk and fibers. In either case, since the 4-6-year-old sheep/goat age group is the most highly represented sheep/goat age cohort, data suggests that some prime-aged animals might have been sent off-site since we would expect prime aged animals to be most highly represented if they all actually were consumed on-site at Kaman-Kalehöyük.

The changes observed in sheep/goat mortality patterns when comparing the EBA with the MBA require more horizontal exposures of structures and features from each time period and additional data to more fully evaluate whether the differences between the earlier and later periods are a function of sampling or of an ancient change in social organization. For example, MBA faunal remains may indicate that prime-age sheep and cattle were deposited in certain locations while pigs and older caprines were deposited in others that have yet to be excavated or analyzed. Or, the differences observed in sheep/goat mortality patterns between the EBA and MBA may have coincided with changes in social organization. For instance, MBA cuneiform translations suggest regional leaders assigned new local Anatolian officials called "*allahhinum*" with the responsibility of overseeing a specific towns' economy and trade activity. If Kaman-Kalehöyük in the MBA became integrated into a new politico-economic landscape where smaller communities were attached to a center (Veenhof and Eidem 2008: 225), an "*allahhinum*" may have resided at the site, and owned or controlled local herds. This official not only may have been afforded the privilege of consuming prime-meat-aged sheep/goats, but also may have shifted Kaman-Kalehöyük's pastoral economy to focus more on the surplus production of milk and fibers to support new regional demand paradigms.

Overall data related to the EBA economy at Kaman-Kalehöyük were more consistent with the local movement of goods, surplus production of older sheep/goats, and a tributary economy. MBA data were more consistent with local and non-local movement of goods, a potentially more diversified set of meat and dairy product sources (cattle), possibly an intensified focus on sheep wool and the ability to transport materials over greater distances. MBA data also hint at Kaman-Kalehöyük's potential participation in a more regionalized economy where new local leaders enjoyed prime cuts of meat and could steer the site's production economy to meet the evolving demands of regional leaders who held sway over the smaller communities, like Kaman-Kalehöyük, located in their territories. Having discussed what is known of the non-faunal and faunal archaeological data and textual studies of the central Anatolian plateau EBA and MBA periods, I turn to a broader discussion of my findings.

Discussion

I began this study by discussing how philologists, based on cuneiform translations, have characterized changes in the early Middle Bronze Age as an economically stimulated phenomenon. Their prevailing perspective is that the goods exchanged between Anatolians and Assyrians did not require the Assyrians to interact with rural local Anatolian populations and their subsistence economies (Veenhof and Eidem 2008: 147). While Anatolian interactions with the Assyrians may have been limited to more urban Anatolian elites, the open question was just how much locales in the countryside, like Kaman-Kalehöyük, were impacted by this intensification of long-distance exchange activity with the northern Mesopotamians. Interpretations like the one shared here are pervasive in scholarly work of the period and thus prepared me to expect large-scale changes in archaeological remains from the EBA to the MBA at larger more urban locations, like Kültepe-Kanesh, and little or no change at smaller rural locations, like Kaman-Kalehöyük.

In other words, if MBA philological assumptions of a lack of Assyrian interactions with the Anatolian countryside were accurate, and the Assyrians consumed whatever the local economies in more urban areas already provided, then minimal changes in archaeological remains from sites in the Anatolian countryside would be detected when comparing archaeological remains from the late EBA to the early MBA. If this were the case, then archaeological material would be consistent with little diachronic deviation in the economic organization or degrees of social inequality at smaller rural sites. In this study I set out to determine whether even indirect interactions between Anatolians and Assyrians in the early 2nd millennium BC stimulated changes in degrees of specialization and/or social inequities at Kaman-Kalehöyük, which might prove true if Kaman-Kalehöyük was, or emerged as, a production site that provided animals or animal byproducts to more administratively focused urban locations.

Further, if the Assyrians preferred different animals, animal meats, or animal byproducts than local Anatolians, as textual translations have suggested (Albayrak 2003; Atici 2014; Gökçek 2004; Lassen 2010; Sasson 2004), and created a demand for such food or secondary products, then an influx of Assyrians into a preexisting economic production system on the plateau, focused on local consumption patterns, would have put stress on the supply system. If the Assyrian footprint on the plateau in the 2nd

millennium BC was as significant as cuneiform translations contend, then it is unlikely that existing local Anatolian production economies could have, without modifying their economies, generated surpluses of preferred animals, meats, by-products, or other goods to support a much larger number of people who were less focused on producing food for themselves. Since we have no evidence to suggest that Assyrians brought herds with them from northern Mesopotamia, nor that the Assyrians acquired local herds, it's unlikely that Assyrians were in a position to raise their own animals. Further, if Assyrians took residence only in more urban locations with designated exchange districts that housed people less focused on raising their own animals for consumption purposes, the increase in this population at these urban locations may have impacted the production schemes of any less administratively focused, or rural, sites which supplied those more urban locations with food or other goods.

In short, it doesn't matter whether or not the Assyrians were in direct contact with rural communities like Kaman-Kalehöyük. As long as rural communities, like Kaman-Kalehöyük, supplied some of the food at centers, an increase in the population of non-food producing specialists at centers would have likely impacted production strategies in the countryside. And, as seen in Chapter 6, uneven distributions of certain animals, animal parts, or animal ages in excavated material over time may indicate not only increasing degrees of production specialization, but also expanding degrees of social inequity. For example, degrees of social inequality can expand if locations in the countryside, like Kaman-Kalehöyük, during the MBA had different access to certain animals or parts of animal carcasses than they did in the EBA. Overall, as seen in Chapter 7, Kaman-Kalehöyük faunal data suggests that, regardless of whether interactions between rural local Anatolians and Assyrians were direct or indirect, animal economies and associated social structures at Kaman-Kalehöyük in the MBA appear to have differed in some important ways from those of the earlier period.

Current faunal and non-faunal archaeological data suggest that intensified interactions between the Anatolians and Assyrians in the 2nd millennium BC, either at Kaman-Kalehöyük or at locations to which Kaman-Kalehöyük was attached, did in fact coincide with increasing degrees of specialization and social inequities among those residing at this small rural site. Current faunal data and other archaeological remains also are consistent with alterations in the choices made by Kaman-Kalehöyük herd owners and the local landscape in the MBA when compared to the EBA. As discussed in Chapters 4 and 7, data suggest changes in the relative abundances of certain animals and age profiles which are complemented by other diachronic differences between the EBA and MBA at Kaman-Kalehöyük such as: a shift from hand to wheel-made ceramics (Michel 2011; S. Omura 2011); the first expression of administrative devices such as stamp and cylinder seals and sealings in a variety of local and non-local styles (M. Omura 1996: 199-200); the recovery of rarely encountered cuneiform tablet fragments (Yoshida 1991, 2002; Michel 2011; Larsen 2015); evidence of conflict via a fortification wall (Omura 2011), copper weaponry (Akanuma 2007), and mass burials (Hunt 2006, 2007);

finer metallurgical objects found alongside more simple forms (personal observation); and, a change in spindle whorl decoration (personal observation).

When all of the Kaman-Kalehöyük archaeological remains evaluated in this study are taken together, evidence suggests changes took place in both the economic and social organization of the site in the MBA. While architecture and associated architectural features require more horizontal exposures from the EBA levels at Kaman-Kalehöyük to more fully compare the EBA remains with the more extensively excavated MBA, EBA data was more consistent with relatively lower degrees of social inequality, and Kaman-Kalehöyük's participation in a geographically smaller-scale tributary economy with lower degrees of specialization than was found in the MBA. In the MBA, patterns suggest higher degrees of social inequality and a more surplus focused economy with higher levels of specialization spanning a wider geographical footprint. The patterns observed in the current Kaman-Kalehöyük data also are consistent with diachronic changes observed throughout the Anatolian plateau when comparing remains the earlier and the later periods.

The diachronic changes observed in this study both align with and diverge from the many decades of research conducted by Assyriologists. My findings complement and align with archaeological and philological posits that cite the existence of expanded hierarchical structures and more geographically diverse interactions spheres in the MBA when compared to the EBA. This study, however, also suggests that some rural sites in the Anatolian countryside may have been impacted by the various politico-economic and social forces at play in the 2nd millennium BC on the central plateau to a much greater extent than previously thought. In terms of specialization, current evidence from Kaman-Kalehöyük suggests that due to increased or changing demands at centers, the animal economy may have been restructured in at least some of the rural communities attached to more administratively focused locations. And, perhaps due to uneven surplus production and involvement in geographically expanding exchange systems, socioeconomic inequalities may have grown in the MBA when compared to the earlier period.

Additionally, in the current study I found no evidence that the Anatolian-Mesopotamian interactions alone caused expansions in the degrees of economic specialization and social inequality at Kaman-Kalehöyük in the MBA relative to the EBA. The differences between the excavated remains from Kaman-Kalehöyük EBA and MBA deposits suggest one of two phenomena, or a combination thereof, took place at the site at the onset of the 2nd millennium BC. Either the intensified interactions between the Anatolians and Assyrians in the 2nd millennium BC had a greater impact on the Anatolian economy and production areas *in the countryside* than scholars thought, or substantial changes in central Anatolia's politico-economic and social organization were already in motion and happened to coincide with increased interactions with the northern Mesopotamians. This is a classic dilemma of whether the observed patterns reveal not only correlation, but also whether that correlation is coincidence or shows causation. We cannot resolve that issue without significantly increasing available evidence.

By complementing the corpus of Assyriological research (Garelli 1963; Larsen 1976 and 2015; Leemans 1960; Veenhof 1972; Veenhof and Eidem 2008) with new archaeological data, this study helps better understand just how much impact the intensified interactions between central Anatolians and the viators from northern Mesopotamian may have had on local rural economies. Kaman-Kalehöyük faunal remains suggest some changes took place in the exploitation of domesticated animals in the MBA compared to the EBA, though whether it was a direct or indirect result of intensified interactions with the foreign population from northern Mesopotamia remains an open question. The cuneiform tablet fragments found at Kaman-Kalehöyük raise the possibility that some resident(s) of the site may have had direct interactions with the Assyrians.

Future studies are needed to further evaluate whether the social and economic changes observed at Kaman-Kalehöyük were due to Kaman-Kalehöyük's intensified participation in a broader interaction or exchange network, or a combination of influential factors including the emergence of a more centrally controlled regional economy, new demands for different volumes or types of goods that were placed on the site's production economy, the infusion of new people onto the plateau, the emergence of a new local hierarchy at the site, the introduction of a new literate class, new emulative schemes, or other internal developments. Additional studies of smaller, more rural sites like Kaman-Kalehöyük will also show if the economic and social changes observed at this location were an isolated phenomenon, if changes during the early stages of the MBA were more pervasive throughout the Anatolian countryside, or if rural communities varied in the ways they restructured their economies and societies in response to new opportunities and demands which presented themselves in the early stages of the 2nd millennium BC.

Considerations for Future Inquiry

Throughout this study I focused on evaluating the social artifacts associated with the EBA and MBA at Kaman-Kalehöyük and in its immediate environs. Evidence was consistent with increasing degrees of both specialization and social inequality in the later period when compared to the earlier period. Through my evaluation of diachronic change via multiple lines of archaeological data and an abundance of philological studies, many questions arose when trying to better understand the socio-political and economic dynamics which may have been at play on the central Anatolian plateau during the 2nd millennium BC. Two topics, in particular, stood out as focal areas of future inquiry. By viewing artifacts of daily life through ethnographic analogy and more robust exchange paradigms, scholars can broaden the interpretive aperture related to the Anatolian and Assyrian interactions that took place on the central Anatolian plateau during the early stages of the 2nd millennium BC.

First, MBA scholarship has rendered Assyrian social motivations for long distance travel to economic archetypes, which likely presents an incomplete picture of the multitude of factors that influenced the onset and intensification of this activity. In many anthropological and archaeological studies, contact with foreign peoples over long distances has often focused on "trade" activity, placing primacy on identifying and enumerating the goods that changed hands, characterizing the actors involved in executing exchanges and relegating their goals to economic motivations. Middle Bronze Age Anatolian-Assyrian studies are no different. Volumes have been written related to the Anatolian-Assyrian interactions of the 2nd millennium BC, and almost all of them accept the idea that these long-distance relations were primarily driven by the Assyrian desire to secure goods such as gold and silver from the Anatolians in exchange for tin and textiles (Atici 2014; Barjamovic 2011; Hatunoğlu 2021; Larsen 1976, 1987, 2015; Postgate 1995; Stein 2002, 2005; Veenhof 1972, 2010). In this future inquiry I will treat the desire for these "things" by Anatolian and Assyrian actors as one of several potential stimuli, which drove persons to cross, and allow travel through, expansive physical geographies.

The ethnographic record is replete with examples of both individualistic as well as socio-political motivators for engaging in long-distance travel. Some of the individualistic drivers include search for knowledge, need for adventure, connecting with one's origins or ancestral past, personal curiosity, rite of passage or self-realization, fame, and/or escape from social restrictions. Socio-political motivations include: differentiated knowledge, novelty, pilgrimages to ask for favor, cures for illness, exile, the procurement of ritualistic or other cognitively valued "things" (including natural resources) as a means of expressing power, information, escape or safety, alliances, scouting, etc. In summary, one need not look very far to realize that "…a priori assumptions as to reasons for long distance…[travel]…can be hazardous because they are too simplistic or because they assume motivational primacy (e.g., profiting) when such is not always the case" (Helms 1988: 68).

The ethnographic record demonstrates that cultures, and more specifically, persons, should not be oversimplified to a myopic focus or motivation related to long distance travel and exchange. Instead, ethnographies demonstrate that singular deterministic interpretive frameworks, such as those characterized as generalized "trade" or economic gain, are rarely, if ever sufficient to explain the full spectrum of social influences that drive or allow ventures into geographically distant, foreign lands. Ethnographies ranging from the Akawaio search for foreign ritual songs (Colson 1973), to the Jesuit missionaries 'search for knowledge (Rowbotham 1942), and cultures spanning from the Aranda tribes (Strehlow 1947) to the Aztec empire (Berdan 1982, Carrasco 1982), all demonstrate a wide range of reasons why individuals or persons (or agents thereof) travel long distances. These anthropological case studies characterize the motivations for long-distance travel as complex and fluid, combining dimensions of individualism, social or political stimuli, and economic considerations operating in concert. Furthermore, the ethnographic record provides innumerable examples where the obtainment, and subsequent possession of knowledge greater than a common culturally-specific denominator is metamorphosed into social and/or political power.

Many ethnographies have prompted me to rethink the economically charged corpus of academic literature regarding the long-distance interactions that took place between Middle Bronze Age Anatolians and Mesopotamians. Three types of case studies have had the greatest impact on my thoughts related to both why the Assyrians chose to venture into their distant periphery and why local Anatolians allowed them to do so. The most impactful accounts were related to: a) safety and sanctified aspects of exchange expeditions as characterized by the Navajo, Australian aborigines, Yao, and Ibo; b) political and information gathering stimuli for foreign travel in pre-Columbian Mesoamerica; and c) knowledge, literacy, and mystical dimensions associated with West African Hausa and Dyula scholar-traders. I plan to evaluate the Anatolian-Assyrian interactions of the 2nd millennium within the context of these and other ethnographies.

Secondly, I plan to study the <u>social act</u> of barter as a new and different lens from which to view the exchange activity engaged in by 2nd millennium BC central Anatolians and northern Mesopotamians. Since the MBA intensification of the Anatolian – Assyrian interactions occurred pre-coinage and in pre-capitalistic settings, a study of barter can broaden anthropological discourse of the period to include a more personal element to the interactional gravitas associated with 2nd millennium BC exchange activity. Research focused on barter exchange may inform our understanding of the 2nd millennium BC for four main reasons. First, barter is a frequently occurring exchange activity expressed across a wide range of current and ancient economic organizational paradigms. Second, barter is a nearly omnipresent and fluid socio-cultural phenomenon, which can create, reify, or transform both the values of goods and the social relationships of the actors involved with the exchange of those goods (Hole and Heizer 1965: 278). Third, barter, in addition to being pervasive across space and time, serves to counterbalance scholarly interpretations, which rely heavily on modern capitalist market concepts to explain exchange dynamics that took place in ancient contexts. And fourth, while Assyriologists have acknowledged textual references to “price fluctuations”, “haggling”, “everyday bargaining”, and the “selling of goods on credit”, evaluating barter as an exchange activity, particularly by archaeologists, is still nascent (Larsen 2015: 274-275).

What occurred on the central Anatolian plateau in the 2nd millennium BC, during the Old Assyrian Period, has often been characterized as mercantile, colonial, or pre-capitalist trade activity, all of which imply certain assumptions related to economic organization (Algaze 2008; Atici, et. al. 2014; Özgüç 1997; Postgate 1995; Stein 2005; Veenhof 2008). For decades, scholars have described the long-distance interactions and exchanges, which took place between Northern Mesopotamians and Anatolians during this celebrated time period in ancient Turkey as peaceful and regulated (Larsen 1976; Veenhof 2010), despite a politically fractionalized landscape (Bryce 1998), fickle alliances (Laessoe 1963), and exceptional geographical and likely cosmological distance between and among its actors (Barjamovic 2011). In addition, studies of the economic transactions depicted in Old Assyrian cuneiform tablets have tended to place great emphasis on enumerating the illustrious goods that were exchanged (gold, silver, tin, textiles) and assigning "prices" or profit margins to them (Atici, et. al. 2014: 2; Barjamovic 2011: 2; Erol 2019; Hatunoğlu 2021; Larsen 1976: 86; Lehner 2014: 135; Michel 2022; Veenhof 2010: 39), while spending relatively little time on the determination of commensurabilities among those notable goods and still less on the non-glorified goods that were exchanged, or the complex social forces which surrounded these exchange interactions (Larsen 2015: 274).

For example, in the 2nd millennium BC goods from Mesopotamia had irregular availability due to many factors, inclusive of the fractionalized geopolitical landscape that existed between the entities who engaged in the long-distance exchange of certain goods. While some of the cuneiform tablets tell us of situations where transactions were completed immediately upon arrival of tin and textiles from Aŝŝur, still others recount where goods were placed in the hands of trusted agents who traveled around the Anatolian plateau peddling those goods, hence, non-simultaneous *quid pro quo* transactions (Larsen 1976: 104, 104 footnote 74). The aforementioned suggests that a few conditions must have been present in the Anatolian-Assyrian exchange interactions:

1) many people who conducted the exchanges were familiar with one another and/or the Anatolian landscape, 2) many locations where goods could be exchanged were established and known (Barjamovic 2011: 5), and 3) a web of social ties existed among exchange sponsors in Aŝŝur, including those who trekked to and from northern Mesopotamia on their behalf, as well as the patrons' overseers in Anatolia. In addition, social ties must have cross-cut all of the aforesaid Old Assyrians, as well as those who frequented or lived in the *karums*, and also the locals with whom they exchanged goods, inclusive of local rulers who allowed the Assyrians to participate in exchange networks that traversed local lands. Furthermore, Larsen (1976: 90) has shared that:

> *"…when there was a shortage of either wool, tin, or Babylonian textiles, the people in Aŝŝur could apparently do nothing about it but simply had to wait…" and "when supply was cut off, the men in Aŝŝur simply advised their correspondents in Anatolia of the unfortunate state of affairs and promised to buy as soon as the missing goods were again offered for sale in Aŝŝur."*

The ramifications of shortages in goods bartered by the Assyrians or their agents in Anatolia assumes one or more of the following: a) the Assyrians living in Anatolia had other means to sustain daily life, such as alternative jobs, crafts, or skills (Lassen 2010), b) the Assyrians lived on "credit" until more "things" arrived or Assyrians were "held" captive until exchanges were completed, or c) indebted Assyrians departed the Anatolian area(s) where they had incompletely exchanged goods in search of new exchange loci to peddle their wares or to procure essential resources, but likely not without some agreement to satisfy their side of any outstanding transaction. All of these scenarios not only support models of credit but also are consistent with the idea that Assyrians did in fact possess social ties to the Anatolians, had established some measure of mutual trust with Anatolians, bartered labor or other goods of need/desire with locals in times when Assyrian tin and textiles were unavailable, and likely bartered for goods other than gold and silver to maintain their daily lives as permanent or transient residents of the central Anatolian plateau. Since we have very few accounts of transactional defaults, hostilities, or fugitive behavior, one may argue that the exchange of goods between northern Mesopotamians and central Anatolians often contained an inherent delay or credit component characteristic of a well-integrated social system, a system punctuated by sheer geographical distance from Aŝŝur as well as civil unrest in the landscape connecting Anatolia to Mesopotamia. Textual translations suggest that actors in the exchanges of goods must have been known entities, who met at prescribed locations, with expectations of future engagements. Simply stated, exchanges with delays in consummating a transaction that has begun, or is expected, via credit systems, supports the existence of much closer social ties than simple commodity exchanges imply. These social ties can be better understood by more closely evaluating both personal and market-based barter exchanges.

In sum, these two future areas of inquiry are intended not only to broaden current explanatory paradigms, but also to serve as a jump-station for future anthropological archaeologists focused on the 2nd millennium BC in central Anatolia.

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APPENDIX 1.

Textual Sources of the MBA (after Larsen 1987).

Dates	Location	Document Type	Contacts	Imports	Exports
2025-2000	Ur	administrative	Magan	copper/stone	textiles/wool/oil/barley
1930-1865	Ur	administrative	Dilmun	copper/ivory	wool/silver
				pearls/spices	wheat/sesame
1920-1840	Kültepe-				
	Kanesh	private	Assur	tin/textiles	silver/gold
			East Anatolia	copper/wool	tin/textiles
1810-1790	Ur	private	Dilmun	copper	silver
1810-1765	Kültepe-				
	Kanesh	private	Assur	textiles/tin?	silver
1790-1780	Larsa	private	Eshnunna	silver?	?
			Susa	tin?	?
			Sippar	tin	silver/gold
			Zagros	slaves	?
1785-1760	Mari	diplomatic &	Susa/Assur?	tin	?
		administrative	Syria	wine/wood	tin
			Babylonia	?	wine/wood
			Anatolia	horses?	?
			Cyprus	copper	tin
1785-1600	Sippar	private	Eshnunna	tin	paint
			Zagros	slaves	oil/aromatics
			Syria	wood/wine	tin
				oil/aromatics	
			Assur	tin?	silver?

APPENDIX 2.

Kaman-Kalehöyük Locus Key

LETTER	LOCATION/PROVENIENCE	STRATUM	PERIOD
A	KUZEY IV 91 R448	IV-b	EBA
B	KUZEY IV 95 R448	IV-b	EBA
C	KUZEY IV 250	IV-b	EBA
D	KUZEY IV 88	IV-b	EBA
E	KUZEY IV 89	IV-b	EBA
F	KUZEY IV 94 R448	IV-b	EBA
G	KUZEY IV 92 P3370	IV-b	EBA
H	KUZEY IV 93 P3371	IV-b	EBA
I	KUZEY IV 100 R450	IV-b	EBA
J	KUZEY IV 108	IV-b	EBA
K	KUZEY IV 114 R450	IV-b	EBA
L	KUZEY IV 114	IV-b	EBA
M	KUZEY VI 191 R429	IIIc	MBA
N	KUZEY V-XXXVII-55 L 90	IIIc	MBA
O	KUZEY V-XXXVII-55 L 70	IIIc	MBA
P	KUZEY V-XXXVII-55 L 92	IIIc	MBA
Q	KUZEY V-XXXVII-54 K 83	IIIc	MBA
R	KUZEY V-XXXVII-54 K 87	IIIc	MBA
S	KUZEY V-XXXVII-54 K 82	IIIc	MBA
T	KUZEY V-XXXVII-54 K 88	IIIc	MBA
U	KUZEY V 91	IIIc	MBA

Kaman-Kalehöyük Fauna by Context and Taxa (Nicola 2015).

Locus	*Equus sp.*	*Cervus sp.*	*Cervus elaphus*	*Sus domesticus*	*Sus-Juv*	*Ovis sp./ Ca*	*Bos taurus*	*B. primigenius*	*Felis sp.*	*Felis catus*	*Canis sp.*	*Vulpes vulpes*	*Testudo graeca*	Shell	*Homo sapi*	*Aves sp.*	Total
A	1			21	7	95	33		3								153
B				13	12	55	15										83
C				5	3	29	6										40
D			1	2	2	52	16			3			1				75
E				7	1	23	1		1					1			33
F				1		36	6				5	1					49
G				1	1		2										3
H						12	11				1						24
I			1	1		13											15
J				2	1	10	2	1		2							17
K				9	9	37	2				3						51
L				6	3	8	1										15
Subtotal	**1**	**0**	**2**	**68**	**39**	**370**	**95**	**1**	**4**	**5**	**9**	**1**	**1**	**1**	**0**	**0**	**558**
EBA Total	**0.2%**	**0.0%**	**0.4%**	**12.2%**		**66.3%**	**17.0%**	**0.2%**	**0.7%**	**0.9%**	**1.6%**	**0.2%**	**0.2%**	**0.2%**	**0.0%**	**0.0%**	**100%**
M	7		4	42	6	241	108		2		13		1				418
N						14	5										19
O				6	2	42	4										52
P	1			25	7	37	9				3			2	1	5	83
Q				8	2	26	7				9			1	1	2	54
R			1	14	2	19	1				7						42
S				9	2	29	9									3	50
T	1	1		6	2	37	6				1					4	56
U	2			16	2	44	15				3			1		6	87
Subtotal	**11**	**1**	**5**	**126**	**25**	**489**	**164**	**0**	**2**	**0**	**36**	**0**	**1**	**4**	**2**	**20**	**861**
MBA Total	**1.3%**	**0.1%**	**0.6%**	**14.6%**		**56.8%**	**19.0%**	**0.0%**	**0.2%**	**0.0%**	**4.2%**	**0.0%**	**0.1%**	**0.5%**	**0.2%**	**2.3%**	**100%**
Grand Total	**12**	**1**	**7**	**194**	**64**	**859**	**259**	**1**	**6**	**5**	**45**	**1**	**2**	**5**	**2**	**20**	**1419**

Kaman-Kalehöyük EBA Fauna by Context, Count and Percentage (Nicola 2015).

	A		B		C		D		E		F	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ovis sp./ Capra sp.	95	62%	55	66%	29	73%	52	69%	23	70%	36	73%
Bos taurus	33	22%	15	18%	6	15%	16	21%	1	3%	6	12%
B. primigenius	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Sus domesticus	21	14%	13	16%	5	13%	2	3%	7	21%	1	2%
Canis sp.	0	0%	0	0%	0	0%	0	0%	0	0%	5	10%
Felis sp.	3	2%	0	0%	0	0%	3	4%	1	3%	0	0%
Equus sp.	1	1%	0	0%	0	0%	0	0%	0	0%	0	0%
Cervus sp.	0	0%	0	0%	0	0%	1	1%	0	0%	0	0%
Vulpes vulpes	0	0%	0	0%	0	0%	0	0%	0	0%	1	2%
Testudo graeca	0	0%	0	0%	0	0%	1	1%	0	0%	0	0%
Shell	0	0%	0	0%	0	0%	0	0%	1	3%	0	0%
Homo sapiens	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Aves sp.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
	153		**83**		**40**		**75**		**33**		**49**	

	G		H		I		J		K		L		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ovis sp./ Capra sp.	0	0%	12	50%	13	87%	10	63%	37	73%	8	53%	370	66.3%
Bos taurus	2	67%	11	46%	0	0%	2	13%	2	4%	1	7%	95	17.0%
B. primigenius	0	0%	0	0%	0	0%	1	6%	0	0%	0	0%	1	0.2%
Sus domesticus	1	33%	0	0%	1	7%	2	13%	9	18%	6	40%	68	12.2%
Canis sp.	0	0%	1	4%	0	0%	0	0%	3	6%	0	0%	9	1.6%
Felis sp.	0	0%	0	0%	0	0%	2	13%	0	0%	0	0%	9	1.6%
Equus sp.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0.2%
Cervus sp.	0	0%	0	0%	1	7%	0	0%	0	0%	0	0%	2	0.4%
Vulpes vulpes	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0.2%
Testudo graeca	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0.2%
Shell	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	0.2%
Homo sapiens	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0.0%
Aves sp.	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0.0%
	3		**24**		**15**		**16**		**51**		**15**		**558**	

Kaman-Kalehöyük MBA Fauna by Context, Count, and Percentage (Nicola 2015).

	M		N		O		P		Q		R	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Ovis sp./ Capra sp.	241	58%	14	74%	42	81%	37	45%	26	49%	19	45%
Bos taurus	108	26%	5	26%	4	8%	9	11%	7	13%	1	2%
B. primigenius	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Sus domesticus	42	10%	0	0%	6	12%	25	30%	8	15%	14	33%
Canis sp.	13	3%	0	0%	0	0%	3	4%	9	17%	7	17%
Felis sp.	2	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Equus sp.	7	2%	0	0%	0	0%	1	1%	0	0%	0	0%
Cervus sp.	4	1%	0	0%	0	0%	0	0%	0	0%	1	2%
Vulpes vulpes	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Testudo graeca	1	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Shell	0	0%	0	0%	0	0%	2	2%	1	2%	0	0%
Homo sapiens	0	0%	0	0%	0	0%	1	1%	1	2%	0	0%
Aves sp.	0	0%	0	0%	0	0%	5	6%	2	4%	0	0%
	418		**19**		**52**		**83**		**54**		**42**	

	S		T		U		Total	
	No.	%	No.	%	No.	%	No.	%
Ovis sp./ Capra sp.	29	58%	37	66%	44	51%	489	56.8%
Bos taurus	9	18%	6	11%	15	17%	164	19.0%
B. primigenius	0	0%	0	0%	0	0%	0	0.0%
Sus domesticus	9	18%	6	11%	16	18%	126	14.6%
Canis sp.	0	0%	1	2%	3	3%	36	4.2%
Felis sp.	0	0%	0	0%	0	0%	2	0.2%
Equus sp.	0	0%	1	2%	2	2%	11	1.3%
Cervus sp.	0	0%	1	2%	0	0%	6	0.7%
Vulpes vulpes	0	0%	0	0%	0	0%	0	0.0%
Testudo graeca	0	0%	0	0%	0	0%	1	0.1%
Shell	0	0%	0	0%	1	1%	4	0.5%
Homo sapiens	0	0%	0	0%	0	0%	2	0.2%
Aves sp.	3	6%	4	7%	6	7%	20	2.3%
	50		**56**		**87**		**861**	

Kaman-Kalehöyük EBA *Ovis/Capra* Wear Stages by Locus (Nicola 2015).

(Each row in each column represents a single specimen except where preceded by a number)

A	B	C	D	E	F	H	J	K
M2 = F/G	P4 = G/H/I	P4, M1, M2, M3: E	M1, M2 = H	M1/M2 = C/D	M1/2 = D/E/F/G	M1/2 = D/E/F/G	P4/M1/M2/M3 = F	M1/M2 = D/E/F/G
M2 = F/G	P4 = F/G				M1/2 = D/E			M1/M2 = C/D
M2 = H/I (mand)	M1, M2, M3 = G				M1/M2/M3 = F			
M2 = H/I	M1/M2 = C/D							
M1 = G/H/I (mand)	M1/M2 = C							
M3 = G/H	M1/M2 = C/D							

Kaman-Kalehöyük MBA *Ovis/Capra* Wear Stages by Locus (Nicola 2015).

(Each row in each column represents a single specimen except where preceded by a number)

M	O	P	Q	S	T	U
2 M1/M2's = D/E/F/G	M3 = F	2 M1/M2's = D/E/F/G	m3, M1 = C	M1/M2 = C/D	m3, M1 = D	m3 = C
M1/M2 = G/H/I	M1/M2 = C/D	M1/M2 = C/D	M1/M2 = G/H/I	P4 = G/H/I	M1/M2 = C/D	M1/M2 = C/D
M1/M2 = F/G/H/I	M1/M2 = D/E/F/G		M1/M2 = D/E/F/G	P4, M1, M2, M3 = D	M3 = F	P4, M1, M3 = F
4 M3's = G	M2, M3 = D/E				M2 = D	
M3 = E	P4, M1 = G				M1 = F/G	
2 M1/2's = C/D						
M1 = D/E/F						
P4 = G/H/I						
P4 = F/G						
M1, M2 = E						
P4, M1, M2 = G						
P4, M1, M2, M3 = H						

Kaman-Kalehöyük *Sus* (Pig) Bones by Locus and Presence of Burning (Nicola 2015).

EBA					MBA			
Locus	**Sus**	**Burned**	**%**		**Locus**	**Sus**	**Burned**	**%**
A	21	9	42.9%		**M**	42	3	7.1%
B	13	8	61.5%		**O**	6	0	0.0%
C	5	0	0.0%		**P**	25	4	16.0%
D	2	1	50.0%		**Q**	8	3	37.5%
E	7	2	28.6%		**R**	14	5	35.7%
F	1	0	0.0%		**S**	9	1	11.1%
G	1	0	0.0%		**T**	6	1	16.7%
I	1	1	100.0%		**U**	16	9	56.3%
J	2	0	0.0%					
K	9	1	11.1%					
L	6	3	50.0%					
Total	**68**	**25**	**36.8%**		**Total**	**126**	**26**	**20.6%**

Kaman-Kalehöyük *Bos* Butchery and Burning (Nicola 2015).

EBA	TOTAL	BUTCHERY	%	BURN	%
Kuzey IV 91 R.448 (2014)	33	0	0.0%	4	12.1%
Kuzey IV 94 R.448 (2014)	6	0	0.0%	1	16.7%
Kuzey IV 95 R.448 (2014)	15	0	0.0%	0	0.0%
Kuzey IV 250 2014	6	0	0.0%	2	33.3%
Kuzey IV 88 2014	16	0	0.0%	2	12.5%
Kuzey IV 89 2014	1	0	0.0%	0	0.0%
Kuzey IV 93 P3371 2014	2	0	0.0%	1	50.0%
Kuzey IV 100 R450 2015	11	0	0.0%	1	9.1%
KL Kuzey IV 108 2015	2	1	50.0%	0	0.0%
Kuzey IV 114 R450 2015	2	0	0.0%	1	50.0%
Kuzey IV 114 2015	1	0	0.0%	0	0.0%
Total	**95**	**1**	**1.1%**	**12**	**12.6%**
MBA	**TOTAL**	**BUTCH**	**%**	**BURN**	**%**
Kuzey VI 191 R429 2013	108	0	0.0%	17	15.7%
Kuzey V-XXXVII 55 L 90 2006	5	0	0.0%	0	0.0%
Kuzey V XXXVII-55 L 70 2006	4	0	0.0%	0	0.0%
Kuzey V XXXVII-55 L 92 2006	9	0	0.0%	2	22.2%
Kuzey V XXXVII-54 K 88 2006	13	0	0.0%	1	7.7%
Kuzey V 91 2006	15	0	0.0%	2	13.3%
Kuzey V XXXVII-54 K 83 2006	7	0	0.0%	1	14.3%
Kuzey V XXXVII-54 K 87 2006	1	0	0.0%	0	0.0%
Kuzey V XXXVII-54 K 82 2006	9	3	33.3%	4	44.4%
Total	**171**	**3**	**1.8%**	**27**	**15.8%**

Kaman-Kalehöyük Measurements of Primary Domesticates (Nicola 2015).

IDENTIFICATION:	*Bos taurus*											
ELEMENT	Provenience	GB	GL	Bp	BFd	Bd	Dm	Dl	GLm	GLl	SD	Glpe
ASTRAGALUS	J					4.31	3.41	3.60	5.99	6.35		
	M					4.46	3.38	3.61	5.94	6.63		
	Q					3.98	3.52	3.73	5.81	6.28		
CALCANEUM	B	4.71	X									
	M	4.10	X									
	M	4.50	X									
METACARPAL												
METATARSAL	U			5.44							2.78	
1ST PHALANX	B		6.87			2.80					2.87	
	M			2.62		2.54					2.24	5.25
	M			2.42		2.22					1.95	5.42
	M			2.86		2.57					2.28	5.50
	M			2.70		2.47					2.17	5.95
	M			2.97		2.92					2.54	6.31
	M			X		2.56					2.01	X
	Q			2.97		X					2.34	X
	U			2.49		2.50					2.07	5.73
2ND PHALANX	F		4.49	3.20		2.41					2.81	
	M		3.14	2.36		1.96					1.87	
	M		3.54	2.79		2.18					2.08	
	M		3.54	2.71		2.15					2.32	
	M		3.65	2.82		2.36					2.26	
	M		3.66	2.68		2.33					2.34	
	U		4.05	2.73		2.31					2.16	
	O		3.90	2.63		2.30					1.98	

IDENTIFICATION:	*Equus sp.*						
ELEMENT	Provenience	Bp	BFd	Bd	Dd	SD	Glpe
TIBIA	M			5.17	3.12		
	U			5.45	3.62		
	U			5.34	3.66		
METATARSAL	M	3.41				2.06	
1ST PHALANX	M	3.39		3.09		2.14	6.39
	A		3.52	3.66		2.47	

IDENTIFICATION: *Ovis sp. / Capra sp.*

ELEMENT	Provenience	GB	GL	BT	BD	Bp	BFd	Bd	GLm	GLl
HUMERUS	D			3.19	3.33					
	M			2.81	2.97					
	M			2.71	2.86					
TIBIA	P							2.53		
	C							2.67		
	D							2.52		
	E							2.81		
	M							2.38		
	M							2.84		
	M							2.51		
	M							2.45		
ASTRAGALUS	P							1.75	2.60	2.69
	P							X	2.67	2.78
	P							1.66	2.55	2.72
	A							1.81	2.82	2.99
	B							1.59	2.73	2.97
	M							1.92	2.70	2.84
	M							1.80	2.53	2.62
	M							1.70	2.64	2.82
	M							1.91	2.78	2.93
	N							1.94	2.87	3.02
	U							1.53	2.74	2.87
	O							1.98	3.05	OV
CALCANEUM	M	1.83	X							
	M	1.78	4.92							
	M	1.73	5.00							
	M	2.20	5.20							
	M	1.93	5.58							
	M	2.09	6.16							
	M	2.09	6.40							
METACARPAL	U					X		2.47		
METATARSAL	P		X			X		2.38		
	A		X			X		2.67		
	B		11.34			2.11				
1ST PHALANX	A					1.27		1.09		
	A					1.19		1.17		
	B		3.68			1.24		1.19		
	B		3.63			1.33		1.34		
	C					1.14		1.11		
	C					X		1.07		
	H					1.09		1.02		
	L					1.23		1.14		
	M					1.09		1.02		
	M					1.54		1.34		
	M					1.54		1.43		
	M					1.21		1.14		
	M					1.32		1.24		
	M					1.29		1.25		
	M					1.17		1.06		
	M					1.33		1.21		
	M					1.11		1.12		
	M					1.42		1.27		
	M					X		1.37		
	N					1.18		1.09		
	U					1.42		1.23		