

MODELING COLLAPSE: ANALYSIS OF THE BRONZE AGE-IRON AGE
TRANSITION AT TWO NEAR EASTERN SITES

by

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Presented to the Faculty of the Graduate School of
The University of Texas at Arlington in Partial Fulfillment
of the Requirements
for the Degree of

MASTER OF ARTS IN ANTHROPOLOGY

THE UNIVERSITY OF TEXAS AT ARLINGTON

May 2014

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Acknowledgements

I would like to thank Dr. Karl Petruso for his unwavering support; Dr. Naomi Cleghorn and Dr. Shelley Smith for their teaching and guidance; Helen McDonald and the staff of the Oriental Institute for providing access to their collections; and my wife, Hannah Nutt, for diligently helping me tackle the visual aspects of archaeology.

April 21, 2014

Abstract

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This project tests a three-step model for archaeological collapse, by analyzing assemblages from two museum collections, Alişar Hüyük and Tell el Fakhariyah. Focusing on three categories of artifacts, namely biological remains, tools and weapons, and objects of personal adornment, the model evaluates change over a brief time in order to investigate the transitional period during a collapse. As the sites used for this research were excavated during the first half of the twentieth century, the project assesses the possible utility of old museum collections in light of probable collection biases.

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Prolegomenon

The word “collapse” can evoke powerful images in the mind. From fears of stock market crashes to the belief in an impending apocalypse, the subject is rife with speculation and uncertainty. The impacts of economic and political fluctuations threaten ever widening circles of humanity, with the rising tide of globalization sweeping people into a highly connected world. The study of the phenomenon of collapse is vital to comprehending the magnitude of any such threat and grasping the adaptations populations make in response to these events. Likewise, research promotes clarification of the ambiguity inherent in the term itself, as scholars seek consensus on definitions and the bounds of discourse.

The avenues of collapse are many, and restricting it to any single process might strangle academic and professional discourse. In the midst of theories and postulation, the popular fear and fascination remains. Collapse is, by its essential nature, a human phenomenon and a deeply human concern. The term implies increasing uncertainty as systems, whether political, structural, or social, begin to unravel. Risks rise and familiar patterns disappear or change. How then do persons and cultures caught in the midst of collapse adapt to their new conditions and the attendant stresses?

This work explores the heart of that question through examination of archaeological assemblages from the end of the Bronze Age and beginning of the Iron Age in the Near East. At a time of great change, this region underwent rapid socio-political fluctuations and unrest. Empires and languages vanished into memory, even as other ideas and cultures rose to dominance in their places. Grappling with this premise of dynamic change, this work seeks to utilize the archaeological record to explore three smaller questions, which inform the central inquiry.

Three Questions

1. Is collapse a measurable phenomenon upon a short-term scale?

In order to measure the immediate impacts of collapse upon populations, there must exist a metric. Without a measuring stick, whether in the form of visible parameters for measurement or a model which promotes discussion of concrete data, the exercise of understanding collapse in terms of months and years rather than decades and centuries remains elusive. To tackle this problem, a model is constructed to facilitate a unified approach that takes into account the varied types of data available from collapse.

2. How can old archaeological collections provide current and relevant data for the scientific researcher?

Due to the availability of collections fitting the criteria for the study, older excavations were chosen for analysis. Not excavated with modern methods, the biases of past researchers and decades needed to be addressed to prevent skewing of the results. Therefore, the model must function in a way to allow the study of both modern and older collections with equal ease. In doing so, the work explores the possible value of these more senior, curated assemblages.

3. What is collapse, and why should we study it?

In answering the previous two questions, this study finally seeks to demonstrate value in the research of collapse itself. By striving to isolate a comprehensive description of the collapse process, the research investigates what exactly the word collapse signifies. In addition, it asks why this phenomenon deserves special study and what value that study brings to the world as a whole.

Scope and Limitations

Before delving into the minutiae of the research, it is important to recognize the scope and limitations of the project. The data come from two sites excavated over 70 years ago, chosen for their relevance to the study; however, the samples are smaller than those ideal for quantitative research in a modern excavation. The circumstances of excavation and

curation limited the amount of material available, and thus the project focuses on what is accessible rather than dwelling on what is ideal.

The study is built around a model of collapse, which was carefully constructed to provide a flexible and descriptive framework for research. With the model as the ultimate reference for the analysis, the project neither measures the etiology of collapse nor makes sweeping statements about all collapses. Instead, it assesses the model's applicability to the sites in question and suggests how similar models can help other researchers. While there is speculation outside of this framework, it serves to supplement the analysis of the model.

Project History

In November, 2009, I applied for a National Science Foundation Graduate Research Fellowship in Archaeology in order to facilitate a graduate career. Part of the application asked for a description of a research project undertaken by the student, and if none existed, the student was to describe a research project that would appeal strongly to their interests.

Having learned about the Bronze Age Collapse in my Aegean Prehistory course the previous spring, I described a complex and highly involved project, seeking to analyze the collapse of the Hittite empire, with emphasis on museum collections and on site survey. When I heard that I

had received the fellowship, I proceeded to plan this project. However, with new regulations on studying in Turkey, I became discouraged of implementing my initial plan within my budget and allotted time. Instead, I modified the project and turned to considerations of various museums around the United States.

Throughout the summer and fall of 2010, I contacted various institutions, looking to discover if any possessed collections that I could analyze for the data I required. Museum after museum produced fruitless results, until I contacted the Oriental Institute at the University of Chicago. Originally inquiring about a series of investigations in the late 20th century from the Amuk Valley in Anatolia, I was attempting to locate modern collections with excellent standards of curation and excavation. However, these collections were still in publication and would not be available for evaluation for many years. Instead, Helen McDonald, my contact at the institute, recommended that I consider two additional sites, excavated in the early 20th century.

These two sites, Tell el Fakhariyah and Alişar Hüyük, were not brought to light with modern excavation techniques. This problem led me to ask how I could study this material without falling prey to extreme collection biases. This question further developed throughout 2011, as I took graduate courses and attended an archaeological field school, all of

which provided me with new perspectives on the collection and curation process.

Selection biases and the nature of the collection process were key questions in the zooarchaeology course I completed in the fall of 2011. The course contained readings and lessons on the statistical analysis of assemblages, which can be skewed by the collection methods employed. With this in mind I developed criteria for analysis of older collections.

At the same time I was still in contact with the Oriental Institute, compiling a list of artifacts for evaluation, while constructing a theoretical model that I could test. The model needed to be easy to understand and to test; however, it would also need to make a meaningful statement about collapse. By January of 2012 the model was complete. In July of the same year, I spent several weeks examining artifacts in Chicago, with assistance from my wife, who acted as my eyes for the project.

Before handling the collections, I expected to find a great deal of fragmentary material with few, if any, strong trends. By the end of the first week, I was already noticing patterns appearing in the fauna, and at the end of our stay, I had found similarly interesting developments in the lithics.

My study of these materials led to a reevaluation on how best to approach the formal analysis. Although qualitative approaches were still

extremely important to my research, the amount of lithics available would allow for basic statistical methods. Economic coursework that I undertook in the Fall of 2012 provoked an interest in regression analysis and my belief that it could benefit the study; however, further research revealed that the data would not support such methods.

This work has gradually gained momentum since that time, leading to its revision in light of new publications and research. However, the core of the project remains: the examination of collapse on a narrow time scale.

Sites and Data

Alişar Hüyük

Extensively excavated in the late 1920s and early 1930s by Erich Schmidt and Hans Henning von der Osten, Alişar Hüyük was a town in highland central Anatolia south of the Hittite capital at Hattusha (modern Bogazköy). The excavators published a multivolume explication of their findings (von der Osten 1937). The site yielded a massive quantity of material from the Copper Age through the Classical period. In 1990, Ronald Gorny wrote his dissertation on the Bronze Age materials at the site (Gorny 1990), and returned there to excavate in the surrounding region in the 1990s (Gorny et al. 1999).

The Bronze Age cultural complex of the area is Hittite, an Indo-European culture dominating Anatolia during the 2nd millennium BCE,

which is designated Neo-Hittite after the Bronze Age collapse, and finally was absorbed by non-Hittite groups such as the Phrygians in the Iron Age. From this period the most significant materials to the study are the animal and human remains, supplemented by objects of personal adornment and small tools.



Figure 1-1 Location of Alişar Hüyük

Tell el Fakhariyah

The second site of interest, Tell el Fakhariyah, is located on the Khabur River in Syria. The excavation of the site has been sporadic, with various research institutions conducting brief seasons over the past century (McEwan et al. 1958; Pruss and Bagdo 2002; Bonatz and Bartlm 2007). The Oriental Institute collection originates from soundings taken by a team in 1940 sponsored by the institution and led by C. W. McEwan (McEwan et al. 1958).

Fakhariyah was a part of the Kingdom of Mitanni, an area variously occupied by the Hittites and the Assyrians throughout the Late Bronze Age after approximately 1500 BCE. The site shows a phase corresponding with the Neo-Assyrian Empire in the Iron Age (ca. 900-600 BCE), and is interesting for both its liminal status on the edge of the Hittite and Assyrian powers and its connection to each. For the purposes of the study, the most significant artifacts from Fakhariyah comprise the lithic tools and blades. Additional materials of interest include objects of adornment, weapons, and tools, but unlike Alişar no unmodified bones were collected from the site.



Figure 1-2 Location of Tell el Fakhariyah

Both sites serve as important elements of the project, but more material was available from Alişar.

Model and Methods

In order to facilitate research consistent with the scope and limitations of the data, a clear model for analysis was created to provide the framework for assessment and discussion. This model posits that forced changes in communities lead to visible alterations in cultural networks and transmission, and result in a period of societal reevaluation and reinvention. As a simple model, these three steps aid in direction of research considerations and provide a framework for considering collapse in a scientific and holistic manner.

The first element of this model, forced changes, stands for any triggers that lead to cultural disruption. Thus famine, war, disease, social, political, and/or economic unrest, and many other conditions could be the impetus behind a collapse event, likely connected as multifaceted processes all leading to the same conclusion. Said disruptions may appear in the archaeological record as alterations to patterns in materials that are short-lived and represent daily life. In examining these disruptions, the project seeks to isolate some of the influences that initially led to any immediate cultural changes.

Ultimately, the society in question likely will reach an equilibrium or new state concurrent with its altered environmental and social conditions. This state is described as reimagination and reinvention of the cultural self

and modes of life, as those elements still important to the society will hold over from before while other elements and practices will address the new situation. Such a state is the arbitrary end point of any collapse in this model, characterized by the development of relative stability through cultural adaptation.

Both qualitative and quantitative analyses are employed to test this model. Initially, artifacts of like kinds are described with qualitative terms and assessed by various criteria to produce descriptive understandings of emerging patterns, after which key metrics are taken to allow for quantitative analysis when appropriate, primarily through basic methods seen in the evaluation of the lithics. This combined approach encourages rich, deep descriptions of trends without either relying upon or neglecting mathematical rigor.

Chapter 1

The Wide-Ranging Meanings of Collapse

“Collapse” is a term with a contentious history, both within and outside the discipline of archaeology. The term is heated in modern discourse, having been shaded with myriad meanings. When talking about “collapse”, as with any heavy weight word, it is important to define what the word does and does not indicate in the discussion. With the potential to spark conflict, why then does collapse still maintain its prominence in historico-archaeological verbiage?

A variety of definitions of collapse have surfaced in historical and archaeological parlance. These have changed over time, but despite their alterations are concerned with describing a deceptively simple set of events: the decline and fall of a society. This range of change is best explored through the history of collapse research.

History of Collapse Theory

The notion of collapse has evoked a popular fixation for centuries. This public interest is intrinsically tied to the history of the subjects of research, whether Greece, Rome, or China. Many of these theories are bound to the disciplines from which they arose, and have strong connections to history, sociology, archaeology, economics, and the natural sciences.

Even if defining collapse is daunting, there are several key characteristics shared across various theories. The very nature of the word is of a dramatic fall, like unto a monumental building, once strong and whole toppling to the ground. This fall indicates a diminution or loss of grandeur. Different theorists might term this as a decline from cultural heights and power, a position characteristic of Social Cycle Theory, or might describe collapse as a simplification rather than any diminishment of culture or art (Tainter 1988, *passim*). The continuing value of the word “collapse” remains with the struggle of scholars to comprehend the mechanism by which what once was is no more. In many ways “collapse” is preferable to other terms, such as “decline” or “fall,” themselves loaded with meaning and subjective assessments of value.

Classical Period to the 18th Century

For many centuries, collapse was seen as part of repeating cycles undergone by every society. Known now as Social Cycle Theory, the body of thought entered into scholarship in the Classical era and was elaborated with growing frequency through the 20th century. One of the earliest appearances of cycles in historiography is in Polybius’s *Histories* (trans. Waterfield 2010). Written at the height of the Hellenistic era with the rising of the dominance of Rome, the five surviving volumes of this work provide keen insights into the events of the 3rd and 2nd centuries BCE

and their historical and political environment (Polybius, trans. Waterfield 2010).

Book VI of *The Histories* is a digression concerned with the rise of Roman dominance in the Mediterranean. This book explores the rationale for Rome's success, wherein Polybius (trans. Waterfield 2010) finds that a balance of differing elements (both popular and aristocratic) in the government provide Rome a degree of protection from the cycles of revolution that plague other states, leading to their decline and inevitable movement towards malignity. This work clearly explicates this theory, and notes that it is circumventable with careful balance. Although this theory was expressed by earlier authors, Polybius's efforts are both clear and synthesize the historiography up to that time.

By the Middle Ages, collapse and social decay was still of great interest. Ibn Khaldun, a 14th century Muslim historian and historiographer, wrote his opus, *The Muqaddimah*, a book on the philosophy of history, in 1377. This work addressed and furthered the concepts of historical cycles and proposed a universal theory of history (Ibn Khaldun, trans. Rosenthal 1967, Passim).

The work describes the phenomenon *asabiyyah*, social cohesion, which the author imagines as an organic force arising through cultural and sociological identification (Ibn Khaldun, trans. Rosenthal 1967). As time

passes, the elites, once close to a society when it is small or tribal, begin to alienate themselves from that society, breeding decay as the bonds of *asabiyyah* break down (Ibn Khaldun, trans. Rosenthal 1967). This theory was expanded upon and utilized to analyze many nations in the subsequent centuries. The most notable of these adaptations of Ibn Khaldun's theories is the work done by Ottoman historians of the 17th century on the rise and fall of their own empire (Lewis 1986).

By the 18th century, works concerning themselves with collapse become more prevalent. Giambattista Vico's *La Scienza Nuova* (ed. Romano 1948) in 1725 dealt with rhetoric and history, and proposed a cyclical model for three stages of history gone through by every society, namely the divine, heroic, and human, each typified by trends and tropes. Vico saw these stages as inevitable, and tied them closely to the rhetorical devices of each age. Although important in the philosophy of history, this work is overshadowed by the other major contribution of the 18th century.

The History of the Decline and Fall of the Roman Empire, published in six volumes between 1776 and 1789, was a massive undertaking and sought to trace the fall of Rome, Eastern and Western, through the conquest of Constantinople in 1453 (Gibbon, ed. Womersley 1994). Seeing the foundation of the Praetorian Guard under Augustus as the initial seed of dissolution, Gibbon (ed. Womersley 1994) proposes a

gradual loss of civic virtue and responsibility of citizens, leading to increased foreign power in the empire, culminating with the final fall. Gibbon describes Christianity as a deleterious influence on Roman virtue, which would lead to his perceived ignorance and dogma of the Dark Ages as opposed to the enlightenment of Rome (Pocock 1976). Although extremely thorough, the terms in which his arguments are placed are ones of weakness, where the health of the state reflects the quality of individual character, a quality which is defined in a subjective manner. Due to the vast criticisms levelled at his work, Gibbon was constantly revising his writings and addressing critics until his death (Gibbon, ed. Womersley 1994). Despite the controversies surrounding certain theses, the work remains hugely influential in historiographic culture (Ostrogorski 1986). This work does not place the fall of Rome as an inevitable point on a continuous cycle; rather, it delves into the causes and effects that brought about this decline, which may explain its persistent esteem.

19th and 20th Century Cycle Theory

Much of the scholarship on social collapse from the 19th and early 20th centuries is concerned with Social Cycle Theory as prominent philosophers, such as Danilewski (1869) and Spengler (1918), predicted the fall of Western civilization after the slow descent from the heights of Rome and Germany. Vilfredo Pareto (trans. Bongiorno and Livingston

1935) was the first sociologist to describe truly modern Social Cycle Theory in his work, *Trattato di Sociologia Generale*. This theory depicts a struggle for social hegemony passing between various elite factions or typologies (namely “lions” and “foxes”), leading to disruptive cycles (Pareto, trans. Bongiorno and Livingston 1935).

In trying to describe much of the highly philosophical foundation of Social Cycle Theory, the question arises of why philosophical rather than causal explanations were sought through so many centuries. Much of the work was based upon observations of current and past societies within the historical framework of the writers' lives. These authors would often employ case studies to explicate their theories, and sought to propound theoretical constructs durable enough to survive application to numerous cases. Polybius writes extensively about the fall of Greek states and the fragmentation of Hellenistic society with reference to earlier polities like Egypt, even as the rising shadow of Rome necessitated explanation. Likewise, ibn Khaldun demonstrates his theories with reference to several historical empires, particularly the vacillations of Persia. Causes are often internal and relate to character traits, such as ibn Khaldun's *asabiyyah*, but this does not diminish the thought-provoking impacts of these works on future research.

More recent research has left the philosophical and turned to population dynamics, agrarian cycles, and mathematical modeling in a quest for theories of causality. By the mid-20th century, trends of defined and measurable cycles began to appear in academic publications, the strongest of which began in the research of European civilizations and early Chinese dynasties (Postan 1973; Usher 1989; Chu and Lee 1994). These patterns were unified only in the 1980s, as research began to demonstrate strong correlations across the cycles of these societies (Usher 1989).

The mathematical approach has provided a look at the cyclical nature of numerous societies (Korotayev et al. 2006). The current models describe a theory wherein agrarian societies face a population growth curve throughout their birth and rise, when resources are abundant, until the society reaches carrying capacity on its lands (Turchin 2005; Weiss 2007). After reaching this apogee, shortages of agricultural resources, often in the form of food, lead to societal strife and a die-off of population, where the curve approaches zero (Turchin 2005; Weiss 2007). Once the curve bottoms out, the society may recover and grow once more. In this model, additional hoarded resources and stores can only slow this decline rather than stopping it (Turchin 2005, Pages). This model is concerned with the agricultural society, and by the nature of its research with

sustainability. It postulates a world where without internal restraint and careful controls upon resource expenditure, all agrarian societies are doomed to failure. The mathematical approach is appealing in the quantitative rigor it can provide to these questions; however, this rigor does not make such an approach inherently superior to qualitative or philosophical examination. Instead, this trend may result from a modern interest in mathematical models and hard data.

Toynbee

A final theorist of note with relation to social cycles is the historian Arnold Toynbee. Writing in the mid-20th century, Toynbee (1960) produced a massive study of 12 volumes, *A Study of History*, putting forth a universal theory of history. Although not entirely in line with Social Cycle Theory, Toynbee expounded upon many ideas that function along similar lines.

Toynbee (1960) states that societies fail from internal factors. Through veneration of the past and previous ways of solving problems, the elite, termed “the creative minority” throughout the text, lose their relevance in reliance on past successes and methods, which leads to dissociation from the problems of the present (Toynbee 1960). Therefore, well established states stifle their internal discourses in favor of tradition and precedent, leading to stagnation and decay.

Pursuing Ecology and Sustainability

A new concentration on the impacts of environmental factors and systems on societies characterizes the current field of collapse research. Authors are attempting to consider holistic approaches to exploring collapse, and are frequently expanding upon past theories of population growth and carrying capacity to focus upon human interaction with the environment as a whole. Homer-Dixon's theory (2007) suggests that societies require a minimum amount of energy consumption to thrive, and will dwindle if such resources are depleted or unavailable. This research is related to sustainability studies and often proposes non-sustainable practices, resource exhaustion, and an inability to cope with natural disasters as common explanations for collapse (Diamond 2006). Some researchers have gone so far as to state that collapses can have a solely environmental, climatic, or ecological cause (e.g., Bradley and Weiss 2001). Many of these theorists seek to demonstrate correlation between crisis events and geological indicators of natural disasters, such as earthquakes, volcanic eruptions, and famines (e.g., Bradley and Weiss 2001; Kaniewski et al. 2013). The correlation of a possible factor in any explanation of collapse in a past society is difficult to show as definitive causality. These arguments are therefore strongest when other explanations lack sufficient evidence, as with Kaniewski et al.'s (2013)

refutation of the Sea Peoples in favor of an environmental cause for the Bronze Age collapse, linking together a long string of data to demonstrate that these peoples did not serve as the initial impetus for collapse.

Recent Reevaluation

In the late 1980s, a trend arose to question the historical concepts of collapse. In 1988, Joseph Tainter released his book, *The Collapse of Complex Civilizations*, which proposed a more flexible theory of collapse after dissecting the then-current schools of thought. At the same time, Yoffee and Cowgill released an edited volume, *The Collapse of Ancient States and Civilizations*, which considered the problem from a variety of angles. Both books helped spark new discussions on the theory of collapse.

Tainter's (1988) book regards previous theories as lacking in flexibility, concluding that many models fall into the trap of grand sweeping generalizations, assuming that past societies were either highly resource greedy, Byzantine complex, or relied solely upon acquisition. These models neither jointly nor separately can explain all instances of historical collapse, and are therefore insufficient models if a universal theory is sought (Tainter 1988). They also rely upon the society to lack restraint in its growth and consumption (Tainter 1988). This criticism neatly covers most theorists who seek to provide a single explanation for all collapses,

such as environmental stress. Tainter (1988) is critical of Social Cycle Theory as well, stating that there are many “mystical” explanations describing social failures as a result of a life cycle or other artificially imposed construct of the researcher.

Tainter (1988) suggests that complex societies are a novel phenomenon within the course of human history, and utilize social complexity (e.g., secondary labor and specialization) as one method of solving problems faced by humans. Energy, in the form of resources, is necessary for the operation of social systems, a requirement which increases with growing complexity. Therefore, as complexity increases and energy costs rise, they will eventually reach a point of diminishing returns on investment. When resource stress leads to a lessening of available energy, the society adapts by decreasing complexity to meet the new constraints, whether it be through loss of writing, communication, trade, or other such cultural systems. This is a collapse when such a change is sudden or dramatic.

Yoffee and Cowgill's volume contained several new ideas in addition to exploring various case studies. Yoffee (1988) states that previously, the detailed, archaeological study of collapse was rare, but recognizes that as a historical investigation, the study extends back to Classical Greece. Other perspectives the book explores include central

stability during invasions (Bronson 1988) and collapse placed in the terms of organizational systems (Kaufman 1988).

A significant article in this work is Eisenstadt's description of collapse as a process of redefining social boundaries and systems, usually through anti-systems and trends developing against the grain of the dominant paradigm. Eisenstadt (1988) describes how changes in a collapse need not be total, but might only effect certain areas of culture as part of adaptations to these changing boundaries. This article predates many of the ideas that Allen and colleagues would further explore in 2001, when applying Systems Theory to understanding social structures, which are otherwise invisible in the archaeological record.

In addition to many theoretical works, more focused treatises appeared around the same time, studying particular regions and periods to ascertain the stages and causes of collapses. Relevant to this work's investigation of the Bronze Age Collapse is Robert Drews' 1993 book, *The End of the Bronze Age: Changes in Warfare and the Catastrophe ca. 1200 B.C.* Drews' text considers the mass destruction of cities and palaces at the end of the 13th century BCE, and postulates the type of violent cultural shifts leading up to the crisis. The essential thesis states that radical changes in military technology and tactics destabilized the chariot-dominated warfare previously monopolized by the palatial elites (Drews

1993). The arguments proposed by this and other books fall into the paradigms of the new scholarship, with a focus on cultural adaptation and concrete stresses on societies spurring these changes.

By the early 21st century, these ideas had spread in the archaeological community. In John Nichols and Glenn Schwartz's jointly edited volume *After Collapse: The Regeneration of Complex Societies*, collapse is frequently described as a process of cultural adaptation rather than as a dramatic and sudden shift (Yoffee 2006). Flexible models are applied to the regeneration of social complexity and, as part of a move away from elitist views of history, there is a strong inclination not to consider collapse as a fall from high society to a dark age (Kolata 2006).

This trend in the research moves towards a nuanced perspective, where collapse is a gradation on a process between complexity and simplicity. Although it is no longer a binary state, either flowering or fallen, these new perspectives allow researchers to map trends and fluctuations. If degrees of disintegration and simplification can be measured, they might become operationalized variables for archaeological research.

Diamond and Response

Jared Diamond, author of the highly successful *Guns, Germs, and Steel: The Fates of Human Societies* (1997), entered the fray with the popular work *Collapse: How Societies Choose to Fail or Succeed* (2005).

This volume reevaluates prominent case studies, and attempts to delve into collapses where the author feels there was a major environmental component.

Diamond identifies several challenges facing past and present societies, and considers the viability and sustainability of societal actions in the face of disaster. The chief cause of collapse in Diamond's case studies is overpopulation relative to the carrying capacity of the ecological system (2005). Diamond is quick to state that the environment is not the sole contributor to the destruction of societies, but his strong focus gives it a high degree of prominence above other factors (Diamond 2005).

Significant for its popular appeal, the book did not go without criticism (McAnany and Yoffee 2010b). Many of Diamond's facts appear to be the result of imprecise or misinformed research, which raises doubt about his examples. Chief among these errors are the misinformation about the current state of Australia's ecology, which is based on political and popular propaganda rather than scientific evidence (Marohasy 2005), and Diamond's assertions about Easter Island, which ignore the effects of colonizers and slavers on the population (Peiser 2005).

In response to the popularity of this publication, Yoffee and McAnany in 2010 released *Questioning Collapse: Human Resilience, Ecological Vulnerability, and the Aftermath of Empire*, an edited volume

critiquing the theories and arguments of Diamond's book (2010a). In this text, Yoffee states that the work was driven by a need to demonstrate that geographic determinism and the decisions of a few leaders were not the key reasons for collapse and challenges Diamond's decision to exclude cultural factors from his analysis. McNeill (2010), a contributor to the anthology, is critical of Diamond's definitions of collapse, as his determinations of which societies succeed or fail often contradict each other and these definitions.

Furthermore, the heavy ecological focus often presupposes a conscious decision, where societies *choose* to succeed or fail, ignoring that those few societies that are ecological successes are frequently born out of fortuitous circumstances and not the decisions of leaders to be sustainable (McNeill 2010). These critiques do not question the importance of seeking sustainable practices or the positive impacts of Diamond's work on public awareness, but rather challenge his work as a viable scholarly source for serious research on the topic (Yoffee and McAnany 2010).

Collapse Theory Today

The current state of collapse theory focuses on scientific and nuanced perspectives. Arising from the philosophy of history and government, mathematical models and population dynamics now

dominate sociological and historical discourse. Environmental science now stands as the prominent avenue for archaeological scholarship. This rise of scientific inquiry is occurring alongside a trend towards seeking causal explanations and striving for nuanced understanding of the mechanisms of the collapse process, its etiology, and its aftermath, typified by the work of Tainter (1988) and Yoffee and Cowgill (1988). The 21st century has also seen the popularization of collapse among non-academic readers (Diamond 2005), where scholars struggle with the impacts of a wider audience (Yoffee and McAnany 2010). However, even as detailed theories develop and more data is gathered, collapse is still a term with a long and storied history, signifying various meanings and continuing to struggle with an unclear identity.

Chapter 2

Background to the Bronze Age Collapse

At the end of the 13th century BCE, a crisis of enormous proportions swept across the Mediterranean and Near Eastern world. Termed the “Bronze Age Collapse” by scholars, this event disrupted cultures from Greece to Iraq and Egypt to Turkey, characterized by dramatic political, economic, and cultural changes (Van de Mieroop 2007). The Bronze Age Collapse is the turning point around which this study revolves, most significantly its impacts upon Anatolia and Syria, the foci of this brief overview.

Prior to the crisis, the Near East was a highly connected network of kingdoms and empires, in which complex relationships between rulers were marked with exchanges of letters and gifts (Van de Mieroop 2007). The implosions of these polities led to a vacuum of trade and exchange and a virtual dark age of several hundred years, lasting from the mid-12th to the 9th centuries BCE (Van de Mieroop 2007). Widespread writing would not return to the Mediterranean world until the early first millennium, with the loss of the Linear B script in Greece and the Hittite script and language in Anatolia, where only Hieroglyphic Luwian maintained any continuity (Dickinson 2007; Hawkins 1986).

Across the span of cultures and nations affected by the collapse, a number of characteristics recur, which hint at the possible causes of the upheaval. These factors include: human agency through migration and violence, climatic disruptions from earthquakes or volcanic activity, and famine and disease (Van de Mieroop 2007). Each explanation addresses certain aspects of the archaeological record, but if considered singly, they fail to correlate with all the available evidence. The extent of this evidence is enormous, spanning numerous regions, with especially strong sources coming out of Egypt and Greece (Van de Mieroop 2010; Dickinson 2007). As the sites pertaining to this research are located in Anatolia and Syria, this chapter will only explore evidence from the dominant empires in those regions, the Hittites and Assyrians, respectively.

The Fall of the Hittite Empire

During the second millennium BCE, the Hittite Empire (Hatti in many period texts) intermittently dominated the Near East along with such other kingdoms as Egypt, Assyria, and Mitanni (Van de Mieroop 2007). Speaking an Indo-European language and adopting the Mesopotamian cuneiform script, the Hittites subjugated and assimilated the peoples of central and eastern Anatolia, notably the Luwians whose script and language would post-date the empire (Collins 2008). Ruled by various kings, the Hittite Empire would clash with Egypt at its height for control of

the Levant at the Battle of Qadesh, marking a touchstone for the history of the Near East and unprecedented scale of chariot warfare (Van de Mieroop 2007). From palace records and documents, there is a partial history of the fall of this once mighty empire, whose control stretched as far as Babylon (Collins 2008).

Rebellion and Civil Unrest

Both internal and external disturbances tore at the Hittite polity at the end of the Bronze Age. The most evident of these internal stresses in inscription and artifacts is the long and brutal struggle between royal lines for inheritance. With the acquisition of the throne by Hattusili III (1267-1237) and the exile of the deposed family in the city of Tarhuntassa, an extensive apology was published, explaining and politicizing the exile (Van de Mieroop 2007). This upset set the stage for the decades to come, where multiple family lines sought to snatch the mantle of Great King (Collins 2008).

As these two lines could define their right to rule from a past Hittite king, one of the deposed family members, Kurunta, broke treaties with Tudhaliya IV (1237-1209), Hattusili's successor, to wage rebellion against his overlords in the 1230s BCE. The remains of the bronze tablet the treaty was inscribed upon have been found ritually buried at the time the treaty was broken (Sagona and Zimansky 2009). Kurunta's uprising failed,

but tensions between the lines continued, illustrating a constant stress upon the last Great Kings of the Hittite Empire. Among the final inscriptions of the late empire is a proclamation of the year's work by Suppiluliuma II (1207-1178), last known Great King of a unified Hittite Empire. This inscription tells the dramatic story of rebellions crushed yet again, including the city of Tarhuntassa once more recaptured (Wouldhuizen 2004). An official who swore fealty to Suppiluliuma II was obliged also to swear not to follow any other claiming descent from past Hittite kings (Bryce 2005).

It is impossible at this time to determine whether these internal struggles precipitated the empire's eventual collapse, or if they were symptoms of already growing unrest. Eisenstadt (1988) discusses how anti-systems can appear, striving to overcome the dominant hegemony, often led by competing elites. This conflict is a clear example of these anti-systems, with the dissidence at Tarhuntassa acting as a counterpoint to the capital at Hatusa. Whether late leaders, such as Suppiluliuma II, could have reversed the fall to come is pure speculation, but the competition between governmental systems would impact the lives of citizens (Coffman 1988). It is the opinion of more recent scholars that these internal problems were at the heart of Hittite dissolution and only exacerbated by external stresses (Genz 2013).

Political stresses manifest themselves in the disappearance of cultural apparatuses exclusive to Hittite elites. The loss of the cuneiform script, utilized in the empire to write the Hittite language, is often cited as a sign of an Anatolian Dark Age (Collins 2008). There is a continuation of Hieroglyphic Luwian, used by the Hittites for inscriptions and seals into the Syro-Hittite kingdoms (Hawkins 1986). Luwian, a language of the common people in Hittite times, took the place of Hittite for economic transactions (Hawkins 1987). The only other place Hittite appears is in the diplomatic correspondence of the kingdom of Arzawa with Egypt, which ended near the same time (Hoffner 2009). Correlating with Hittite collapse, this change marks the abandonment of a language, and suggests that the cultural milieu in which it resided was permanently altered.

Natural Disasters

In the midst of this grappling for the throne, natural disasters appear to have struck the foundering empire. In Hittite Anatolia, a grain shortage led to a matter of “life and death” that required a request of grain from Ugarit, a client state in Syria (Bryce 2005). Unfortunately, the identity of the Hittite ruler in this request is unknown, although it appears to date to the 1190s (Bryce 2005). This disturbance may have led the population to migrate into Syria and rural Anatolia, as an analysis of archaeological evidence at sites like Hattusa shows gradual abandonment (Collins 2008).

Rural archaeology in Hittite Anatolia is relatively unexplored when compared with the archaeology of cities, and therefore the nature of these abandonments and the quality of rural life is still uncertain. New projects, such as the Yalburt Yaylasi project on landscape archaeology (Harmansah and Johnson 2013) and the Paphlagonia regional survey of Glatz and Matthews (2009), have begun to change this situation.

Furthermore, Frank and Thompson (2005) describe natural economic cycles, typified as “long phases” of expansion and contraction, in the third and second millennia Near East, with explanations that with rising complexity the fragile societies became more vulnerable to stresses. Climate is a possible culprit for these contractions (Weiss et al. 1993). Criticisms of Weiss’s research suggest that climate is merely one factor and not the entire cause (Abate 1994). Some scientists declare that climate was the sole cause of Bronze Age declines in society, citing analyses of ice cores that indicate volcanic activity and are often interpreted as proxies for environmental collapse (Bradley and Weiss 2001). Volcanic eruptions and activity appear in ice cores dating to the 1190s; however, these markers are too late to be the cause for collapse and are perhaps best regarded as events that exacerbated problems for already flagging Bronze Age nations (Betancourt 2000). Fallen walls and other site damages, sometimes associated with tectonic activity, do not

show the regularity and patterns expected of earthquakes (Van de Mierop 2007).

New evidence is still emerging about both climatic conditions and natural disasters. In 2013, a study by Finkelstein and colleagues demonstrated low pollen levels in the Levant, associated with extreme drought, which appears to corroborate readings of contemporary written sources. Likewise, investigations in Crete suggest that localized earthquakes damaged sites in the 13th and 12th centuries BCE, but the authors contend that only a few sites suffered initial destruction from these disasters (Jusseret et al. 2013). The highly localized activity described within this study demonstrates clear tectonic activity but suggests that this was not widespread enough to serve as a cataclysmic disaster for all of Crete, even less sites on the mainland (Jusseret et al. 2013).

Warfare and Invasion

Raiders and invaders are often named as causes for the Bronze Age Collapse, specifically the so-called Sea Peoples referred to in Egyptian records (Van de Mierop 2010). Certainly other polities fell to raiders, including numerous Hittite vassals and allies, numbering among them Ugarit, the empire's main supplier of grain (Van de Mierop 2007). Drews (1993) believes these Sea Peoples utilized longer swords, javelins and improved weapons to overwhelm the great empires, suggesting that a

revolution in military technology made obsolete the chariot-dominated warfare of the Bronze Age elites. But these weapon forms and technologies had already begun before the collapse, developing in the Aegean, and thus were likely not the cause (Betancourt 2000). An Aegean connection appears in possible tensions between the Hittites and the Mycenaeans and Ahhiyawa, a settlement associated with Mycenaean influence (Bryce 2003).

In the 1200s through the 1190s, there was an increase of Hittite military activity on the western fronts and active efforts to secure imperial boundaries (Yakar 1976). A line of destruction lies across Anatolia, to the east of which there is little evidence of burning and urban destruction (Güterbock 1992). Certainly there is archaeological evidence for a degree of violence or other patterned devastation which led to the creation of an east-west boundary and concerned the polity with the defense of the western front. Further evidence for deliberate damages to sites can be seen in a leveling of the citadel at Hattusa and selective areas, namely the religious temples where massive jars stored grains and supplies (Sagona and Zimansky 2009). Patterns of destruction emphasizing the demolition of temple and palatial complexes are easily visible in Hittite warfare, with the same occurring in the town of Alalakh when it fell to the Hittites in the 14th century (Woolley 1956); thus such selective destruction is not without

precedent. Further evidence of war appears in letters found in the ruins of Ugarit. A letter from the last king of Ugarit notes that all his troops were in Hatti, the name by which the empire was called, leaving his city undefended to raiders from the sea (Bryce 2005).

If invaders did contribute to the Hittite collapse, the question remains as to who these invaders were. The empire had several historical enemies. While the Mycenaeans may have had their part if identified as Ahhiyawa, another likely foe is the Kaska people, numerous tribes living north of the Anatolian highlands. Wars with the Kaska were common, and before claiming the throne Hattusili III re-captured Hattusa, the capital, from these raiders (Glatz and Matthews 2005). The fortifications and settlements along the Kaska border decrease with the end of the Hittite empire, implying a breakdown along the boundary (Matthews 2009). Whether this factor was the cause or result of Hittite collapse is conjectural, but with a history of border problems and violence, this breakdown has significance. Some archaeologists now agree that the Kaska peoples were responsible for the final conflagrations in Hattusa some 30 years after its initial abandonment (Collins 2008). By the twelfth century the peoples later known as the Phrygians had migrated into Anatolia, further displacing or absorbing native populations (Henrickson and Voigt 2000).

Other scholars blame the Sea Peoples, a loose amalgamation of raiders known simply by ethnonyms, but possibly including the Greeks and Philistines among their number (Bryce 2005). Current research on the archaeology of the Sea Peoples is concentrated primarily upon the Philistines in the Levant, with only one site not showing Philistine culture (Killebrew and Lehmann 2013). The spread of these peoples is often documented by following the spread of Late Helladic pottery into the Near East. There is a strong belief among many archaeologists that the Aegean forms were brought by the invaders; however, this long held position has now begun to come into question (Niesiolowski-Spano 2012). Recent scholarship demonstrates that it may be premature to identify peoples only through elements of material culture, such as pottery types, which only makes the situation more complex (Niesiolowski-Spano 2012). These peoples may have attacked the Hittites in Anatolia, but current scholarship suggests that internal problems rather than attacks from without were the more likely cause of the final destructions (Genz 2013).

Aftermath and Continuity

With the last vestiges of the Hittite Empire crumbling away, Syro-Hittite states rose and flourished, as did various kingdoms in Turkey and Syria with cultural connections to the previous empire (Van de Mieroop 2007). New cultures, whether native or migrant, integrated and merged

with the essentially Anatolian elements, notably an Aramean influence in Syria (Collins 2008). Even as single states rather than polities following the command of an imperial center, these kingdoms appear to have possessed a shared culture. During the Hittite Empire, local traditions were brought to the capital for integration and unification, as can be seen in the appropriation of regional deities into the state cult (Gorny 1995b). Following the dissolution of the empire, the various states copied and mimicked the cultural center at Carchemish in religion and art (Collins 2008).

These Syro-Hittite rulers had Anatolian names evoking an Indo-European ancestry (Hawkins 1979). In fact many of these names are adaptations of the names adopted by Hittite monarchs (Bryce 2005). The title of Great King was utilized in inscriptions and adopted in the area of Carchemish, which had been governed by viceroys with genealogical links to the Hittite royal family (Hawkins 1988). Even certain toponyms in Assyrian records, especially Carchemish and the adjacent territory of Malatya, harkened back to the empire (Güterbock 1992). This final legitimization by other powers implies that the ties to Hatti were important to contemporary nations.

Cultural continuity appears in religious traditions that maintain similarities from the Hittite to the Syro-Hittite period. Sources are difficult to

locate and are primarily archaeological. Burial of sacred statuary was a practice for over 500 years in the Syro-Hittite kingdoms, including interment of the gate lions (themselves a continuation of Hittite iconography) and statues of deities and kings after the fall of a city or at its resettlement (Ussishkin 1970). So called “Hollows and cup-marks”, divots, possibly for poured offerings, are found on Hittite and Syro-Hittite statues, especially gate lions, and civic monuments (Ussishkin 1975). At the sanctuary of ‘Ain Dara, Hittite statuary and art appears in a Levantine tripartite temple, blending cultures into something that is uniquely Syro-Hittite (Zimansky 2002). With more regularity, the Hittite storm god was worshipped along with Kubaba, the city deity of Carchemish, in multiple polities, reinforcing Carchemish’s cultural dominance and its connection to the memory of the old empire (Hawkins 1981).

A major change from the Bronze Age to the Early Iron Age was an essential economic shift. Craftsmanship moved from the palace economy to the workshop, presenting numerous grades of wares for public works, indicating economic competition between these personal or family enterprises (Winter 1979). Craftsmen appear to have had a greater mobility in the early Iron Age than the Bronze Age, as palace loyalties changed and the economy transitioned to a less centralized, more

distributive, structure. Such mobility has been analyzed from passages in Homer's *Odyssey* among other sources (Zaccagnini 1983).

Assyria Through Crisis

In contrast to the dissolution of Hittite power, the Assyrian Empire maintained continuity throughout the Mesopotamian Dark Age (Kertai 2008-2009). This continuity was not total, as the empire had to make adjustments to its operations to meet new pressures, but societies are never truly changeless (Kertai 2008-2009). The Assyrian language is a dialect of Akkadian, and the empire shared in the rich linguistic and cultural heritage of Mesopotamia (Van de Mieroop 2007). Excavation of sites that revealed much about Assyria at the time of the Bronze Age Collapse was scarce until the early 21st century, but scholars have begun to fill in the gaps (Kertai 2008-2009).

From the capital of Aššur located in modern-day Iraq, the Middle Assyrian Empire had stretched out at the end of the Bronze Age, threatening Hittite, Egyptian, and Babylonian interests throughout Mesopotamia and the Levant (Van de Mieroop 2007). In the 13th century BCE, Assyria conquered Mitanni, an empire of Indo-Aryan speaking elites controlling a population of Hurrians, a people with a Hurro-Urartian language not connected to modern tongues (Van de Mieroop 2007). This expansion drove the Assyrian frontier past northern Syria, creating a

border beyond which it would have nominal but little actual control throughout the Mesopotamian Dark Age of 1200-900 BCE (Kertai 2008-2009).

Royal infighting weakened Assyria from the end of the 13th century BCE, with the death of Tukulti-Ninurta I (1244-1207) , who was deposed and slain by his sons (Van de Mieroop 2007). Continued strife and civil war would sporadically appear throughout the 12th century (Van de Mieroop 2007). The reign of Ashur-bel-kala (1073-1056) saw further civil war and the loss of territories in Mesopotamia and Syria to the Arameans and other peoples, while the Assyrians fought amongst themselves (Van de Mieroop 2007).

Even as Assyria faced intermittent internal upheaval, the cultural makeup of its neighbors shifted dramatically, with the migration of Arameans, Indo-Europeans, and other peoples (Van de Mieroop 2007). Frequently Assyrian rulers would lead campaigns into other parts of Mesopotamia and Anatolia to quell these peoples, but after 1056 the borders began to significantly shrink (Van de Mieroop 2007). Only in the 10th century would Assyria begin to turn around its ill fortunes, laying the groundwork for the Neoassyrian Empire to follow (Van de Mieroop/ 2007). Despite this dire image of civil conflict and damaged borders, Assyria remained the most powerful kingdom in Mesopotamia throughout the

period and maintained its autonomy by redefining its relationships with polities at its border (Kertai 2008-2009). This adaptability and reinvention of political and military strategies may have provided Assyria with the resilience that Hatti lacked.

Syria beyond Assyrian Power

The rest of Syria suffered the fallout of collapse outside of the Assyrian aegis. This was not as dramatic as where Philistine influence settled in the Levant. By monitoring the spread of Aegeanizing pottery either imported or manufactured domestically, archaeologists can track foreign influences. Lehmann (2013) describes how northern Syrian, Aegean-style pottery is domestic and shows signs of imitation, while that closer to Lebanon is more reflective of the settlement of Sea People migrants. Later waves of Arameans and other ethnic Groups would reshape the cultural landscape of Syria in the absence of Assyrian hegemony (Van de Mieroop 2007).

Parallels with other Eras and Regions

Several parallels with the Bronze Age Collapse occur in archaeological contexts both within and outside the Near East. These can give other perspectives on collapse and the regeneration of societies. Indeed, Mesopotamia, Anatolia, and the Aegean all suffered widespread destructions toward the end of the Early Bronze Age, which would

presage the Bronze Age Collapse by more than a millennium (Van de Mieroop 2007).

Throughout the Bronze Age, the Near East experienced other, less-extreme collapse events. Similar collapses have significantly occurred in the Levant (Miroschedji 2009) and Mesopotamia (Weiss et al. 1993). Within southern Mesopotamia, the fragmentation of a larger, Akkadian state in the 22nd century BCE shares similarities to the later and much vaster Bronze Age Collapse, with a rapid decline of polities in the region (Weiss et al. 1993). In this case, there is strong evidence for a climatic shift, where growing aridity led to loss of farmland, thereby increasing societal stress (Weiss et al. 1993).

Classic Maya

A discussion of the archaeology of collapse would not be complete without mention of the collapse of the Classic Maya centers of the south and central Yucatan in the first millennium CE, accompanied by dramatic changes in the architecture and art of the north (Andrews 1973). This series of events has had a tremendous impact on the archaeology of collapse and has produced many valuable methods and theories. There is no great consensus of this research, and even a debate of whether the Terminal Period (ca. 800-900 CE) should be seen as a collapse (Aimers 2007).

Throughout decades of research, nearly 100 different explanations have appeared (Gill 2000). Prominent among these are several typified by climate change (Medina-Elizalde and Rohling 2012) and invasion (Peissel 1989; Braswell 2003). Nevertheless, both groups of explanations currently lack the evidence to neatly explain all the changes seen in the 9th century CE (Webster 2002). Although many trends, such as ecological vulnerability and causal research appear in the case of the Classic Maya Collapse, the region has proven a fertile ground for innovation of ideas with the vast quantity of theories and approaches utilized for their investigation (Gill 2000). This brief commentary cannot fully explicate the range of scholarship upon this topic, but collapse theory owes a debt to research on the Classic Maya. The archaeology of collapse is frequently a comparative exercise, and insights are often drawn from differing societies, even as patterns and theories are tested across time and distance.

Research on Classic Mayan collapse demonstrates many of the problems seen in the Bronze Age Collapse. Despite years of diligent research and a glut of articles, consensus is unlikely to be reached in the near future. Many of the same explanations arise, including climate, natural disasters, famine, and warfare. These commonalities underscore that collapse is a complex matter, not easily explained, unlikely to be

attributed to a single cause, and that evidence is interpretable within a variety of theoretical frameworks.

Research Focus of This Work

Alişar Hüyük and Tell el Fakhariya are the two sites which provide material for this study. Each site has a long history of research dating from the early 20th century. Both provide unique insights about the period of collapse, and provide evidence of occupation from the end of the Late Bronze Age into the Early Iron Age. The sites were chosen for their unique histories and the accessibility of their collections in the United States. All of the materials examined for this study are housed at the Oriental Institute of the University of Chicago.

Alişar Hüyük

The site of Alişar Hüyük was established during the Chalcolithic period in Anatolia and continued into the Ottoman era. The length of occupation is only one reason for the value of this site to modern scholars. Initial habitation may be of the indigenous, Hattic peoples, who were eclipsed by Old Assyrian trading colonies in the early second millennium BCE (Von der Osten 1937d). The early second millennium contains tablets and items from the Assyrian trading colonies, before Hittite hegemony dominates the site with clear strata for the Old and New Kingdoms (Von der Osten 1937d). After the Hittite collapse there is a

stratum with Phrygian pottery and other artifacts, but the stratigraphy is mixed throughout the Iron Age (Von der Osten 1937d).

Excavation of Alişar began as part of a massive project by the Oriental Institute to research the Hittite period in Anatolia. The site was chosen for excavations because it had not previously been disturbed archaeologically (Von der Osten 1937d). Research began in 1926 and lasted through 1932. The excavations are significant to Anatolian studies, as Alişar was one of the first Hittite sites dug in a systematic, scientific manner (Genz and Mielke 2011). The project was remarkable for its time in the widespread collection of faunal remains (Patterson 1937). The breadth of material from this expedition produced eight volumes of catalogs and analyses (Von der Osten 1929; Von der Osten and Schmidt 1930; Von der Osten and Schmidt 1932; Schmidt 1932; Schmidt and Krogman 1933; Von der Osten 1937a; Von der Osten 1937b; Von der Osten 1937c), as well as a volume of inscriptions from the site and its vicinity (Gelb 1935).

After this extensive field research, the material remained untouched until Ronald Gorny analyzed the artifacts from the Bronze Age for his 1990 dissertation, subsequently summarized in an article (1995a). He would later lead expeditions in the region (Gorny 1994), but his project would quickly turn from a focus upon Alişar to a neighboring site, Cadir Hüyük

(Gorny et al. 1999). Much of the later research concentrates on whether Alişar is the famous city of Ankuwa, a secondary capital of the Hittites of particular military importance, a task made difficult by the problematic stratigraphy of the Late Bronze Age (Genz and Mielke 2011). This possibility arises out of the mention of Ankuwa in documents excavated from the Hittite levels at the site (Von der Osten 1937d).

Tell el Fakhariya

Like Alişar Hüyük, Tell el Fakhariya (more recently rendered in the archaeological literature as Tell Fekheriye) has a long and storied history. Initially settled in the Prepottery Neolithic, the site saw occupation through the Islamic Conquest in 634-638 CE (Bartl and Bonatz 2008). Located at the head of the Khabur, an important tributary of the Euphrates River, Fakhariya is the largest site in a highly fertile region of Syria (McEwan et al. 1958). Consisting of two mounds, the smaller being the higher and older, the excavation at Fakhariya has been infrequent but revealing. Unlike Alişar Hüyük, the political environment of Syria has strongly affected when and by whom it was excavated. The site is identified with the Mitanni Empire of the 15th century BCE, with clear Middle and Neoassyrian layers (Bartl and Bonatz 2008). Associated with Washikani, the Mitannian capital, the city held prominence throughout the Hellenistic and Roman periods (Bartl and Bonatz 2008).

During the first decades of the 20th century, Max von Oppenheim, a German archaeologist and adventurer, was excavating the nearby site of Tell Halaf when he began to note the geographic importance of Tell el Fakhariya. In order to assess the site, he authorized mapping and survey, but never commenced excavation (Oppenheim 1931). His brief exploration suggested that this was a Mitanni site, which Oppenheim associated with Washikani (Gossman 2013). Oppenheim's German nationality and politics lost him the excavation rights in 1939, which were then acquired by McEwan of the University of Chicago, who began taking soundings before losing his own permits as a result of the changing political attitudes towards American academics in mid-20th century Syria (Magee 2012).

McEwan's soundings were thorough if limited, revealing burials, a circuit wall, and strata of the Mitanni and Assyrian periods (McEwan et al. 1958). His early death necessitated completion of the single volume of publication by a host of other contributors and specialists (McEwan et al. 1958). By this time, additional soundings were taken by Moortgat (1956; 1957), enlarging McEwan's trenches and verifying the ease with which the Mitannian layers could be reached. Later construction projects revealed statues from the Neoassyrian and Roman periods, underscoring the power and significance of the site throughout its history (Bartl and Bonatz 2008). The Neoassyrian statue bears an inscription important for early

Aramaic studies (Zadok 1982). In 2001 Pruss and Bagdo verified the stratigraphy and examined the Late Antique layers but only for a year.

The most recent excavations were carried out by Bartl and Bonatz, with a survey in 2005 and excavations starting in 2006 (Bartl and Bonatz 2008). This research has provided the only systematic excavations lasting several years, but the material is still in publication (Bonatz 2013). These most recent expeditions are intended to clarify the site's history with an attention to detail lacking in prior work (Bonatz 2013).

Chapter 3

Model and Methods

For the purposes of this study, a model of the collapse process serves as a theoretical framework. In constructing such a paradigm, it is necessary to consider both the limitations of and questions central to the study. Without being tailored to the available archaeological record, this model will lack utility. The model at the heart of this project was built around several questions and their attendant assumptions.

Central Questions

1. Is collapse a measurable phenomenon upon a short-term scale?

If collapse is to remain an important focus of archaeological research, macroscopic and microscopic methods are necessary to provide myriad perspectives on the phenomenon. This question asks if there are a set of methods which can provide a short term and intensive approach to the study of collapse. The model will, therefore, need to suggest how short-term changes might appear in the archaeological record in the context of rapid social change. To have broad applicability, the model will need to consider collapse as a general phenomenon rather than from a particular etiology, such as war or environmental disaster.

2. How can old archaeological collections provide current and relevant data for the scientific researcher?

The data at hand were excavated and catalogued decades ago, before the development of modern excavation and curation techniques. This question recognizes this fact and requires the methods compatible with the model to take into account the limitations of the data. The assumption implicit in the question is that all data are valuable within the bounds of its limitations. By recognizing inherent biases of the data set, the researcher can tailor methods that take into account those idiosyncrasies.

3. What is collapse, and why should we study it?

In answering the previous two questions, this study finally seeks to demonstrate value in the research of collapse itself. . The research postulates that value exists as a result of the significance of the phenomenon to the lives of individuals and its vast impact on the societies under study. Deeper understanding can have implications for comprehending past civilizations and understanding the development of present societies.

Limitations

The prime challenge with this project is the nature of the data. The collections have suffered continual attrition from the moment of

excavation. Even before archaeological investigation, the vicissitudes of time and site formation processes create biases in the material record, such that some artifacts survive better than others. The excavators deliberately chose which artifacts to keep and which to discard based upon their assessment of what is valuable. This creates assemblages with biases already built in when they arrive at museums or on the desks of conservators. The archaeological record is inherently fragmentary. Ever-evolving excavation techniques help mitigate the innate biases of any particular collection; however, it would prove presumptuous to declare an assemblage foolproof with the application of a new method.

During the excavations of Alişar Hüyük and Tell el Fakhariyah, not all artifacts were brought back to the United States, with many remaining in the country of discovery. Furthermore, the time in curation leads to further damage. Even as conservators and curators seek to protect collections, artifacts age and are lost. As an example, the majority of canid and equid remains from Alişar Hüyük for the period being studied disappeared between the time of their publication in 1937 and the project in 2012. Despite the diligence of museum workers, losses occur and collections do not remain static.

Cost and time are secondary limitations to the project as a whole. Budgetary restrictions prevented the research from benefitting from

methods requiring significant expense or extensive field research. These methods might provide clearer or more detailed data. In order to adapt to these concerns, the model should function with simple methods that are available with little to no cost by relying on simple statements that can be evaluated through a variety of methods.

This suggests that the ideal model is flexible even when allowing for specificity. A model that is too loose might not provide a solid enough framework to work within, while one which is overly specific might likewise stifle customization of approaches to meet the needs of particular collections. This model is designed with these limitations in mind and attempts to answer the central questions of the study through three simple steps.

Outline of Model

The three phases of the model consist of disruption, response, and reinvention. This is deceptively simple but contains the potential for deep inquiries. The model is designed to provide a framework for imagining the liminality of collapses. Rather than looking at the events from their origins or their fallouts, asking why or where to, the model asks how, seeking to grasp the fundamental mechanism of change. Without change, an event, no matter how dramatic, is not a collapse, as the word implies societal diminuation. Sites with strata straddling the period when society is

collapsing provide glimpses of this liminal phase and allow researchers to look at the transition itself.

Disruption results from forced changes to a society. All the various factors that may lead to such an event are significant for their potential to impact a society in a way that disrupts routine. Famines and droughts lead to food shortages, diseases to upset living conditions and rising mortality rates, and invasions strain populations through loss of resources, land, and lives. These factors will encourage stresses to propagate throughout affected societies. Through the constriction of resources, damage to cultural networks, or by posing immediate threats to life and limb, disruptions upset daily activity.

Such an event may not appear in the archaeological record, as the history of collapse theory should demonstrate. Whether or not the cause is readily evident, forced changes should present themselves. Trade connections break down, and valuable materials gain increased rarity. The model works upon the assumption that these forced changes must occur in order for the unfolding events to qualify as a collapse. If it lacks this significance, the implication of gravity of the term comes into question.

People in a collapsing society make decisions that respond to forced changes within the bounds of their agency. This agency consists of the pallet of actions from which they may choose to react to the disruption

event. These decisions can be expected to influence the archaeological record through the remains of daily life.

Shadows of lives appear in materials used to adapt to changing circumstances. When resource availability shifts those items with the shortest lifespans should be expected to show the first signs of changing. Rather than studying monumental architecture or city planning, small items, used daily and swiftly discarded, are the archaeological currency of rapid change. In a sense, as long as it is impacted by the disruption, an item consumed soon after its creation will serve as a better indicator of short time periods than one which only shows the passing of decades. Researchers should predict alterations in the production and use of these items as lifeways change to meet the evolving circumstances of the collapse.

Reinvention and reimagination is the last stage, where material culture evens out into a new form. Since cultures are always undergoing some sort of change, this stage does not represent stagnancy. It represents a new stability at the close of the liminal phase. The terms reimagination and reinvention are particularly apt to this phase. Societies will keep those lifeways that are valuable to them, remembering the past or time before the disruption, but with key elements incorporated through

the periods of adaptation. The presence of the third stage is not divorced from the past of the first and exists in the context of that former time.

Among the implications of this model is that consumables of society are tied intimately to daily life. Food, tools, and clothing, all essential to the human condition, should serve as the key indicators of societal change on the individual level. Likewise, the lives and decisions of individuals serve as the building blocks of cultural transformations, the proverbial sands in the hourglass of civilization.

Methods

The collections from Alişar Hüyük and Tell el Fakhariyah have innate particularities, which the methods need to address. Without such consideration, these could bias the research and call into question the validity of the project as a whole. The most significant factors arise from collection and curation practices from excavation to museum storage and preservation, discussed previously.

Methods should consider these biases and adjust for them accordingly. Relevant data are those that are readily available, can demonstrate change, and are applicable to samples of varying sizes. This adjusts for the attrition of the collections that has occurred due to their conditions of excavation and curation. In terms of methodological choice, a mixed qualitative and quantitative approach is desirable. Qualitative

techniques provide detailed information on individual artifacts, which is synthesized with quantitative analysis of larger sample sizes. Working as a sliding scale, these two approaches permit a synthesis that can address the particularities of the collections.

Qualitative approaches have the advantage of being tailored to each artifact. Through intensity and careful documentation, descriptions of artifacts reveal unique characteristics and minute details about items and their users. The qualitative approach is time consuming and does not reveal the extent and significance of wide-spread trends.

Quantitative approaches look at macro-level factors, which extend throughout an assemblage. By recording indicators of certain important characteristics, quantitative analysis reveals trends in the data, potentially showing correlation and statistical significance. The shortcomings of these methods include susceptibility to mathematical constraints, especially those arising from small sample sizes, and the possibility of overlooking unique details that are not within the parameters of the methods.

Overview of Synthesized Methods

In approaching the assemblages from Alişar Hüyük and Tell el Fakhariyah, a sliding scale from qualitative to quantitative was employed. Each piece underwent inspection, with a basic description taken along with pictures and video. If the artifact showed notable or unique qualities,

a detailed description was written alongside further photography. Along with the qualitative indicators, key metrics (such as dental age of animals and dimensions of spear points) were recorded. These were drawn both from common standards in the field, as well as occurring details discovered in the qualitative phase. In this way, quantitative assessments were possible for large enough samples.

After collection, the data were recorded in spreadsheets using Microsoft Excel. Additional qualitative analysis was performed through mapping and diagramming of observations, similar to the affinity diagrams developed by Jiro Kawakita (Kawakita 1967). The Kawakita method (1967) is a qualitative analysis technique wherein observations are sorted into categories and subcategories, which are placed into a visual map according to their affinities, in order to organize qualitative data sets.

On Methods and Data

The data are the foundations upon which the framework of theory is raised. They are the direct link to the past, and therefore are the very heart of the study. Lacking complete knowledge about the past, the project must interface with the partial record in a way that provides maximal opportunity to answer pertinent questions. In selecting where and how this interface will occur, the researcher determines what data to gather from which fragments of the archaeological record.

The three-stage model sets forth a rough framework of how people in societies will react to collapse and predicts the probable indicators of those reactions. The model, therefore, provides an outline for the kinds of data that are relevant. Data suited to the three stages are those central to daily life, including objects central to survival, such as food, tools, and raiment.

Human and animal remains show signs of the conditions of their lives and their state at death. Human remains give an intimate glimpse into the quality of life of individuals. Animal remains demonstrate the health of food, draught, and companion animals as well as their age at death. Tools and objects of adornment were objects with daily importance to people of the time. Tools and weapons reveal use patterns, manufacturing techniques, and resource availability. Objects of adornment expose how people presented themselves as well as manufacturing methods and available materials.

The methods should complement the available data and present them in as honest a way as possible. The synthesized approach attempts to create a system for all types of data relevant to the model without exacerbating biases or overlooking details. Staying true to the data is key to this approach. Each kind has its own story to tell regarding how uses were altered. This aids in clarity and avoiding misrepresentation.

Chapter 4

Human and Animal Remains

Among the many objects brought to the Oriental Institute of the University of Chicago by the excavators at Alişar Hüyük, the faunal and human remains are important to this study for their direct information about the local population and the animals they husbanded. There are no equivalent remains from Tell el Fakhariyah stored at the Oriental Institute, making this category of data a glimpse into only one of the two sites. The material was published in overview, with summary treatment appearing in the final volume on Alişar Hüyük. Krogman (1937) provided an analysis of the human craniotypes with reference to racial typologies, and Patterson (1937) gave a brief discussion of faunal presence and absence through each phase of the site.

Human remains provide a glimpse at individual lives, impacted by the conditions of living. Likewise, fauna show how domesticates were raised, killed, and consumed. Throughout this assemblage, deliberate modification by humans is rare, visible on only two specimens. Bone tools and objects of adornment are not included in the analysis below, but will be considered in subsequent chapters.

This skeletal material suffers from certain deficiencies, which make the application of the three-step model difficult. The data are highly

fragmentary, with a predominance of mandibles and maxilla in the assemblage. This is a result of selection and curation biases, where material was lost over time. As an example, more canid and equid remains were brought to Chicago, but disappeared after their analyses, not appearing in the museum's archives for some years despite assiduous efforts to locate them.

Periodization was problematic with respect to this assemblage. Much of the material was identified only within a broad period or range of periods, such as Hittite or Middle / Late Bronze Age. This does not allow for the desired focus on short timespans for the model. Those bones not assignable to the Hittite, Post-Hittite or Phrygian periods were not included in the final analysis in order to narrow the applicable periods as much as possible. Even though they do not allow for pinpoint accuracy, they might provide hints about changes over time, which analysis of better defined strata might refine.

Human Crania

Among the material applicable to the study are two human crania and two human skulls. These specimens do not form a representative sample as they span several centuries. They do provide hints at possible trends in population health through the assessment of unique individuals. Since cranial calipers were not available to me, my analysis focused on

qualitative indicators of sex and health. There were several curatorial modifications to the skulls, with mandibles, when present, wired on, and other reconstructive processes. The age groups and sexes given for the specimens below are taken from their listings in the museum catalogue.

The oldest of the crania, specimen A17639, was the most complete, with a provenience from a burial dated to the Late Bronze Age. As no crania identified as Hittite were available, A17639 was used as the sample with which to compare the three Post-Hittite crania. With robust processes and of a comparatively large size, A17639 showed remarkable dental health, with all four third molars in occlusion, only one having been lost post-mortem. The teeth were almost entirely free of calculus or other signs of poor oral hygiene, although the teeth may have been cleaned in conservation. Overall, A17639 demonstrated a relative high quality of life.



Figure 4-1 A17639



Figure 4-2 Dental arcade of A17639

The other three specimens were less complete, with taphonomic processes apparently having worn away at the bone. All three were recovered from Post-Hittite layers, and none was identified as associated with a defined burial. The single adult skull from this sample, A7580, was found outside room 1314, rather than with any funerary context. The other

skull is believed to belong to a male (A7581) and the cranium to a female (A7575) adolescent. Only A7575 had dentition present, with pitting in the pre-molars and molars as well as ante- and post-mortem enamel damage.

Although identifying ethnicity is difficult, the nasals of A7580 showed a high, triangular nose and those of A7575 were more tent-like in form, suggesting of different ancestry. Such a possibility is attractive but lacks sufficient evidence from a sample of four specimens. Likewise, A7581 and A7580 shared a similar non-metric trait of deep, parallel lines on the frontals superior to the temporal lines. A7575 also possessed the hint of a palatine torus on the partial palate. This feature is associated with Anatolian populations, increasing in frequency from ancient times (Eroglu 2008).



Figure 4-3 A7575



Figure 4-4 A7581, arrows pointing at parallel lines



Figure 4-5 A7580, arrows pointing at parallel lines

These observations remain highly tentative, due to the small sample size. If there is indeed some sort of population change taking place in the Post-Hittite period, it may coincide with the transition to Phrygian culture that occurred shortly after the Hittite collapse.

Faunal Remains

A variety of taxa was represented at Alişar Hüyük, and suggests a diversified, if scant, collection of species. The majority of the material comprised mandibles and maxillae with associated dentition. Loose teeth and cranial fragments comprise a second category, followed by a few metapodials. The chief taxa from this assemblage are sheep/goat, cattle, and pig. Dental analysis is particularly significant, as it provides reliable indications for health and age. The sheep/goat dentitions were aged with

Deniz and Payne's method (1982) and the pig and cattle with Hillson's titular work on teeth (2005).

Modified Bone

Out of the faunal material only two pieces showed deliberate human modification. Both were sheep/goat mandibles from the same Hittite lot. The first contained several deep scratches of possible anthropogenic nature, while the second had two clear drill marks. Neither was extensively modified, which, along with deposition in concentrated lots, suggests that the majority of the bones were drawn from food refuse, consistent with Patterson's (1937, 294) conclusions.

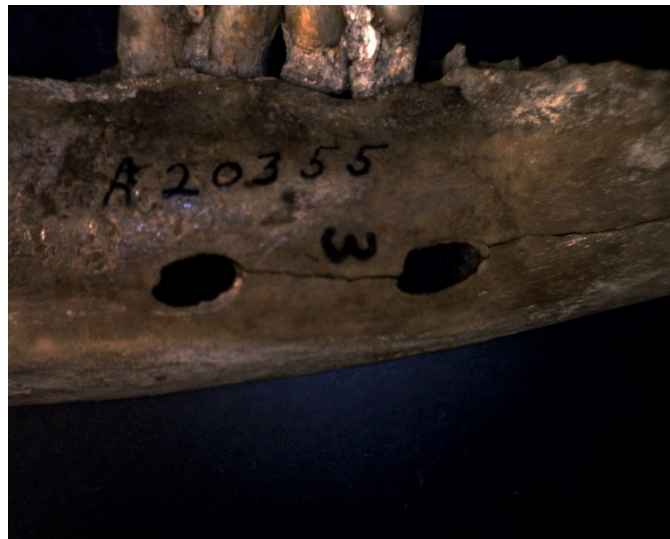


Figure 4-6 Drilled sheep mandible

Sheep/Goats

Among the taxa pertinent to this study, sheep/goat represented the largest quantity of fauna in the collection, with a total of 91 mandibles and

10 maxillae from the taxon. All of these are associated with Hittite rather than with Phrygian strata. These paint a basic picture of subsistence for the site at the end of the Bronze Age.

The teeth of the sheep show that the majority of the sample were slaughtered between 12 and 24 months of age, demonstrating a predilection for the consumption of young animals. Cut marks are rare, and foramina on the buccal side of mandibles appear with regularity. Taphonomic discoloration and wear is not common throughout the sample; although regular deposits appear on the buccal face of mandibles and within the mandibular foramina. These build-ups may indicate taphonomic alteration. Furthermore, frequent calculus on teeth demonstrates a build-up of dental plaque from the diet.

Cattle

The second bovid taxon from the site was cattle, identified as oxen, with 18 mandibles and 9 maxillae or maxillary fragments. Like the other bovids, all of the specimens originated from the Hittite layers. Out of the various elements, only one maxilla and three mandibles showed clear signs of cut marks, at least one of which had juvenile dentition. The majority of the teeth were heavily worn, with grooves and divots throughout. Ante-mortem tooth loss and resorption appeared on several

bones, and dental calculus was ubiquitous. There was evidence for dental caries on at least one specimen.

All of these signs indicate heavy dental wear and hard use of the animals. The oxen, while possibly used for food, appear to have lived frequently to maturity, implying common use as beasts of burden. When compared with the more prevalent sheep-goats, the cattle would not need to fill a subsistence niche in Hittite culture at Alişar Hüyük. Furthermore, the heavy wear on the dentition may indicate a harder diet than that of the sheep-goats or may relate to the longer lives of the cattle compared to other domesticates.



Figure 4-7 Cut marks on juvenile mandible with deposits



Figure 4-8 Hittite ox dentition with focus on damage and wear

Pigs

Pigs were the only taxon with specimens represented from both Hittite and Phrygian strata. The available sample consists of 24 mandibles and a maxilla from the Hittite period and 5 mandibles and 5 maxillae from the Phrygian. Both assemblages frequently showed scattered foramina on the buccal and lingual aspects of the mandibles, possibly indicating some degree of genetic continuity if indeed a population trait.

Almost all of the 25 Hittite elements show signs of death at young ages, many having deciduous premolars. The mean age at slaughter appears to have been between 6 and 18 months. The less numerous Phrygian sample is consistent with these trends. Animals from both periods have heavy build-ups of dental calculus; although the Phrygian

pigs have more severe dental damage, with heavy grooving and wear along with abscesses of the gums.

These data imply that Hittite animals were relatively healthy when compared to the Phrygian, which had a greater tendency towards dental damage. However, the disparate sample sizes may have confounded the comparison of populations. Nevertheless, as the only faunal material immediately postdating the Hittite era, this does suggest a decline in the health of domesticates.

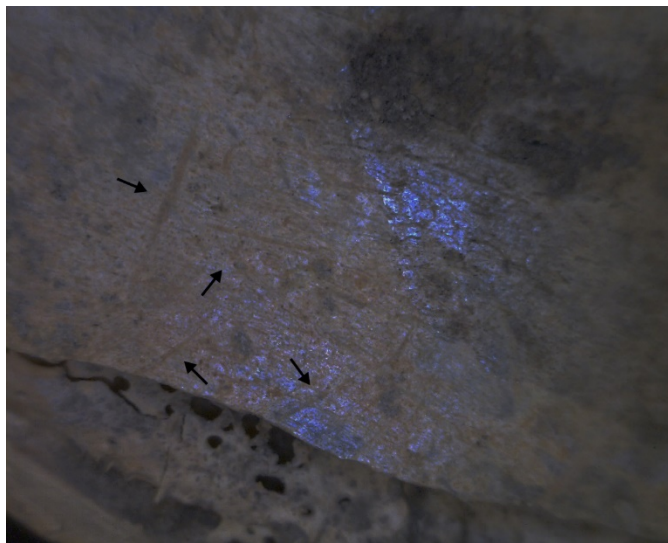


Figure 4-9 Phrygian pig mandible with cut marks

Miscellaneous Taxa

Several taxa were represented in small quantities at the site. These included wild fauna, such as duck and hare. Other domestics, comprising horse and dog elements, completed the assemblage, with much of the

latter lost before my analysis was carried out. Among these miscellaneous pieces was a unique element, a complete *Canis familiaris* (domesticated dog) humerus (specimen A20340).

Dating to the Late Bronze Age, A20340 was not broken for marrow access like many of the long bones described throughout Patterson's (1937) article. The distal joint appears to have a fenestration, possibly from taphonomic wear. A20340 was fully fused, suggesting that the dog was mature and of a relatively large breed. Clear cut marks at either end, with less noticeable markings on the mid-shaft, suggest that the dog was defleshed, either as part of funerary and disposal practices or through butchery.

Since dog is apparently not a normative food source for the culture in question, this suggests the possibility that the animal was treated with special care after death, either indicating particular cultural value or disposal procedures. Personal communication with Dr. Naomi Cleghorn confirms that these cut marks are consistent with butchery procedures. With the disappearance of the bulk of the canid remains, further conclusions are not possible.



Figure 4-10 Specimen A20340, proximal anterior



Figure 4-11 Specimen A20340, distal posterior

Trends and Analysis

With relatively large samples coming from Hittite layers (only 6.14% of mandibles or maxillae discussed being Phrygian), there is not enough material to examine change over time. However, despite this drawback,

some conclusions can be reached about the change from the Bronze Age Hittites to the Phrygians of the early Iron Age. Nevertheless, the lack of examples from a transitional period in the assemblage prevents clear discussion of the collapse as a process through application of the three-step model.

These data reveal a limited but relatively clear picture of Hittite subsistence and only a brief glimpse of the Phrygian period. Young, healthy sheep/goats seem to have been important in Hittite subsistence, with cattle used as a draught or work animal, only sometimes serving as a food source. Pigs comprised the second largest food source, with the pattern of very young animals continuing. Cattle appear to have had a rougher diet than either pigs or sheep/goats, with heavier dental wear and a higher rate of dental damage. Additional animals are poorly represented, with attrition of the museum collections a key factor in preventing a more focused analysis of other taxa.

The Phrygian sample only demonstrates the continuation of pig husbandry, although this does not mean that sheep/goats and cattle were not kept. These pigs appear to have had an increased amount of dental pathologies when compared with the Hittite sample. The presence of non-metric traits does suggest the possibility of genetic continuity in the fauna.

The dearth of data on Phrygian fauna from the period complicates the matter, providing a confounding factor for serious statistical analysis.

The human crania are the only example where there is more Post-Hittite skeletal material than that associated with the Hittite period. The Bronze Age male demonstrates a high quality of life with dental health serving as a proxy for this assessment. The Post-Hittite crania hint at upheaval, with a skull found outside funerary contexts.

The nature of the museum collections led to the greatest difficulties in finding valuable data from the assemblages for testing the model. Collection methods, age, small sample sizes, and uncertain stratigraphy all served as challenges for the project. Furthermore, as the majority of the skeletal material did not bear signs of cultural modification, seriation and other factors could not help correct for these biases. This implies that artifacts, such as tools, might serve as a more reliable data set for the model.

Chapter 5

Tools and Weaponry

Tools are the vehicles by which humans modify their surroundings. Both craft items and objects of utility in their own right, they are direct levers on reality through which action is performed. Both as embodiments of human technology and craft pieces, these artifacts are important to understanding cultural change on a micro level. Tools change with the alteration of manufacturing processes, the aesthetics of their producers and consumers, and with the specifics of the applications to which they are put.

For the purposes of this study, tools are objects with a primarily utilitarian existence, such as lithic blades. As a result of this definition, weapons are included in the discussion alongside artifacts designed for manufacturing other items. Rather than being the objects upon which human will is acted (bodies and fauna) or those used to express identity (objects of adornment), they are objects designed to aid in imposing human will upon the world.

The study of these artifacts is subject to certain biases which can influence the final work. As with the fauna, uncertain stratigraphy leads to difficult periodization, where objects are assigned to broad ranges of time. This challenges the very basis of the three-step model by inhibiting a

micro-level approach. As tools are consumed and eventually destroyed, they may not undergo typical disposal processes. Weapons may be lost in distant battlefields or looted by conquerors. Likewise, constant wear and usage may lead to a higher rate of attrition for this category of artifacts than more prized items.

Weaponry

Alişar Hüyük

Lance and Arrowheads

There is a small collection of lanceheads or spearheads from Alişar Hüyük with bearing on the study. One head is identified as Bronze Age, one as Post-Hittite, and one from Iron I. In order to have a greater body for comparison, four Middle Bronze Age heads are considered for possible continuity. All these weapons share the feature of having tangs rather than sockets for hafting.

The Bronze Age piece (11.2 cm long and 3.2 cm from barb to tip) is a thin blade with two barbs at the base of the head. Two of the Middle Bronze Age blades also have the similar feature of two barbs. The other Middle Bronze pieces are of a leaf-shape, with one showing clear signs of wrapping on the tang.

The Iron I and Post-Hittite points are quite different from their predecessors. The Iron I piece (Figure 5-1) has a long, heavy blade, with

parallel edges and a rounded point (overall length of 11.7 cm and 9.3 cm blade). The Post-Hittite tip is the only lancehead made of iron. Heavily rusted, it has a short, conical point (1.5 cm) and long tang (7.3 cm overall). These may represent radical changes in weapon design, especially in the case of the iron point which shares little with the bronze weapons.



Figure 5-1: Iron Age point of bronze

There are three bone arrowheads from Alişar Hüyük (Figure 5-2), all identified roughly with the Bronze Age. Each has a different shape, ovoid, round, and semi-rectangular in cross-section. Each is in the form of a head (1.2, 1.5, and 1.1 cm in length) abutting a long tang for shafting, giving overall lengths of 5.1, 5.2, and 4.1 cm. Two of these three have distinctive ridges spaced around their tips.



Figure 5-2 Bone arrowheads

There are four bronze arrowheads applicable to the study. The only one associated with the Bronze Age is of a unique profile, entirely square, with a tip apparently bent from impact (1.9 cm head and 4.3 cm overall). Two of the other three are assigned to Iron I (3.2 and 4.2 cm in length) and the third as Post-Hittite (3.3 cm long). The Iron I arrowheads have three blades spaced out from the center, while the Post-Hittite, showing possible signs of an impact, only has two and possesses a barb. All three of the later types have small sockets for shafting rather than a tang for insertion into the arrow's shaft. Lastly, there is a single, long, iron arrowhead from the Post-Hittite period (6.2 cm long). Having a tang for shafting and a flat, triangular profile, this may represent an intermediate form between the Post-Hittite bronze style and the earlier with tangs.

These imply a change in arrow technology throughout the transition. Moving from more round or geometric shapes in the Bronze Age, the Post-Hittite head shows a form very much like a miniature spear or lancehead, with a socket rather than a tang. The Iron I heads continue in socketing the head but now possess three equidistant blades rather than two. Whether there is a substantive difference in penetration between the designs is unclear and would serve as an excellent invitation to perform experimental archaeology.

Comparanda

The Bronze Age lance and arrowheads from Alişar Hüyük compare favorably to several specimens catalogued by Lorenz and Schrakamp (2011). The long head with barbed points is common, with heads mounted by tangs for both arrows and lances. Arrows appear both as elliptical and barbed. The only piece without a tang is a lancehead from Kuşaklı, which is believed to be designed for close combat.

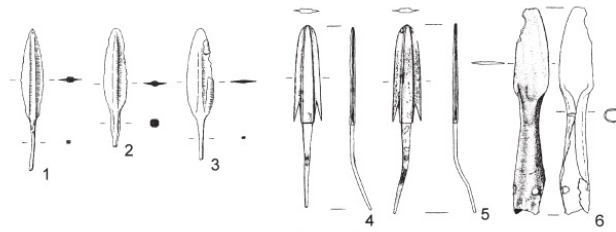


Fig. 3. Arrowheads and a lance head:
 (1-3) Elliptical arrowheads from Boğazköy (after Boehmer 1972, Taf. 30, nos. 876-878);
 (4-5) Barbed arrowheads from Kuşaklı (after A. Müller-Karpe 2001, 229, Abb. 4.4-5);
 (6) Lance head from Kuşaklı, presumably for close combat (after A. Müller-Karpe 2001, 229, Abb. 4.6).

Figure 5-3 Illustration from Lorenz and Schrakamp (2011, 130)

Tell el Fakhariyah

The weapons from Tell el Fakhariyah do not straddle the Bronze Age Collapse like those from Alişar Hüyük. The eleven lanceheads and two arrowheads from the site closest to the event are almost all identified with the Neoassyrian period, save one arrowhead and two lances simply designated as coming from the Iron Age. Interesting, all these weapons are constructed of bronze and show similar forms. The Iron Age arrowhead is slim, triangular, and shafts via a thin tang. The Neoassyrian lanceheads (Figure 5-4) are of a leaf design, of different thicknesses and lengths, all mounting via a tang rather than a socket. The two Iron Age lances vary in form. One, identified as a small lance or large arrowhead, has a thin, leaf-shape, while the other has a longer blade with a heavy central rib.



Figure 5-4 Neoassyan lancehead of bronze

As opposed to Alişar Hüyük, these show strong similarities across the entire assemblage. The question arises why weapons do not appear from the immediately preceding periods at Tell el Fakhariyah. This could have resulted from a stronger military focus for the Neoassrians, excavation or site formation biases, or removal of weapons at the end of the Bronze Age.

Flint and Obsidian

The lithics from Tell el Fakhariyah form the most coherent category of finds from that site relevant to the study. Those held at the Oriental Institute were taken from three of the soundings (IV, VI, and IX), and span from the pre-Mitannian, Khabur period through the Iron Age (900-600 BCE), with a single example from later occupation. Each floor of these soundings is associated with a specific period of occupation, providing a

relatively clear stratigraphy. However, there is doubt as to the validity of the association of these lithics to these periods. The full collection of lithics is described by Braidwood (1958, 54-55). The below table illustrates the amount of lithics associated with each level and period mentioned by Braidwood (1958, 53-54).

Table 5-1 Contexts of soundings with lithics

Sounding	Floor	Period	Flints	Obsidian
IX	Below 6	Possible Khabur (Pre-1500 BCE)	330	56
IX	6	Mitannian/Khabur mix (1500-1300 BCE)	115	32
VI	1&2	1300-1200 BCE	Not Given	Not Given
IX	5	Iron Age (900-600)	55	34
IX	4	Iron Age (900-600)	10	0
IX	3	Iron Age (900-600)	66	20
IX	1&2	Iron Age Mix with Later	Not Given	Not Given
IV	9	Possibly Classical or Antique	1	0

This table shows that the greatest combined quantity of flint and obsidian blades comes from the Khabur and mixed Mitannian-Khabur strata, before the 13th century BCE. There are a number of blades from Sounding IX Floors 5 and 3, with the intervening Floor 4 showing a

decrease in flints and an absence of obsidian. If this stratigraphy is consistent with the actual period of use, it demonstrates that the industry spanned the stratigraphic gap between the late 13th and early 8th centuries and points to a unified tradition at the site, perhaps tapering off with the increase in the use of metal implements. This three hundred year gap in the stratigraphy is a challenge in the record from Tell el Fakhariyah and similar sites, identified in other artifacts also showing strong manufacturing continuity, such as the ivories (Kantor 1958, 65).

The flints were certainly manufactured at the site, as there is a variety of debris from cobbles found on various levels, including a test cobble from the levels of the Iron Age palace. The assemblage under consideration is not entirely complete, as several elements, including cores, were left by the excavators (Braidwood 1958, 54).

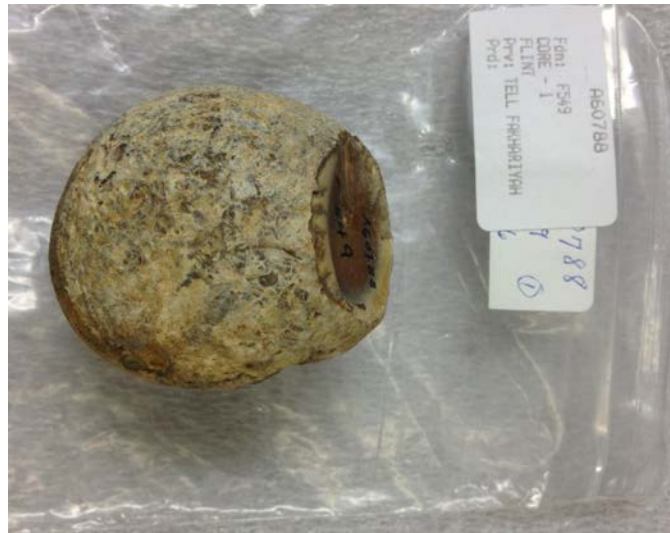


Figure 5-5 Test cobble from Iron Age palace

When examining these blades, analysis by Braidwood showed that all of these tools do not reflect any previously discovered tradition (1958, 54-55). They show extreme continuity across all specimens from every level where found, leading to Braidwood's conviction that they came from an earlier occupation level and were mixed into the higher strata through use of habitation strata as building material (1958, 55).

In order to test the model and the likelihood of the lithics being from an earlier strata, they are assessed as to quality and degree of use. Flints with high inclusions or a chalky texture are ranked as low quality, while those with only minimal inclusions are ranked as high. Likewise, lithics showing extreme reuse and retouch are ranked separately from those with no or minimal evidence for such activity. This procedure tests if there is a

significant difference between the pieces associated with the various floors.

Table 5-2 Distribution of flints according to quality, latest to earliest

Sounding	Floor	Very Bad	Bad	Decent	Good	Very Good	Total
IV	9	0	0	1	0	0	1
VI	1	0	0	4	0	0	4
VI	2	0	0	2	1	0	3
IX	3	0	4	24	1	0	29
IX	4	0	3	6	0	1	10
IX	4 & 5	0	0	1	0	0	1
IX	5	4	10	36	0	0	50
IX	6	4	15	47	0	3	69
Total	All	8	32	121	2	4	167

Table 5-3 Percentages of flints according to quality, latest to earliest

Sounding	Floor	Very Bad	Bad	Decent	Good	Very Good
IV	9	0.00%	0.00%	100.00%	0.00%	0.00%
VI	1	0.00%	0.00%	100.00%	0.00%	0.00%
VI	2	0.00%	0.00%	66.67%	33.33%	0.00%
IX	3	0.00%	13.79%	82.76%	3.45%	0.00%
IX	4	0.00%	30.00%	60.00%	0.00%	10.00%
IX	4&5	0.00%	0.00%	100.00%	0.00%	0.00%
IX	5	8.00%	20.00%	72.00%	0.00%	0.00%
IX	6	5.80%	21.74%	68.12%	0.00%	4.35%
Total	All	4.79%	19.16%	72.46%	1.20%	2.40%

Table 5-4 Distribution of lithics according to amount of retouch, latest to earliest

Sounding	Floor	Possible Slight	Slight	Possible Moderate	Moderate	Heavy	Very Heavy	Total
IX	3	1	2	0	3	3	1	1
IX	4	0	0	0	1	1	0	10
IX	5	0	2	1	9	6	2	2
IV	1	0	1	0	0	0	0	20
IX	6	1	8	1	11	1	0	22
Total	All	2	13	2	24	11	3	55

Table 5-5 Percentages of lithics according to amount of retouch, latest to earliest

Sounding	Floor	Possible Slight	Slight	Possible Moderate	Moderate	Heavy	Very Heavy
IX	3	10%	20%	0%	30%	30%	10%
IX	4	0%	0%	0%	50%	50%	0%
IX	5	0%	10%	5%	45%	30%	10%
IV	1	0%	100%	0%	0%	0%	0%
IX	6	4.55%	36.36%	4.55%	50%	4.55%	0%
Total	All	3.64%	23.64%	3.64%	43.64%	20%	5.45%

These two tables show differing, yet distinct, patterns. The blades qualified as “Very Bad” appear in the same amounts in Floor IX 6 and IX 5 (4 pieces each) with half again as many “Bad” pieces in IX 6 than in IX 5 (15 compared to 10). Furthermore, IX 6 shows far less retouch on blades, not including reshaping of blades over time, demonstrating a tendency to discard earlier in the artifact’s life cycle in the Bronze Age than in the Iron Age periods. Although IV 1-2, corresponding to the period just before the Bronze Age Collapse, contain very few samples, the available material does not show the extremely low quality and high retouch found in other strata.

The numbers suggest that this pattern is not random. Although the exposed walls show that they were constructed with flints in the building materials, the deeper soundings could not be examined to see if this was traditional (Braidwood 1958, 54-55). This implies that, although inferior materials were used throughout the site, high grade pieces decreased with time even as retouch of available pieces increased with the onset of Iron Age occupation. If these conclusions are accurate, the lithic tradition, described by Braidwood as extremely homogeneous (1958, 54), was an active part of the culture at Tell el Fakhariyah from the earliest excavated occupations into the Iron Age, eclipsing the lacuna of the Bronze Age Collapse.

Miscellaneous Tools

There are a variety of miscellaneous tool types which do not have the corpus size of either the lithics or the weapons. These items can give additional hints about the sites but only provide data which are extremely fragmentary. Through the combination of many fragments, an entire picture may be constructed.

Spindle Whorls

There are several spindle whorls from the Post-Hittite period. Assessing wear is difficult, but both stone and clay artifacts are represented (two whorls and a bobbin from Iron I and five whorls identified as specifically Post-Hittite). These show heavy thread marks, indicating long or heavy periods of use before discard. Those identified simply with the Bronze Age and one from the Middle Bronze Age, all clay, do show thread wear, but were discarded before heavy wear accumulated.



Figure 5-6 Bronze and Iron Age clay spindle whorls

Three axes from Alişar Hüyük appear to be tools rather than weapons. One of the two bronze pieces was shafted with the handle running perpendicular to the cutting edge, perhaps for planing or other woodworking. The single axe from the early Iron Age is a small (4.4 cm in length) piece showing no signs of hafting. The blade's edge is broken away with the face highly polished from work, suggesting extreme use before it was discarded.



Figure 5-7 Bronze axehead

Rubbing stones and Drills

Although far less enlightening than other artifact types from Alişar Hüyük, several tools show the presence of crafts from the site throughout the end of the Bronze Age into the Iron. These include several drill bits of bronze dating from the Bronze Age, both in general and specifically the Middle Bronze A, all of a tapering design with a square cross-section merging to round. The only available drill handle from the period is stone, with a single hole for holding the bit, dating from the early Iron Age. Although these do not show continuity of methods, these tools imply a continuation of craft technologies and materials across the time span, as the handle appears to fit these or similar bits.

Three rubbing stones from the Bronze Age and one from the early Iron demonstrate continued craft activity at the site. They all show patterns

of deep grooves, heavy wear, and use in polishing activities. All of the wear is not wholly explainable. The Iron Age stone is unique in having a bronze peg driven into the side.

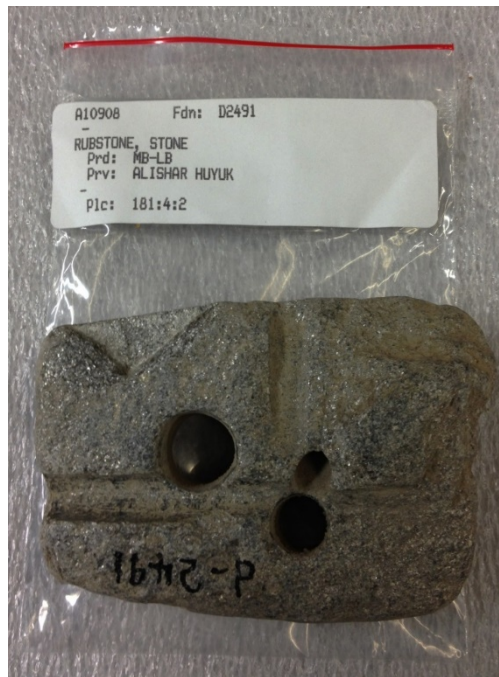


Figure 5-8 Example rubbing stone

Needles

A single bone needle is associated with the Bronze Age at Alişar Hüyük. The craftsmanship is precise, with a long eye (3.5 mm wide) and cylindrical shaft (5.9 cm long), quite similar to the bone clothing pins from the same site. The eye twists and the shaft is slightly curved, appearing to follow the natural contours of the bone. Two bronze needles come from the site from the Middle Bronze Age, but no needles are from the early Iron in the collection.

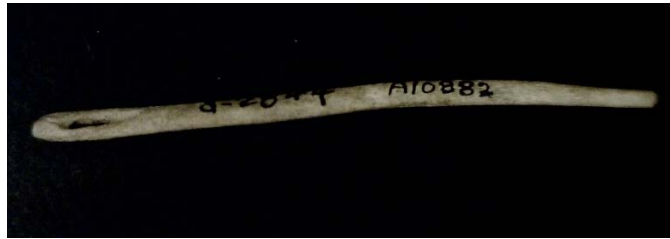


Figure 5-9 Bone needle

Awls

There are two bone awls from Alişar Hüyük in this assemblage. They are 8.2 and 8.7 cm in length, from the Bronze and Iron Age respectively. Both pieces are extremely simple, only shaped for piercing with a drilled hole at the end for gripping. These holes showed wear from a string or other hanger. Although the Bronze Age piece is identifiable as being made from a metapodial, the lack of additional specimens prevents more detailed analysis. Likewise, the simplicity of decoration prevents discussion of changes over time.

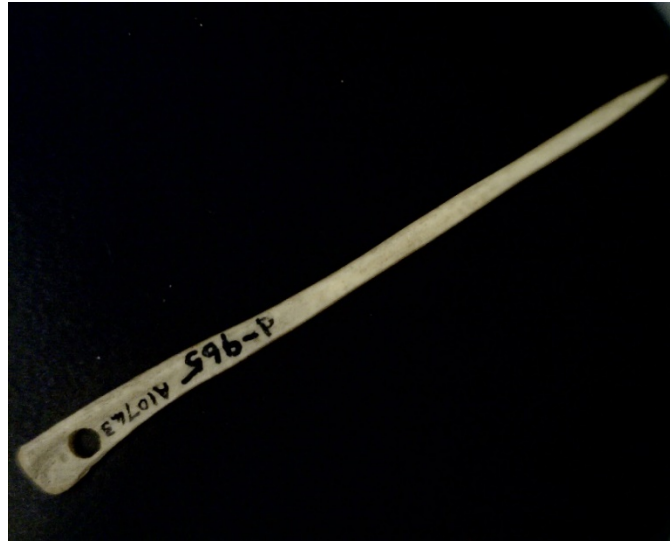


Figure 5-10 Bronze Age awl

Synthesis and Analysis

The weapons from Alişar Hüyük show possible continuity throughout the Bronze Age, with both leaf-shaped and barbed lanceheads coexisting. After the Bronze Age Collapse, there appears to be a change in weapons technology, with the two examples showing a long robust point and a triangular iron tip respectively. Bronze points from Tell el Fakhariyah appear all from a single tradition; however, examples from immediately before the Bronze Age Collapse were not available for the study.

Arrowheads from Alişar Hüyük suggest a change in weapons technology with the Post-Hittite period. There is a shift from bone weapons and squared or rounded profiles to bronze and iron points with distinctive

blades. Iron Age heads are affixed to shafts through sockets rather than the tangs of the older designs.

These shifts in weaponry may relate to alterations in methods of warfare and military technology. If the arrowheads are representative of the overall site, quality bronze weapons may have become more prevalent in the early Iron Age alongside iron points. The frequency of iron use is difficult to assess with the extremely small samples and the likelihood of iron to corrode away if exposed to oxygen.

Analysis of the lithic assemblage is problematic, as there is evidence that the distribution may be the result of site formation processes (Braidwood 1958); however, the distribution of blades does suggest that there is a pattern to those found at various levels, with a higher concentration of high grade flints before the Bronze Age-Iron Age transition. If this is the case, the extremely conservative tradition of the artifacts demonstrates a high level of cultural continuity throughout the period under examination.

The miscellaneous tools are far less useful for theory building. Although some are suggestive of minor trends, the spindle whorls appear to contain the most relevant information. The Iron Age whorls and bobbin have heavy thread wear when compared to the Bronze Age. This implies longer uses before disposal. The combination of these observations is

consistent with a picture of the Bronze Age Collapse and early Iron Age as a time of both technological change and greater resource stress when compared to the Late Bronze Age.

Chapter 6

Objects of Adornment

The final category of objects under investigation is that of personal adornment. The available collection comes from both sites, with objects of several different classes. However, before delving into the data, it is necessary to define an object of adornment and clarify why they are important to the study.

For this research an object of adornment is a possession which encodes one's identity in decoration or specific features of craftsmanship. These are usually objects worn about the body, such as various types of jewelry and clothing. For this study, themes are also considered on small, utilitarian items, such as decorated styli and cosmetic supplies. The overarching theme of this category is that of individual expression, unifying the disparate items. Self-expression is an exercise of the limits of individual agency within a cultural milieu, through which patterns may arise as to trends, fashions, and changes expressed in the culture.

Due to the lack of preserved textiles and other delicate materials, the focus of this chapter is on objects of stone, glass, bone, and metal. Preservation is uneven across these materials, especially when comparing various metallic objects of bronze and iron. The items examined consist of beads, clothing pins and fibulae, and other

miscellaneous pieces. Although the analysis of these materials is primarily stylistic, the methods are complicated by the problematic periodization of the collections.

Beads

Both Alişar Hüyük and Tell el Fakhariyah produced a variety of beads, manufactured from several materials, including faience, shell, and various stones, such as carnelian and limestone. These beads appear throughout the Bronze and Iron Ages, and are of various sizes and shapes. A wide variety of the Alişar Hüyük beads are made of glass, with a spectacular variety of colors and qualities. Only one of these beads is dated, linked to the Post-Hittite period, placing the likely introduction of the style during the period. This would make the period similar to the technological introduction of these objects at Tell el Fakhariyah.

One danger of studying beads is that many may have been part of a more complex composite single item, such as a necklace or elaborate piece of jewelry. Some of these items can be reconstructed, such as a Late Assyrian necklace from Tell el Fakhariyah (A34206), containing numerous beads of shell, faience, and stone. Deposition and stratigraphy can help to eliminate this bias, which was not always possible when studying this collection.



Figure 6-1 A34206

With the end of the Bronze Age, glass beads become common at both sites. Stone and faience are still popular materials, but the rise in glass is consistent with the Iron Age at both sites. These appear to have been valuable possessions. In one case, several beads were buried with an Iron Age individual.

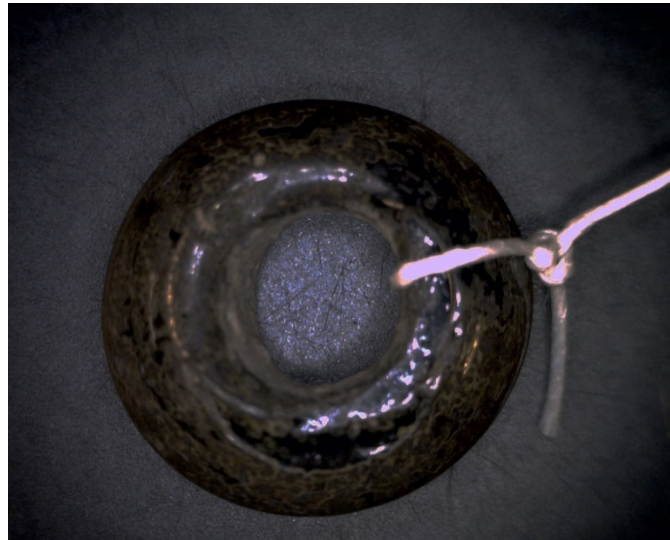


Figure 6-2 Iron Age glass bead from Tell el Fakhariyah

Bone Jewelry and Decorative Miscellany

All of the bone jewelry studied were recovered from Alishar Hüyük. The majority of these pieces are clothing pins of varying style, but a

variety of miscellaneous artifacts are included in the collection. The dating problem is particularly acute with the assemblage, with many of the pins identified as simply from the Bronze Age, a long period of time. These are interesting for how they compare to the more chronologically assignable metal pieces and those few bone objects associated with the early Iron Age.

Some of these pieces are relatively plain, such as a pair of rings (one bone, A10807, and one shell, A10824). The simplicity of these pieces can obscure their purpose or the details of those who owned them. In a similar manner, a simple arm guard (A10893), just over 6 cm long, exhibits cut marks left on the cortical surface and rough saw marks, calling into question whether its purpose was purely functional or decorative.

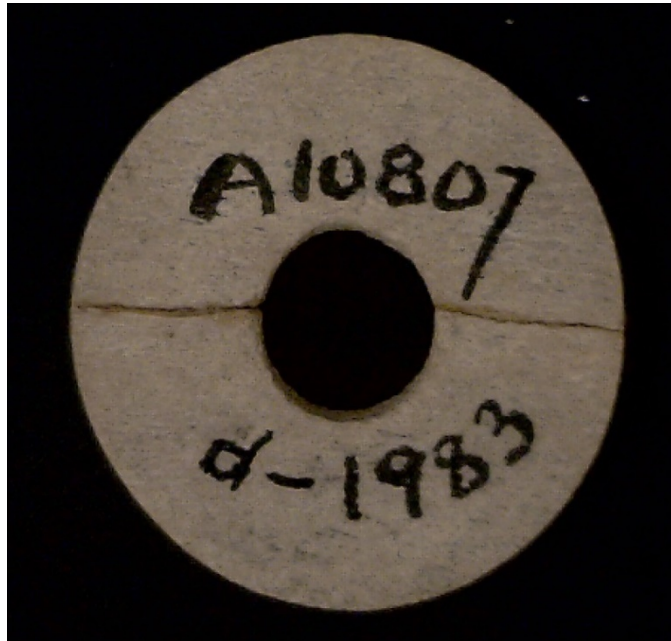


Figure 6-3 Bone ring



Figure 6-4 Shell ring



Figure 6-5 Bone armguard

Some of the artifacts do have recognizable decorations. A theme appearing at Alişar Hüyük is a series of pierced circles. Circular symbols may occur on artifacts as a basic decoration. The pierced design, however, is a possible example of extremely simple rosettes, common to Mesopotamian art, a hypothesis suggested in conversation with personnel of the Oriental Institute. Although small box lids from the Bronze Age in the assembly do not show this decoration, it appears on the single early Iron Age example. The theme appears on one of the two Bronze Age styli.



Figure 6-6 Bronze Age lids on left and right, Iron Age lid in center

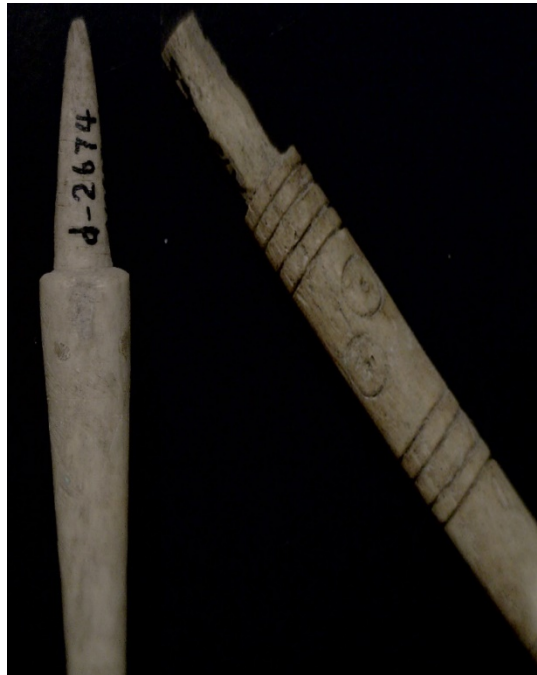


Figure 6-7 Two styli, simple and decorative

The dearth of these objects makes analysis difficult. The possible repetition of the pierced theme, also appearing on a bone pin below, may suggest some degree of aesthetic continuity. However, without more material, whether this similarity is coincidental or represents true continuity is uncertain.

Bone Pins

There are a total of twelve bone pins assigned to the general period of the Bronze Age from Alişar Hüyük. Of these, two are missing their heads. One has incised lines around the shaft. All those with heads never repeat a single design. Crenelations, a pyramid, and a teardrop are among the shapes inventoried.



Figure 6-8 Variety of Bronze Age bone pins

One of these pins has a unique bird motif on the head. This design is constructed with the pierced circles seen on the Iron Age lid. The diversity of designs on the pins suggests that the pierced circle was not the only design at the site. Its appearance throughout time may indicate that it was a favored design and may suggest some degree of continuity.



Figure 6-9 Head of bird pin

Metal Jewelry and Decorative Miscellany

The metal personal objects are predominantly jewelry and all are drawn from Alişar Hüyük. Although one is constructed of iron, the bulk of the assemblage is bronze. The single iron piece is a large ring from the Post-Hittite period at Alişar Hüyük. The majority of the pieces are clothing pins, which are present from both the Bronze and early Iron Ages.

Some artifacts are unique in the assemblage and thus do not provide a place for comparison. They include a bronze necklace from the Bronze Age and an early Iron Age bronze razor. Although there is a similarity between the design of the razor handle and the links of the necklace, the ability to draw comparisons is limited by the few objects.

Metal Pins and Fibulae

Similar to their bone counterparts, a variety of bronze pins appear at Alişar Hüyük. Eight are associated with the Bronze Age in general, with more ascribed to the Middle Bronze. Unlike the bone pins, two bronze pins are from the early Iron Age and one from the Post-Hittite period. As these artifacts straddle the Bronze Age Collapse, qualitative analysis should help assess relative continuity in patterns and design.

The Bronze Age pins have a variety of designs. The majority of shafts are plain with only a few having incised lines. The heads are of

various shapes, including a bird head, teardrop, and star. The shafts range from 8.2 to 10 cm in length.



Figure 6-10 Variety of Bronze Age pins

The Post-Hittite pin is missing its head; however, the shaft shows a pattern of incised lines near the neck. The two early Iron Age pins are both complete, with only slight damage. One has a similar pattern of incised lines on the neck, with a flat, crenelated head with central indentation. The second has a pattern of lines spiraling down the shaft and a similarly crenelated head with divot. The existence of patterns on all three shafts and the heads of the two early Iron Age pieces strongly suggest that these patterns became desirable in the object. Both also share similar dimensions, with shafts 10.5 and 10.3 cm long and heads 10 x 3 and 9 x 4 mm respectively. The Post-Hittite piece is 11.5 cm long, even with its missing head, for comparison. One Bronze Age pins has a similarly

shaped head to the Iron Age counterparts, although its unadorned shaft is much shorter, the artifact having an overall length of 8.2 cm.

The three bronze fibulae are from the Early Iron Age, suggesting that this kind of fastener appeared at the site at this time. The most complete is simply decorated, with slight scalloping and perforations, while the two fragmentary pieces are decorated with incised patterns of lines. These demonstrate the continued value of bronze for decorations into the Iron Age, and a new kind of clothing technology separate from but not totally replacing the older, straight pins.

Synthesis and Analysis

The objects of adornment are a wide ranging set of items, tied together through a common theme. They are the artifacts carried and worn by people in their daily lives, and thus should provide a window into the identity of those people. The evidence is scant at best, but several conclusions can be drawn from these artifacts. Detailed analysis is still foiled by a lack of thorough stratigraphy for the artifacts and consequent imprecise periodization.

This category of artifacts, more than the tools, depicts technological shifts occurring at the sites. The onset of the Iron Age coincides with the introduction of glass beads. These do not replace the faience and stone popular in earlier centuries but instead enrich the available material. Glass

may have achieved its popularity as a result of local manufacture, cost and trade concerns, or due to aesthetic reasons, but the phenomenon occurs at both sites, suggesting pragmatic reasons for the popularity.

The bone and metal artifacts speak directly to the state of Alişar Hüyük before and after the collapse. With small samples, trends are qualitative rather than quantitatively significant. If the sample is in any way representative of the state of the site, some conclusions can be suggested.

Possible continuity of bone artifact manufacture from the Bronze into the Iron Age at Alişar Hüyük may appear through decorative themes, such as the pierced circle. However, the beginning of the Iron Age seems to mark an absence of bone in personal jewelry from the assemblage, even though this does not mean it was not used for this reason. Bronze, popular through both periods, appears to become the norm for daily wear in the form of fasteners. Those Iron Age and Post Hittite pins available show regularity in decoration, with similarity to at least one earlier piece, with decorative shafts and crenelated heads. This is in contrast to the variety of heads found on both metal and bone pins from the Bronze Age. The introduction of the Early Iron Age fibula is the major change in clothing technology for Alişar Hüyük.

There appears to be a trend towards innovation with the early Iron Age, with relative similarity found throughout the Bronze Age at both sites, only upset by the assemblages of the new era. Although this innovation is not visible at the micro level, it appears in the macro history of the sites. Change is a key factor in understanding this period, as these material shifts would mark substantive alterations to how the people lived. The nature and origin of these changes is what remains mysterious without further inquiry.

Chapter 7

Discussion and Conclusion

Synthesis of Results

Although the study did not produce results perfectly in line with the expectations of the model, the data were not without significance to the collapse period at both sites. By synthesizing the various observations, overarching trends emerge in understanding the processes at each locale. An idea map depicts the relationships between the qualitative assessments of each artifact type.

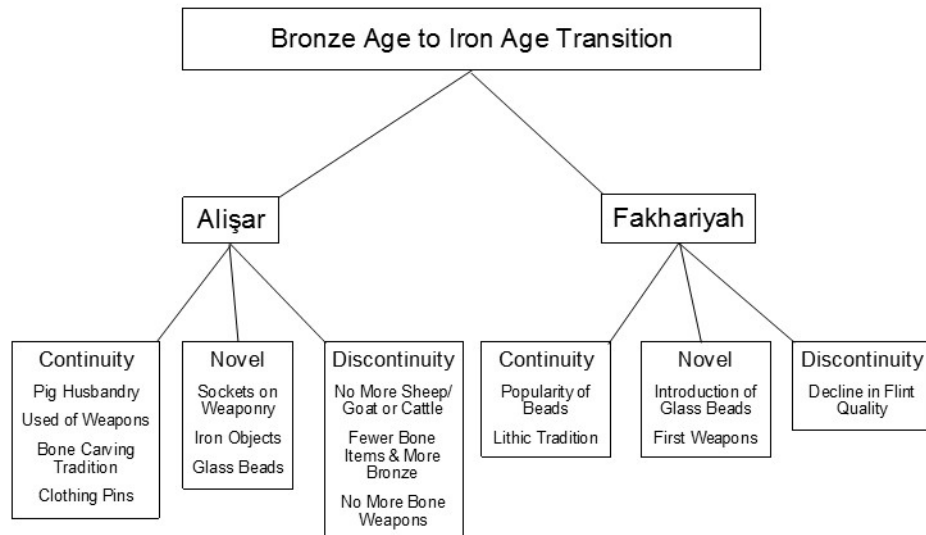


Figure 7-1 Relationship diagram of qualitative observations

The diagram above depicts the qualitative observations grouped according to themes by the researcher. It is inspired by the underlying concepts of other techniques for organizing qualitative data, specifically

the Kawakita method (Kawakita 1967). It is not identical to these methods.

This is a simple form, where observations demonstrating continuity, discontinuity, and novel trends are grouped together for each site.

Alişar Hüyük

The site of Alişar Hüyük exemplifies the trend of rapid change between the Bronze Age-Iron Age transition. This pattern appears in all categories of artifacts, and suggests rapid or dramatic, technological innovation following the Bronze Age Collapse. Nevertheless, there are signs of possible cultural continuity in objects of adornment. These conclusions are subject to the idiosyncrasies of the data and are not without their biases.

The Hittite era is characterized by good health in herd animals, with sheep/goat making up the bulk of domesticates from the site, followed by pigs. The human skull from the Late Bronze Age has signs of a healthy lifestyle, with excellent dental care. Bone is utilized for tools and jewelry, and objects of adornment, such as clothing pins, are crafted out of both bronze and bone. Weapons are primarily made from bronze, with a few bone arrowheads, all of which have tangs for fastening onto shafts.

The Early Iron Age contrasts with this image. Sheep/goat and oxen seem to disappear from the record. Bronze is still valuable, with pins and weapons created from the material. Although small items are still crafted

from bone, it ceases to serve as a key material for jewelry. The medium does show possible continuity in decorative themes. Iron appears in some jewelry objects and weapons, with bronze more strongly represented, either as a result of greater use or differences in survival between materials. Technological shifts are evident in changing spear and arrow points, with sockets replacing tangs, the introduction of fibulae, and first definite appearance of glass beads. The difficulty of the transition is hinted at by heavy use of spinning implements in the Post-Hittite and Iron Age era compared to those of the Late Bronze Age.

The Hittite and Late Bronze Age data show a period of relative health and prosperity. The evidence for the transition to the Early Iron Age is far less robust than in the preceding period, with possible signs of physical hardship, followed by significant cultural change. The strength of this interpretation is based upon the combination of several data sources to inform the conclusion rather than a single indicator. In the three-step model, disruption appears to occur at the terminus of Hittite occupation. Technological and resource shifts serve as responses to this disruption, with declines in bone as a crafting material, more use of iron, and greater reliance on pigs. This rapid change balances out with new cultural patterns in the Iron Age and Phrygian occupation.

This analysis is not without bias. Few artifacts, compounded by selective collection and curation, keep the sample sizes low, which complicates any intense statistical inquiry. Furthermore, the dearth of Early Iron Age material, when compared to the relatively abundant Bronze Age and Hittite pieces, makes conclusions about this later period more tenuous. This is complicated by the categorization of material into often broad time frames rather than precise dates.

Tell el Fakhariyah

The picture from Tell el Fakhariyah is less clear than that from Alishar Hüyük. It may show strong signs of cultural continuity, but the complication of lithic stratigraphy makes description problematic. If Braidwood (1958) is correct, the lithics are misplaced from an older, undiscovered level perhaps corresponding to the third millennium BCE.

Analysis of material quality and the intensity of retouch on these lithics demonstrates that there is a correlation between the Bronze Age strata and the presence of high quality blades and less retouch. This strongly implies that these artifacts are not in a random distribution. If this is the case, the lithics demonstrate the continuation of a unique tool complex throughout the first and second millennia BCE. Such a conclusion represents the most significant evidence for cultural continuity in the project.

Other data only apply to one side of the transitional divide or are beyond the scope of this study to analyze fully. Materials for beads suggest similar resource use in both periods, with the introduction of glass in the Iron Age paralleled at Alişar Hüyük. The weapons, only appearing in the later period, show specific stylistic forms. Continuity is consistent with other artifact categories not studied in this project, including the ivories which demonstrate the continuation of artistic themes from the Bronze into the Iron Age (Kantor 1958, 64-65).

The finds from Tell el Fakhariyah have more precise stratigraphic assignment than those from Alişar Hüyük, exemplified by the different floors from soundings VI and IX, and thus do not suffer from the problematic periodization of the other site. Although excavated in 1940, the stratigraphy does provide enough information to perform a cursory analysis. The artifacts are sparse, with only the lithics having significant bearing upon the research. The limited data set is likely a result of the single season of excavation and the excavator's death before the completion of the publication. Further work would have produced a larger assemblage with consequently more data on the period of interest.

Reflections on the Model

Strengths

At its heart this study was designed to assess the value of the three-step model for collapse. The purpose of the model is to provide a simple and flexible framework for conceptualizing the event. The researcher is then able to address questions about the nature of the transition rather than just its etiology. In short, the systematic description of a fluid process is the greatest strength of the theoretical construct.

Flexibility rather than specificity allows for theory to apply to a wide variety of case studies. With repeated application, this theory can provide comparative grounds for future research and illuminate the transitional phase of collapse. Its simplicity, consisting of disruption, response, and reinvention, is easily understood and tested in an archaeological context.

The question of transition is particularly interesting in the field of collapse studies. Rather than considering causation or revitalization, the model asks how people react to the disruption of a collapse event. Human action is central to understanding this paradigm. By focusing on human responses, it seeks cultural elements central to understanding the characteristics of collapse.

In the context of the study, the model functions to inform how questions are asked. By analyzing artifacts before, during, and after the

collapse, disruption and human adaptation are sought in the archaeological record. This promise was not fully realized in this current project, owing to the limitations of the data sets.

Weaknesses

The model struggled to mesh fully with the data at hand. The narrow lens of analyzing the collapse event itself limits the model to brief timespans and requires assemblages with defined stratigraphy which span the range of the event. Thus, in this project the model acted as a guide for organizing the available data rather than as a framework for rigorous testing.

The biases of the data prevent detailed analysis of the assemblages in this project. Absent data are not subject to scientific inquiry, and those with uncertain periodization do not allow for accuracy in addressing brief timespans. In this way, the characteristics of the data directly impact the theoretical rigor with which the study is accomplished.

Although methods tailored to the data can help to mitigate these problems, they do not fully obviate the challenges of imprecise data. Rigorous documentation and larger sample sizes should minimize the problems. These weaknesses underscore the key role of finding data suited to any particular project.

Implications for Future Research

In order to move forward with this research, future studies should approach collapse from the strengths of the model. This would require locating an assemblage with transitional material in an abundance, either through intensive research of recent museum collections or new excavations. Items that are rapidly consumed and discarded would prove especially useful when focusing on day-to-day activity.

Flexible methods for approaching the archaeology of collapse can aid researchers of any culture, and this theory could work in any locale just as easily as in the Near East. Cross-cultural comparison of collapse data should provide further information on the functions and mechanisms of collapse. The exercise of human agency in the transition process can serve as a strong base for such comparison and is the focus of this model.

Future research may also help to further elucidate the material from Tell el Fakhariyah or Alişar Hüyük. Older collections are not without value to the modern archaeologist. Any approach to analyzing these assemblages should adapt to their unique limitations and biases. The collections from Tell el Fakhariyah and Alişar Hüyük could benefit from intense diachronic analysis, focusing on broad temporal trends, while the new excavations at Tell el Fakhariyah will undoubtedly provide greater understanding of the site as a whole. Furthermore, new methods for

artifact analysis could aid in understanding these sites. Detailed study of the entire lithic assembly from Fakhariyah and the complete fauna from Alişar with modern methods could provide a basis for such diachronic studies.

Conclusions

The initial aim of the project was to analyze and describe the transitional events of the Bronze Age Collapse in Anatolia. This would allow for the investigation of the mechanisms and human factors during a collapse event. With recently excavated material unavailable, the study shifted its focus to older museum collections and incorporated questions about the utility of these collections in such an analysis.

A three-step model, consisting of disruption, response, and reinvention, was created for this project in order to describe the phenomenon of collapse in terms of human action against which the data were measured. The key data are drawn from personal or quickly consumed items relating to daily life, including human and faunal remains, tools and weapons, and objects of adornment. This research reveals patterns consistent with dynamic change and technological innovation at Alişar Hüyük and possible signs of strong, cultural continuity at Tell el Fakhariyah. Biases inherent in the selected data inhibited the research

from delving properly into the minutiae of the transitional period; however, they served to illustrate the strengths and weaknesses of the model.

This project can serve as a springboard for further research. The flexibility of the model allows it to apply to collapses in any culture and to approach sites with widely divergent circumstances. However, its narrow temporal focus requires a site with precise stratigraphy to acquire maximal results. Furthermore, the study demonstrates that aged collections still possess valuable data through the use of methods adapted to their limitations. Such methods help researchers bring modern archaeological analysis to the basements of museums, addressing the stores of data from excavations past and shedding light on ancient cultures.

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Biographical Statement

While attending the University of Texas at Arlington for a degree in English, William Nutt was drawn to archaeology when he enrolled in Dr. Karl Petruso's course on Aegean Prehistory. He graduated the next year with a degree in Anthropology and minors in English, History, and Latin. In April of 2010, William was awarded a National Science Foundation Graduate Research Fellowship to study the archaeology of collapse. He enrolled in the graduate Anthropology program at UTA, working closely with Dr. Karl Petruso on this project over the next few years. Collaborating with the Oriental Institute at the University of Chicago, William focused his analysis on Alişar Hüyük and Tell el Fakhariyah, two sites with material spanning the Bronze Age Collapse. In addition, William helped discover an early depiction of birth at the Etruscan site of Poggio Colla in 2012.

William jointly pursued an MBA along with his studies in Anthropology, graduating from the UTA business program in December of 2013. He plans to apply to Law School for the 2015-2016 year and pursue international business and scientific law, inspired by the legal sections of his archaeology coursework. After completing this degree, William plans to take time to relax and establish a family with his wife of four years, Hannah.