

TOYAH *MITOTES*: ARCHAEOLOGICAL, ETHNOGRAPHICAL, AND RESIDUE
ANALYSIS OF A TEXAS FEASTING ECONOMY, 1350-1600 CE

A Dissertation

by

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Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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May 2018

Major Subject: Anthropology

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ABSTRACT

The proto-historical period of Texas, 1350-1600 CE, is crucial to understanding the changes and challenges of the following colonial period. This dissertation explores and expands the archaeological and ethnohistorical literature to understand the socio-economic behaviors of indigenous Texans within the Terminal Late Pre-Hispanic Period, particularly in terms of feasting activities. Within the Terminal Late Pre-Hispanic in central and south Texas, the archaeological manifestation called Toyah has perplexed archaeologists, especially in the emergence of first locally-produced pottery in the region during this period. This work presents the archaeological and ethnohistorical evidence for feasting within the Toyah tradition, which includes increased evidence of inter-regional trade, large communal cooking features, and Spanish colonial reports of *mitotes* or feasts. Feasting is explored as a global perspective as a common, prosocial human mechanism to deal with increasing population pressures. Through ethnohistorical and ethnographical research, the ethnographic parameters for understanding ritual, medicinal, and recreational use of psychoactive materials, common among feasting societies, among the diverse groups represented in the historical period is explored. This work recommends multi-scalar analysis of ceramic residue to understand the nuances of cooking technology during the Toyah Phase.

DEDICATION

This work is dedicated to the strong women of my blood and heart family, who have taught me patience, persistence, and self-confidence with grace.

We did it.

ACKNOWLEDGEMENTS

I would like to thank my committee chair, Dr. Thoms, and my committee members, Dr. Bryant, Dr. Scheiner, and Dr. Storr for their guidance and support throughout the course of this research.

Thanks also go to my friends and colleagues in the Department of Anthropology. The department students, faculty, and staff have all contributed to my completion in good time and sanity. Special shout-out to the Quad Pod for the emotional, nutritional, and academic comradery.

Finally, thanks go to all of my family for their unequivocal support and love. Joseph Dozier, my partner in all things, deserves special thanks for his unwavering love and encouragement.

CONTRIBUTORS AND FUNDING SOURCES

This work was supported by a dissertation committee consisting of Professor Alston V. Thoms (advisor) and Vaughn M. Bryant of the Department of Anthropology, Professor Justin Scheiner of the Department of Horticultural Science at Texas A&M University, and Professor Virgil H. Storr of the Mercatus Center at George Mason University.

The section “The Origins of Entrepreneurship and the Market Process: An Archaeological Assessment of Competitive Feasting, Trade and Social Cooperation” was first published within *Interdisciplinary Studies of the Market Order: New Applications of Market Process*, edited by Peter Boettke, Virgil Storr, and Chris Coyne by Rowman and Littlefield International Ltd (2017, pp 113-137). The piece was much improved by comments provided by the editors as well as the other volume authors and is republished here with permission. The section “Toyah *Mitotes*: Feasting in the Terminal Late pre-Hispanic Southern Plains” is under review for publication in the *Journal of Anthropological Archaeology*. Some of the data for the analysis of this section were graciously provided by Doug Boyd, as acknowledged in the text. The section “Indigenous Psychoactive Substances of Texas 1530-1730 CE: an Ethnographic Review” is under review for publication in the *Journal of Ethnobiology*. All other work conducted for the dissertation was completed by myself independently.

Graduate study was supported by a fellowship from the Office of Graduate Studies and the Department of Anthropology at Texas A&M University, as well as a P.E.O. Scholar Award from the International Chapter of the P.E.O. Sisterhood. The writing of “The Origins of Entrepreneurship and the Market Process: An Archaeological Assessment of Competitive Feasting, Trade and Social Cooperation” was supported by the Mercatus Center at George Mason

University through an Adam Smith Research Fellowship. The writing of “Toyah *Mitotes*: Feasting in the Terminal Late pre-Hispanic Southern Plains” and “Indigenous Psychoactive Substances of Texas 1530-1730 CE: an Ethnographic Review” were supported by a Summertime Advancement in Research (STAR) Award from the College of Liberal Arts at Texas A&M University.

NOMENCLATURE

BC	Before Christ
BCE	Before Common Era
BP	Before Present
CE	Current Era
TLP	Terminal Late pre-Hispanic

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INTRODUCTION

Enigmatic Toyah

Toyah is the term used by archaeologists to describe the techno-complex of the Terminal Late pre-Hispanic Period (TLP, 1350-1600 CE) of central and south Texas. The archaeological culture is characterized by the production of a distinct lithic toolkit (Perdiz points, beveled knives, scrapers) and the first sustained local production of pottery (Leon Plain) in the region (Suhm and Krieger 1954). TLP sites are noted for having high visibility of bison (*Bison bison*) remains and remain an understudied Texas archaeological culture (Kenmotsu and Boyd 2012). The geographic extent of what is typically attributed to Toyah was mapped by Johnson (1994), and includes parts of the Southern Plains, Blackland Prairie, and Edwards Plateau. This archaeological tradition seems to have spread across the vast region in a rapid manner; sites with the techno-complex from across the area have been dated within a hundred years of its first appearance (Ricklis and Collins 1994).

The local production of pottery is of particular interest to archaeologists, as the archaeological evidence indicates that TLP peoples were mobile foragers; the production of pottery within hunting and gathering societies is relatively rare and archaeologically associated with moments of ethnogenesis or movements towards complexity (J. E. Arnold et al. 2015; Basgall 1987; Eerkens 2004; Hayden, Canuel, and Shanse 2013; Kelly 1995; Sturm, Clark, and Barton 2016). Leon Plain, the ceramic tradition associated with Toyah, is technologically similar to Rockport (coastal) (Ricklis and Collins 1994; Tomka 2017), undecorated Caddoan (eastern Texas, Louisiana, and Arkansas) (Thompson et al. 2012), and Goliad (indigenous pottery at Spanish mission sites in south Texas) (Hester and Hill 1971) wares. Leon Plain is remarkably well fired

for a first local production of pottery, with average wall thicknesses between four to eight centimeters, constricted necks, and ollas with handles (Perttula et al. 1995). Recent INAA analysis of Leon Plain, Rockport, and Goliad ceramics indicate a similar paste, temper, and firing decisions despite manufacture from Galveston to San Antonio (Tomka 2017; S. B. Carlson, Blackman, and Bishop 2016).

Several hypotheses have been raised to understand the appearance and spread of Toyah material culture during the TLP. Due to the visibility of bison remains at TLP sites, an emphasis on bison-adapted lifeways or even population replacement by more northern plains peoples has been proposed (L. Johnson 1994; Ricklis 1992; Huebner 1991; Scheiber 2007). However, there is no geo-chronological evidence of an adoption of Toyah from North to South (Ricklis and Collins 1994), refuting the idea of a population replacement. In addition, faunal analysis of Toyah sites indicate a diversity of animals utilized by TLP peoples, consistent with earlier periods and without a reliance on bison as a primary food source (S. L. Black 1986; Mauldin, Thompson, and Kemp 2012; Thompson and Mauldin 2012). Stable isotope data from human remains, while limited, indicate that large mammal consumption during the Toyah Phase is comparable to patterns seen in the Archaic (Mauldin et al. 2013; Hard and Katzenberg 2011). Where bison bone fracture analysis (Outram 2001) of food remains have been done, bison processing at several sites is not consistent with intensive greasing activity (Gilmore 2012; Rush 2013). Explanations for the emergence of the Toyah complex that rely primarily on bison, therefore, are unsatisfactory to explain the other changes in material culture (Gilmore 2012; Kenmotsu and Boyd 2012; Mauldin, Thompson, and Kemp 2012; Mauldin and Thompson 2012), especially the emergence of Leon Plain.

Growing consensus is that that the Toyah techno-complex should not be interpreted as a single population or culture, but rather, should be understood as the remains of a dynamic socio-cultural landscape in which individual ethnic identities are homogenized by the biased nature of the archaeological record (Arnn 2012a, 2012b; Boyd 2012; Kenmotsu and Arnn 2012). It is likely that Toyah represents multiple distinct ethnic groups including Coahuiltecan speakers (Thoms 2001a), as well as groups not recorded by Europeans (L. Johnson 1994, 286–87; Kenmotsu and Arnn 2012; Kelley 1947, 121; Wade 2003, 216–23). It also seems clear that population densities during the TLP increased (A. L. Johnson and Hard 2008; Kenmotsu and Arnn 2012), which is also often associated with movements toward ethnogenesis or complexity (Chacon and Mendoza 2017; Morgan 2015). Insofar as archaeological or material culture investigation alone is often unsatisfactory in capturing evidence of ethnogenesis (Dozier 2018; Jones 1997, 2010; Voss 2008), I propose to explore social and economic mechanisms that result in such transitions. In this work, I explore the possibility of a socio-economic transition to a *feasting economy* might explicate the material culture changes that resulted in the Toyah Phase.

Feasting has been an anthropological concept of interest for over a hundred years (Hayden and Villeneuve 2011). When used in a general term, feasts can refer to any large gathering of food and hungry people; anthropologically and in context here, the concept is used more specifically to focus on the *socio-political system* in which individuals mobilize political and material influence by hosting and feeding large numbers of people (Hayden 2014b). Competitive feasts, in which different groups try to out-perform others, is implicated in the development of new prestige goods, corresponding with new cooking technologies, domesticated plants and animals, and expanded trade networks (B. Arnold 1999; Dietler and Hayden 2010; Hayden 1995, 1998, 2009; Hayden,

Canuel, and Shanse 2013; Hayden 2014a; Jennings et al. 2005). I explore these concepts and implications through the questions and projects outlined below.

Guiding Questions

- What are the anthropological and economic perspectives on the role of feasting within transitional foraging communities?
 - What role does feasting play in intensification regimes or in the emergence of complex societies?
 - What role does feasting play in the development of new technologies?
- Is the archaeological record robust enough to identify feasting behavior within the Toyah Phase?
 - If it is robust enough, do patterns of large gatherings change with the advent of the Toyah Phase respective to earlier periods?
- Psychoactive substances are often associated with feasting societies; what kind of altering substances are ethnographically known to be used by the indigenous peoples of Texas?
 - Are the substances used related more to cultural particularities or to the geographical distribution of the psychoactive plants?
 - How are these substances used for different practices (medicinal, ritual, political) among different organizational schemes of the diverse indigenous peoples of Texas?

Methodology and Organization

To approach these research questions, several kinds of ethnohistorical and archaeological data are utilized. Secondary historical (Smith 2005; Wade 2003) as well as primary ethnohistorical (e.g. Bolton 1914; Hatcher 1927a, 1927b, 1927c, 1927d; de Solís 1931; Marcy and McClellan 1853; Huntington and Franklin 1985; Woldert 1942; Smithwick 1900; Dyer 1917; Krieger 2002)

and ethnographical sources (e.g. Fogelson 2004; Rogers and Sabo, III 2004; Campbell 1983; Kavanagh 2001; Jordan 1965; Bandelier, n.d.; Aten 1983; Tiller 1983; Ortiz 1983; Levy 2001; Cremony 1868; Morris Edward Opler 2001, 1983; Hrlíčka 1904, 1908; La Barre 1938; Oliver 1891; Brant 1950; Foster and McCollough 2001; Jordan 2008; Adovasio and Fry 1976; G. G. Carlson and Jones 1940; Sjoberg 1951; Beals 1932; Castetter and Underwood 1978; Bolton 1911; Gatschet 1891; Troike 1962; La Barre 1965; Bittle 1954; Opler 1938; Buskirk 1986; Newcomb and Campbell 2001; Dorsey 1904; Forbes 1959; Newcomb Jr 2001) are utilized to understand patterns of feasting behavior observed by Spanish colonists and early anthropologists. A survey of the contract and academic archaeology literature (e.g. Tomka 2017; Neuman 1970; E. M. Davis 1970; Ferring and Yates 1998; H. A. Davis 1970; Prikryl 1987; Scheiber 2007; Perttula 2008; Crook and Hughston 2015; Krieger 1946; S. Black and Dial 2008; Creel, Scott, and Collins 1990; Hester and Hill 1971; Hixson 2016; Ricklis and Collins 1994; Thompson et al. 2012; Karbula, Feit, and Griffith 2001; Mallouf 1999; Kibler and Broehm 2005; Arnn 2012b; Mallouf 1987; S. L. Black 1997, 1986; Mauldin, Thompson, and Kemp 2012; Kelley 1947; Johnson 1994; Carpenter et al. 2012; Thoms and Ahr 1995; Kibler 2012; Rush 2013; Kenmotsu and Arnn 2012; Kenmotsu and Boyd 2012; Boyd 2012) was mined for an understanding of TLP archaeology

This dissertation constitutes of three stand-alone projects to address each of the research questions. The first project, “Origins of Entrepreneurship and the Market Process: An Archaeological Assessment of Competitive Feasting, Trade, and Social Cooperation” takes a global perspective to understand the anthropological and economic understanding of feasting societies (Dozier 2017). This work explores feasting theory as exemplified in the work of Brian Hayden (e.g. 1998, 2009, 2014a, 2014b) with special attention to the incentive systems that sustain exchange and produce economic change (Hayek 2014a, 2014b, 2014c; Kirzner 2013). The project

explores the archaeological evidence for feasting in two of the best studied cases, the Neolithicization of Anatolia and Bronze Age Celts, before introducing the Toyah Phase as having similar features.

The archaeological evidence for feasting within the TLP is explored in greater detail in the second project, “Toyah *Mitotes*: Feasting in the Terminal Late pre-Hispanic Southern Plains”. This section establishes the archaeological evidence for Toyah as a feasting society. That piece showcases early Spanish narratives (e.g. Krieger 2002; Orellano Norris 2017; Wade 2003) of large gathering of indigenous peoples in the area in what would later be characterized as *mitotes*, or celebratory feasts, by Spanish missionaries. These *mitotes* can be evidenced in the archaeological record by large cooking installations as well as indicators of long-distance change. Through the testing of two datasets of burned rock oven features, this work demonstrates that cooking installations become larger and more frequent in the TLP. Long-distance trade is also evidenced at Toyah sites, with a multitude of sites that contain evidence of trade with Caddoan and Puebloan groups. Particularly interesting is the association of multiple types of ceramics (i.e. both Leon Plain and Caddo ware) within large sites with evidence of communal cooking installations.

Feasting societies, or communities in which feasting is a regular aspect of socio-economic life, often employ the use of psychoactive substances as part of the socio-political ritual of feasts (B. Arnold 1999; Bray 2003; Chacon and Mendoza 2017; Dietler and Hayden 2010; Guerra-Doce 2014; Hayden 1998; Hayden, Canuel, and Shanse 2013; Hayden 2014b; Jennings et al. 2005; Siegel 2005). The third piece “Indigenous Psychoactive Substances of Texas, 1530-1730 CE: an Ethnographic Review” explores the ethnographic record to showcase the diversity of mind-altering substances known to be used by the indigenous peoples of Texas. This section highlights a variety of substances, from black drink, a caffeinated tea made from Yaupon Holly (*Ilex vomitoria*) to

peyote (*Lophophora williamsii*) to alcoholic beverages made from corn (*Zea mays*) and various agaves (*Agave spp.*). Different substances were used by different groups depending on their geographic availability and different roles, such as ritual, medicinal, and political, within the diverse groups of Texas.

The conclusion of this dissertation recounts what has been added to the understanding of Toyah archaeology through these projects. It also outlines what study remains to be done, particularly towards evidence of feasts and psychoactive substance production among the foraging groups of Toyah Phase archaeology. One of the reasons Toyah phase archaeology has remained so enigmatic, as well as why it is so important to study, is that central Texas was not well explored by Spanish colonists during the 16th and 17th centuries (Kenmotsu and Arnn 2012, 22). However, it is likely that decedents of those we describe as Toyah were incorporated into Spanish mission systems, with living descendants within Texas communities today (Thoms 2001b). Through ethnohistorical and archaeological study, I hope that this dissertation helps highlight the innovations, agency, and humanity of the past peoples of Texas.

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THE ORIGINS OF ENTREPRENEURSHIP AND THE MARKET PROCESS: AN
ARCHAEOLOGICAL ASSESSMENT OF COMPETITIVE FEASTING, TRADE, AND
SOCIAL COOPERATION¹

Introduction

The market system is traditionally characterized as a complex mechanism through which goods and services are distributed according to the laws of supply and demand. The mechanics of this system are crucial to understanding the complex world in which we live today; no place on earth remains untouched by the globalizing forces of the market system. The market is not simply the rush of numbers across the news ticker; there are foundational cultural practices and beliefs that allow for market exchanges to occur and which dictate the nature of those exchanges (Lavoie and Chamlee-Wright 2000; Chamlee-Wright 1997; Storr 2010; Storr 2013). While the modern market system of exchange—goods and labor for pieces of paper or numbers on a computer screen—seem second nature to those within this complex maelstrom, humanity has only fairly recently adopted this system of exchange.

Various researchers have explored reasons why Western capitalistic systems have historically dominated (e.g. Diamond 1999; McCloskey 2010b; A. Smith 1982); the origins of complex trading and the accompanying incentive systems, however, predate written history. Several phenomena are oft cited as contributing factors within the development of market systems; I discuss three of these phenomena here: property, specialization, and long-distance trade. These

¹ This section was first published as “The Origins of Entrepreneurship and the Market Process: an Archaeological Assessment of Competitive Feasting, Trade and Social Cooperation” in *Interdisciplinary Studies of the Market Order: New Applications of Market Process Theory*, edited by Peter Boettke, Virgil Storr, and Christopher Coyne, Rowman and Littlefield International Limited (2017: 113-137). Reprinted with permission.

three hallmarks of the market order are not inherent to the human condition. Only in the last 10,000 years is there evidence for sedentism and territoriality (property), the creation of specialized occupations (specialization), and trade across natural, large geographical areas (long distance trade). The sociocultural circumstances under which private property, division of labor, and long distance trade emerges, however, seem to have been catalyzed by competitive feasting. Although sociocultural circumstances are similar in the development of these important economic traits, there is diversity in the geographic and temporal situations in the development of complex foraging traditions (Arnold et al. 2015) and thereby the origins of the market process.

Competitive feasting, as will be expounded in the following pages, requires competing individuals to host increasingly excessive events (Hayden 2014b). The host of the feast provides material goods, such as special foods or symbolic totems, to their guests, and in turn, gain great social status. These feasts provide a mechanism through which different groups of people get together for long distance trade, plan marital/political unions, and allows for intensification in division of labor, as new specialized goods and services are desired. Competitive feasting allows for individuals to gain social (and biological) influence while enhancing the experience of the group at large. These aggrandizers utilize entrepreneurial awareness to create avenues for sociocultural and economic complexity.

I argue, as archaeologists have done before that increasing population pressure during stable climatic periods results in intensified action across the landscape (eg. Binford 1968; Binford 2001). Social coordination is required in order to maintain peaceful relationships in increasingly populated areas (Richerson and Boyd 1995). In these situations, where population pressure is mounting, putting diverse and competing groups of people in contact with one another, a similar phenomenon, competitive feasting, is observed.

To illustrate this mechanism at work, I present three archaeological examples of competitive feasting. I chose my three examples (Neolithic Anatolia, Bronze Age European Celts, and Late Prehistoric Texas) to represent three different continents at three different periods of time. All three examples are preceded by a period of low population densities of hunting-fishing-gatherers; with climatic stability and increasing population densities, all three examples show archaeological evidence of competitive feasting. Evidence for competitive feasting is correlated with the first evidence in each respective region for territoriality, creation of specialized labor, and long distance trade. These three expressions of increasing sociocultural complexity arose prior and independently to the adoption of agriculture (c.f. Arnold et al. 2015), and in the Texas example, farming was not practiced in the region until European colonialization.

In the following pages, I present archaeological evidence to support the interpretation of competitive feasting regimes as catalysts in the development of pillars of the market order. In order to do so, I highlight the theoretical, ethnographic, and archaeological evidence that informs on the mechanisms of competitive feasting, as well as the sociocultural and material repercussions of feasting regimes. I analyze how this theoretical framework differs from other conceptualizations of the market order. In conclusion, I find that competitive feasting mechanisms are consistent with neo-evolutionary understandings of social entrepreneurship and human hypersociality. Feasting studies reaffirm the importance of cultural systems as predating economic action.

But in order to do so, I must start at the beginning of human orders.

Before Market Orders

The first *Homo sapiens* lived in Africa over 190,000 years before present (BP), according to the fossil record (Trinkaus 2005; Cann and Wilson 2003). The archaeological record indicates

that humans spread across the globe, conquering new and extreme environments, in small mobile groups that hunted, fished, and gathered wild plants. The Pleistocene, the geological epoch of this period—often referred as the Ice Age, was much cooler and wetter than today but also experienced more dramatic shifts in worldwide temperature (Farrand 1990). The archaeological record shows no strong evidence for sedentism, division of labor, or long-distance trade in the Pleistocene, and in some places for much later.

A notion of individual ownership of items seems to be innate to the human condition; even the most ancient burials contain goods that are presumed to be owned by the deceased. Rather, for the purposes here, property should be conceived as ownership or authority over a particular landscape. Remains of dwellings are rarely found from the Pleistocene. An extraordinary shelter at the site of Mal'ta in Siberia from 30,000 years ago indicates that Ice Age peoples sometimes used mammoth bones to fasten their shelters, presumably with leather coverings in the frigid tundra (Klein 1971; Sergei A. Vasil'ev 1993). Most shelters would likely have been made from organic material (wood, reed, grass, leather) that does not survive. The food and trash remains (middens) from this period indicate that camp sites were not occupied year-round (Feder 2014, 170–83). There are very few cemeteries from this period (Feder 2014, 180; Wengrow and Graeber 2015)—cemeteries require that families/groups return to a special place for burial. As such, cemeteries are usually interpreted as a sign of sedentism/territorialism because they are a marked place on the landscape that a particular group has claimed for their ancestors (Kelly 1992). The archaeological record therefore shows little to no evidence for sedentism/territorialism, and therefore conceptions of property ownership, for the majority of human history.

In these migrating family groups, there is little evidence for specialized labor. While there are slight variations in stone tool manufacture and use between groups, the basic tool kit remains

the same. Both men and women are found with stone tools and there are no significant differences in health between the sexes observed skeletally (Holt and Formicola 2008). Burials themselves generally contain grave goods which are presumed to be tools of the deceased, but there is no elaboration of tombs and only rarely special treatment made to individuals, though exceptions exist (e.g. Pettitt and Bader 2000). While objects of art have been found in the Pleistocene (e.g. 'Venus' figurines [Dixson and Dixson 2011; Soffer, Adovasio, and Hyland 2000]), there is not enough evidence to suggest that an individual in the group would have been primarily occupied by anything other than resource/food acquisition.

Resource acquisition in the Pleistocene was from the local environment. The remains of stone tools, the most common archaeological evidence, are from almost exclusively from local sources (Feder 2014, 177). Food items are also exclusively from the local environment; there is very little evidence of food storage (Ingold 1983; Whelan et al. 2013), with no ceramics and no evidence for domesticated plants until 10,000 years ago, at the earliest. There is little evidence for sustained, regular long-distance trade in the Ice Age.

These Pleistocene patterns remained fairly unchanged in many areas of the world until the advent of colonialism. Very few long-distance foraging societies remain today (Kelly 1995). Ethnographic studies of foraging peoples, however, can provide limited analogy into the socio-political structures that archaeologists would expect to see in the Pleistocene (Binford 1967; Binford 2001). In these societies, individual bands are led by elders who gain their status through their knowledge and works for the group. These leaders, however, do not experience a significant improvement in their condition relative to the groups. Within mobile hunting-fishing-gathering societies, boasting or showboating is heavily discouraged or even tabooed (Lee 1969; Henrich et

al. 2001). This does not mean that inherent inequalities are completely absent from egalitarian foraging groups (Speth 1990).

Around 10,000 years ago, the patterns from the Pleistocene suddenly changed in what archaeologists call the Neolithic Revolution. As will be expounded on below, the advent of the Holocene, our current geological epoch, brought warmer and more stable climates worldwide. Population densities started to rise in fertile river valleys and new archaeological traditions indicating increased social complexity. The patterns seen in the Neolithic revolution are not observed at the same chronological point worldwide; rather, transitions into more complex political and economic situations seem to be predicated by individual situations of population pressure, landscape productivity, and climatic stability. Multiple subsistence strategies are observed in this transition from mobile egalitarianism to inherited leadership positions; while agricultural regimes regularly receive more attention as a stark contrast to prior lifeways, archaeological consensus is now coalescing around the phenomenon of complex hunting-fishing-gathering lifeways as predicating the hierarchical, sedentary, complex societies which now dominate the globe (Arnold et al. 2015). Before illustrating three archaeological examples of transitions in complexity, I first describe the theoretical underpinnings to feasting regimes.

Feasting Regimes: Alert Entrepreneurs and Pro-Social Behavior

Feasting phenomenon have been object of anthropological study for over a hundred years (Hayden and Villeneuve 2011). Feasts, celebrations which feature conspicuous consumption of food and goods, occur worldwide and often leave archaeologically visible remains (Hayden 2014b; Dietler and Hayden 2010). Hayden (2014b, 10) recognizes several kinds of feasts: alliance and cooperation, economic feasts (for gain), and diacritical (for status display).

Competitive feasting is of primary interest here; it describes the ethnographically and archaeologically observed phenomenon of feasts held within an extended community that intensifies through time. The classic ethnographic example of feasting of this type is recorded along the Pacific Coast of North America (Arnold 2001). Hayden (2014b) highlights the importance of the hosts in propagating competitive feasts; he uses the term “aggrandizers” to describe individuals who have the social awareness and suave to organize large consumption events. Aggrandizers utilize their social network to amass goods that they allocate to their guests. In turn, aggrandizers are respected for their generosity and the grandness of the feasts they are able to host. Hayden’s notion of aggrandizers equates well to Kirzners’s (2013) notion of entrepreneurs.

Kirzner describes the entrepreneur as alert to opportunities to improve their own situation, while serving the needs of others. Entrepreneurs recognize new opportunities to serve others (customers) with goods or services such that entrepreneurs profit. In this perspective, entrepreneurs play a crucial role in pro-social distribution of goods. As long as exchanges are voluntary, both the entrepreneur and the customer are satisfied with the transaction. In competitive feasting regimes, the host is satisfied with The competitive nature of feasts of interest here encourages hosts/entrepreneurs to obtain luxury goods and foods (van der Veen 2003) that are increasingly gratuitous, in terms of volume, quality, or exotic origin (Hayden 2014b). Thereby, competitive feasting actually distributes goods in a way that motivates greater trade within (or outside) a region.

The opportunities that entrepreneurs notice are shaped by contextual constraints, such as technology, institutions, and cultural expectations. Entrepreneurs in different settings, therefore, recognize and pursue different opportunities. As already mentioned, there are often complex sharing rules that apply to small bands of foragers (Kelly 1995); low population densities mean that contractual group obligations ensure group survival during times of stress. The cultural taboos

around the kind of self-aggrandizement seen in feasting societies, therefore, limit the entrepreneurial recognition for some societies. From the archaeological record, those kinds of cultural institutions are impossible to recognize, as they leave no trace in the material record. Conversely, the recognition of feasting types of economic activity in the archaeological record must reflect crucial changes in that society's social structure and cultural institutions.

Hayden's aggrandizers are Kirzner's entrepreneurs, who are alert to opportunities to appease others' desires at a gain for themselves by hosting ever more elaborate feasts. By emphasizing the role of entrepreneur (the host, or aggrandizer) as the driving mechanism for the advancement of market processes, the evidence presented here closely aligns with prior work that emphasizes the interpersonal relationships that foster cooperation in human groups (Boettke 2004; Boettke and Coyne 2005; Granovetter 1973; Kimbrough, Smith, and Wilson 2010; Kirzner 2013; Leeson 2006; Storr 2008; Storr 2010; Storr 2013).

Hayden acknowledges the contradictory nature of competitive feasting—the patterns of amassing goods just to give the majority away seems counter-intuitive. Feast hosts reap actualized benefits from their hosting activities; archaeological evidence indicates differences in the quality of diet between members of feasting societies, whereas hosts enjoy a higher quality diet (e.g. Coupland 2006; Martindale 2006; Samuels 2006). Ethnographic evidence from Papua New Guinea indicates that hosts enjoy a slightly higher quality of goods in general (Sahlins 1963). While harder to quantify, hosts also enjoy reproductive advantages, likely both in number of children and in choices of mates (Hayden 2014b, 17). In other terms, feasting activities are expressions of conspicuous consumption, which communicates the affluence of the host and affords the host with social prestige, which translates into material advancement. The relationship between feasting and wealth accumulation warrants further study; the literature is divided as to if the relationship

between the two is linear (feasting leads to wealth), co-evolutionary (they bolster each other), or unrelated (wealth accumulation purely result of productivity).

In conclusion, host aggrandizers/entrepreneurs advance their own prerogatives while providing goods and services to their communities. Beyond the community, competitive feasting allows for peaceful interaction between groups. These feasting traditions helped motivate innovations in trade connections, trade goods, and specialized technologies, as will be highlighted following a few archaeological examples of feasting.

Archaeological Case Studies

Ancient Anatolia

Anatolia (now the modern state of Turkey) has an incredibly rich archaeological past and was witness to the first agricultural (Neolithic) revolution around 10,000 years ago, referred to the Pre-Pottery Neolithic. Anatolia mirrors the transitions seen across the Levant during this period, as traditional hunter-gatherer societies start accumulating in greater numbers and start building architecture using stone. These hunter-gathering societies relied on wild foods: wild goats and gazelle, wild cereals, fruits, and tubers (Dietrich et al. 2012, 690). Pottery post-dates these societies. Archaeologists know relatively less from this period; hunting and domestic camps seem transitory and as such leave less impact on the landscape—there are no cemeteries, just occasional burials.

Beginning around 9,000 years ago, however, various changes in the archaeological record indicate that fundamental aspects of social life were changing in Anatolia and across greater Southwest Asia. Research at the sites of Çatalhöyük (Atalay and Hastorf 2006; Bogaard et al.

2009; Carter et al. 2006; Hodder and Cessford 2004) and *Göbekli Tepe* (Dietrich et al. 2012) have revolutionized archaeologists' understanding of the origins of complex societies.

Göbekli Tepe is a ritual tell (mound) site dated between 9,000 and 12,000 years ago (Schmidt 2000). The site is considered the world's first temple, with exquisitely carved anthropomorphic features. Similarly, *Çatalhöyük* is a tell site dated between 9,000 and 7,700 years BP, which held between 3,500 and 8,000 people (Hodder 2007; Hodder 2014). The site is one of the first urban settlements worldwide. Both of these sites have given insights into the expanding economic network of the Neolithic through the expansion of feasting regimes.

Çatalhöyük and *Göbekli Tepe* have left considerable record of the feasting activities that occurred at these sites through the preservation of extensive middens (trash pits or deposits). These deposits indicate that, even before the domestication of grains or animals, humans were gathering in fairly large numbers to consume large amounts of specialized foods (Atalay and Hastorf 2006; Bogaard et al. 2009; Dietrich et al. 2012). Evidence for food preparation at *Çatalhöyük* occurred within individual residences (Atalay and Hastorf 2006), though extensive middens throughout the site, as well as installations of animal bones, indicate that public feasting was an integral part of the social life of these people (Bogaard et al. 2009). Stable isotope analyses of human burials indicate that cattle was unlikely to have been the majority source of protein for individuals (Richards et al. 2003), yet the preponderance of bovine bones at the site indicate their prolonged use and social importance (Russell and Martin 2007). Individual rooms at *Çatalhöyük*, likely from slightly later periods, have built-in cubbies for food storage, in some of the earliest examples of private storage of goods (Bogaard et al. 2009); most hunter-gatherers do not store food for an extended period of time nor do they keep said food in one place. Bogaard et al. (2009, 663) estimate that storage capacity in buildings indicate modest surpluses of 50-100% of estimated requirement;

this level of food storage is extremely rare for foraging societies (Testart et al. 1982; Ingold 1983). As a ritual site, Göbekli Tepe has evidence for the production of relatively large amounts of beer, in support of the interpretation of feasting events that were occurring all over Anatolia in the pre-pottery Neolithic (Dietrich et al. 2012). The difference in storage and consumption patterns can be interpreted to be one of the first indications of inequality (Wright 2014).

Feasting and permanent architecture emerge in Anatolia prior to the domestication of pack/food animals and plants. It is evident that these feasts would have attracted visitors from the wider interaction sphere. Although the vast majority of goods (textiles, wooden objects, perishable foods) decay, recent lithic sourcing studies of obsidian, an extremely valuable type of volcanic rock which can produce incredibly sharp stone tools, have shown that obsidian from Anatolia made its way down into the southern Levant during this period, before the use of any pack animals (Carter et al. 2006)! This traded obsidian is not treated the same as locally available lithic raw material; most of the obsidian evidence comes from high-prestige burials, indicating they were of particular importance.

The Celts

Hunting-gathering-fishing communities in northern and western Europe during the Bronze Age and into the Roman Period are often referred to as the Gauls (especially within France) or generally as Celts (Dietler 1994, 585–86). Celtic peoples are well known through the archaeological record as well as through the recordings of the Roman Empire, which fought against various groups along its northern border for centuries. The term today is sometimes used to describe peoples who carry on a Gaelic linguistic tradition, although the link between archaeological Celts and linguistic Gaelic speakers is tenuous. Modern neo-paganists, especially

within the British Isles, have also taken up the term in resistance to dominant socio-political regimes and claiming heritage over Celtic archaeological sites (Dietler 1994)

Some archaeological Celtic groups were acculturated into Roman society through the colonization of southern Gaul and the British Isles while other groups, especially Germanic peoples, actively resisted Roman intrusion. Celtic societies utilized feasting regimes to regulate power and trade (Dietler and Hayden 2010). In the Bronze Age, prior to the growth of the Roman Empire, the first public works are associated with feasting events. The well-known site of Stonehenge has a lesser-well known midden surrounding the stones, which where drug several hundred miles from their quarry (Thorpe et al. 1991). The Celtic peoples who built Stonehenge were semi-sedentary hunter-gatherers that occasionally husbanded pigs, yet the extensive midden indicates that large consumption activities occurred at the site on a regular basis. The site, which has several earthworks, also has a large cemetery—one of the first in the region—which shows stratification in the distribution of grave goods (Parker Pearson et al. 2009). The grave goods also indicate that trade extended perhaps onto the mainland of Europe. At the site of Llanmaes in South Wales, hundreds of pig right forelimbs in an early Iron Age midden indicate that feasting activities were highly organized events that could motivate the labor of presumably as many households (Madgwick and Mulville 2015).

Roman interactions with Celtic peoples allows for a ethno-historical perspective on competitive feasting regimes (Dietler 1990; Dietler and Hayden 2010). The Romans characterized the Celts in much the same way as European colonists stereotyped the indigenous peoples of the Americas: barbarians. While Romans certainly enjoyed feasting in their own way, Roman colonists were able to create inroads with Celtic peoples by understanding Celtic competitive feasting regimes (Woolf 2000; Dietler 1990). Participation in elite Celtic feasting practices gave

Roman officials peaceful access to the full suite of Celtic trade goods, even in a political economy without a formalized marketplace culture (Woolf 2000).

Toyah Phase

North America has been home to a diversity of indigenous cultures. While the ethnographic informs much about the cultures present during European colonizations, the archaeological record is the primary source of information about more ancient cultures. Between 700 and 300 years ago (1300-1700 BCE), a new archaeological phenomenon tradition in central Texas is recognized; this phenomenon is characterized by the proliferation of bone-tempered pottery, beveled stone knives, and bison hunting (Collins 2004). While the archaeological record cannot speak to what these peoples would have called themselves, archaeologists recognize this new social field under the name Toyah (Arnn 2012).

Toyah is the first archaeological tradition in central Texas to take on a ceramic tradition, even though neighboring groups to the east (Caddoan) and west (Puebloan) had utilized ceramics for thousands of years. While stone arrowhead points of a certain style called Perdez are widely distributed throughout Texas, many Toyah sites contain a variety of point styles and pottery from surrounding cultural areas (Kibler 2012). While archaeologists should not strictly assume that differing point or pottery styles represent different ethnic peoples, some of the pottery styles are found primarily within different archaeological contexts. Rockport pottery, for example, is primarily found on the Gulf Coast of Texas and is associated with the historic Karankawa, who were limited to coastal sites (Ricklis 2010). Puebloan pottery from New Mexico has also been found with Toyah sites (Kibler 2012).

In addition to goods from multiple archaeological traditions, Toyah sites also contain evidence of processing of large quantities of food. Toyah was initially associated with bison

hunting, though more recent studies have indicated that a wider subsistence base that included deer, rabbit, and small game was common (Black 1986). Plant food was an important part of the diet as well; agave and root foods were commonly cooked through earth ovens. Earth ovens use heated rocks as an energy source within a pit; food is wrapped in leaves or cloth and buried over the rocks for 3-36 hours. The moisture content of the leaves and packing materials ensure that the food never burns, but steams over a large period of time while conserving fuel (Black and Thoms 2014; Thoms 1993). Earth oven quantity and size increased in the Toyah period, indicating that population size and densities increased (Thoms 2008; Thoms 2009; Kenmotsu and Arnn 2012). Some of these cooking features are incredibly large, indicating that large amounts of food were being cooked at one time. The evidence for large-scale cooking, as well as trade, is indicative of feasting activities.

Unfortunately, site formation processes (how long sites have been open to the elements) are not well defined for many Toyah sites; most sites have been recovered from cultural resource management surveys which have limited resources. Because Toyah is a relatively recent archaeological tradition, many sites have not been buried very deeply and may have been plowed over. Unfortunately, that does not allow for very precise sequencing of how long sites were occupied. As such, most archaeologists presume that Toyah sites were only occupied seasonally (Black 1986; Johnson 1994; Arnn 2012; Kenmotsu and Arnn 2012).

As is evidenced above, the Toyah phase represents a time of population density increase. This increase in Texas indigenous populations follows the de-population of the large Puebloan sites in New Mexico; cities such as Paquime were abandoned around 1300 CE after a period of extreme droughts in the 1230s-1250s and an increase in violence (Benson et al. 2007; Foster 2012). It has been suggested, as I agree, that many large Toyah sites represent multi-cultural gatherings

in which luxury and utilitarian goods could be traded. These feasts arose with increased population pressure; presumably similar trading parties were observed in the historical period, where hundreds, if not thousands, of indigenous peoples of disparate origin met for important discussions concerning alliances (for war and for marriage), trade, politics, and food (see Foster 2008). Historical records of these feasts make it clear that while native groups did not necessarily stay in a single location for the entirety of a year, there were well understood geographical boundaries (territorialism) and rules for the exchange of goods (property) (Krieger 2002; F. T. Smith 2005).

Unintended Consequences of Feasting

Feasting is the first archaeologically observable mechanism of long-distance trade and inter-group social cooperation. Beyond the three case studies investigated here, feasting has been implicated in the archaeological record as a positive motivator for complexity in the Levant (Hayden, Canuel, and Shanse 2013), early dynastic China (Underhill 2002), northern Europe (B. Arnold 1999; Zori et al. 2013; Guerra-Doce 2015), the Hopewell complex in the Midwest of the United States (Pauketat et al. 2002), and along the Pacific coast (Arnold et al. 2015). The ubiquity of feasting societies as antecedent to more complex civilizations speaks to the evolutionary benefits of the system (Boyd and Richerson 1996). As feast hosts (Kirzner's entrepreneurs, Hayden's aggrandizers) met the desires of their guests (customers, peers), the unintended consequences of institutional and technological development also followed. Feasting mechanisms provided the motivation for the development of crucial concepts of the market system, namely in the establishment of dedicated geographical boundaries and claims to land and material goods (private property, ala Demsetz (1967)) as well as in the development of specialized trade and services (specialization).

I have already explored some of the ways that the concept of private property manifests: from the establishment of community cemeteries and permanent settlement to more complex land tenure systems. The association between feasting events and the emergence of geographical notions of ownership is important as land ownership and tenure is crucial for understanding market processes.

A more subtle consequence of feasting mechanisms is the development of new and important technological innovations (Hayden 1998). As explored above, entrepreneurs aggrandized feasting mechanisms through the distribution of special goods; these goods in turn become elaborated as feast hosts look to impress their guests even more. Specialized food is a centralized aspect of feasting activities, and here the archaeological evidence is overwhelming; feasting activities intensified cooking technologies that is correlated with the development of pottery and the domestication of cereals (Hayden 2009; Hayden 1998; Hayden 2014a; Hayden 2003).

In all three examples presented here, the independent development of indigenous pottery production arises with evidence of feasting. While the first occupations of Çatalhöyük in Anatolia do not contain pottery, the technology is widely adopted following its prominence. Similarly, some of the first evidence of local pottery production, Beaker Ware, for the Celts is found in association with burials with evidence of feasting (Guerra-Doce 2006; Guerra-Doce 2015; Rojo-Guerra et al. 2006). Toyah pottery is even more striking, as neighboring groups, such as the Caddo or the Puebloans, produced pottery for more than a thousand years before groups in central Texas adopted the technology. The development of pottery technologies is one of the first indications of craft specialization and the beginnings of a division of labor. Complete specialization, where individuals take on one industry for the majority of their time, occurs first within sedentary groups under

hierarchical, city-state level societies (Feder 2014, 344). Nonetheless, division of labor allows for crucial specialization in markets and propels the development of complex economic production, the importance of which has been known since before the time of Adam Smith.

In coordination with the development of specialized labor, important technological advancements accompany feasting societies across the globe. The domestication of cereal grains (such as wheat, corn, and rice) precipitated agriculture and revolutionized food production worldwide. Cereal grains were domesticated from wild tropical grasses; the domestication process increased yields, size of the grains, as well as ease of harvest and processing (Zeder et al. 2006). Mounting archaeological and genetic data indicate that humans utilized wild forms of these grains without changing general hunter-gather-fishing lifeways. In cases where agriculture was adopted, there seems to be several hundred years gap between the utilization of cereals (such as wheat [Blockley and Pinhasi 2011], corn [Bryant 2007], and rice [Zhu et al. 2007]) and their use as agricultural staples. These grains would have taken much energy to process and were often utilized as specialty foods within feasting contexts (e.g. Jennings 2004; Guerra-Doce 2014). Wheat, for example, has been found in several wild forms at archaeological sites in the Levant from the Natufian, around 12,000 years ago; these grains would have tough outer coats (glumes), which make it harder to process, and weak stems that hold the grain to the stalk (rachis) that make the grains difficult to harvest (Feder 2014, 287). Following the feasting regimes in the Pre-Pottery Neolithic, grains with softer glumes and weak rachis were increasingly selected, as were varieties with increasing number of seeds; this selection process altered the genetic structure and phenotype of wheat to what it is today. Early wheat has been seen in many early tell sites, with the possibility that the grain was being processed to produce beer (Atalay and Hastorf 2006; Katz and Voigt 1986;

Crewe and Hill 2012; Guerra-Doce 2015; Hayden, Canuel, and Shanse 2013; Maeir and Garfinkel 1992; Sallaberger 2015).

The evidence for maize domestication follows a similar narrative. Maize is an extremely altered form of the tropical grass teosinte (*Zea mays spp.*); teosinte has extremely small grains that are covered in a hard glume. The earliest evidence for teosinte exploitation is not for the grain, but rather for the sweet sap in the stalk. This sap can be enjoyed simply by chewing by the stalk, but also through fermenting the sap into a weak wine. The transformation from a hard shell to soft grain is a single-point mutation; human exploitation of the plant cannot then be explained through use of the plant as a grain from its origins. Following increasing use of maize in the Mexican lowlands, which has been primarily been identified through microfossils of the stalk (Piperno and Pearsall 1993; Piperno and Pearsall 1998), maize developed and became the staple crop for much of the New World. Chicha, corn beer, was an important part of feasting events under the Olmec, Maya, Aztec, and Inca and likely has held importance as a specialty food for much longer into the prehistory of the region (Bray 2009; Bruman 2000; Goodman-Elgar 2009; Jennings 2004; Weismantel 2009).

It has been well argued that exploitation of cereal grains for feasting events, as described here, strengthened the relationship between humans and these carbohydrates, which lead to their unintended domestication (Hayden 2014a; Hayden 2009; Smalley and Blake 2003). Feasting regimes often emphasize the use of alcohol beverages from cereal grains (Arnold 1999; Bray 2003; Bray 2009; Dietler 1990; Dietrich et al. 2012; Joffe 1998; Guerra-Doce 2015; Weismantel 2009; Hayden 2009; Zori et al. 2013); the archaeological evidence is mounting, but the association between brewing for feasting and domestication is increasingly convincing (Braidwood et al. 1953; Hayden 2003). The onset of the Holocene, the current geologic epoch, brought drier, warmer

temperatures undoubtedly improved conditions for cultivating tropic grasses (Blockley and Pinhasi 2011; Flannery 1973). Domesticated grains became the staple crop in agricultural revolutions worldwide, of which the impact cannot be understated.

As discussed here, as a result of feasting mechanisms, the archaeological evidence points to developments in technologies essential to the development of agriculture as well as the emergence of land ownership regimes. These innovations are foundations under which market systems operate.

Discussion

Many theorists have tried to understand the origins of the market; these theories have often arisen in economic thought and are quite varying, due to the fact that no one facet of what is considered a market—or a market system—is agreed upon, just as confusion over the concept of “emergence” (Beaulier and Prychitko 2006). In the economic development narrative, however, there is no mention of feasting paradigms. Rather, these paradigms argue normatively, after Adam Smith, that agriculture lead to surplus and the creation of wealth, which lead to trade, private property, and the market system. Also, economic treatises of feasting mechanisms have recently argued that feasting is insurance against theft. These two narratives, as I will address below, fail the anthropological and archaeological evidence for the emergence/maintenance of regular long-distance trade.

Economic textbooks often mythicize a period of bartering as the mode of pre-currency exchange (Graeber 2014), as popularized by Adam Smith (1982). Smith’s emphasis on the natural division of labor surmises an individualized surplus (i.e. a baker has extra bread, the shoemaker has extra shoes), which is then bartered to meet the needs of the individuals. With the expansion

of markets, he argues, metal currency comes to replace bartering as a more effective mechanism for trade. Graeber (2014) traced this idea to the 1500s through the lectures of an Italian banker, Bernardo Davanzati (Waswo 1996). In the modern era, emphasis has been placed on agriculture as this mythical origin to surplus, which catapults the division of labor (see Arnold et al. 2015 for discussion).

Anthropological work, however, has long denied the reality of such an institutional system of pre-currency bartering (Mauss 1969) as well as the necessity for agriculture to create surplus (Arnold et al. 2015). As Humphrey (1985, 48) emphasizes, “No example of a barter economy, pure and simple, has ever been described, let alone the emergence from it of money; all available ethnography suggests that there never has been such a thing.” Rather, bartering arises out of complex situations in which other forms of exchange predominate (Chapman 1980), such as when currency systems are considered unreliable (Humphrey 1985). Chagnon (1968, 100) states that for the Yanomanö “...a prerequisite to stable alliance is repetitive visiting and feasting, and the trading mechanism serves to bring about these visits,” though the trading aspects are downplayed in the social and political theatre of the feast. Feasting is the explicitly understood reason for inter-group peaceful celebration—like the Kula Ring phenomenon (Malinowski 1922), the bartering and trades are (necessary) byproducts of feasting societies.

The archaeological record also negates this narrative of surplus leading to bartering leading to extensive trade and currency. Little evidence for the division of labor exists for the majority of prehistory, and when specialized labor (such as pottery production or spiritual practice) does arise, it’s within the framework of feasting exchange systems, which predate agricultural regimes. If the individualized or communal accumulation of surplus was required for the development of long-distance trade and markets, archaeologists should find storage features that predate or co-currently

arise with evidence of trade. This is not so. Toyah feasts, for example, show that incredible amounts of food were cooked at feasting events, but the ceramics are seldom larger than individual bowls. The storage pits that contain Toyah remains are no larger than the non-feasting peoples' of the Archaic before them. Bartering likely also occurred within these prehistoric societies, as Chapman (1980) argues, precisely because another form of exchange (feasting) predominated and facilitated the peaceful interaction of different groups. This regularized opportunity for bartering helped solidify relationships to turn to formalized trading institutions. In other terms, the institution of feasting lowers the transaction cost (Heady 2005, 264–65) for economic and social exchange by providing rationale for the peaceful gathering of disparate groups.

Beyond narratives of economic development that neglect feasting activities, some economic treatises of feasting have characterized the tradition as a rational expression of adherence to property rights (Johnsen 1986; Leeson 2014). In this narrative, the destructive action of feasting destroys high-valued goods as a costly signal, as well as redistributes wealth as social insurance. These narratives, however, are limited to situations with permanent, settled peoples with pre-existing property conceptions and geographically-constrained subsistence patterns (i.e. agriculture or anadromous fish). Potlatching in the Pacific Northwest of North America, perhaps the most intensely studied form of feasting, was variable across time and space. To this point, I have avoided the term because I believe, and as Hayden (2014b) makes the distinction, that potlatching is a different mechanism than the competitive feasting discussed here. While both potlatching is a form of competitive feast, with the conspicuous consumption and drive for increasing elaboration, the destructive aspect is not seen in the archaeological record. In fact, the destructive aspect of at least Kwkiutl potlatching seems to have been driven to elaboration with European settlement (Johnsen 1986, 47)—a disruption in the social structure of native peoples. Therefore, these narratives are

fairly constrained to particular circumstances in which property rights have already been established, and there is some form of social or economic pressure against the system. The *longue durée* perspective here focuses on the first forms of feasts, where property rights are only territorial rather than institutionalized and formal. Potlatching, Kula Ring, and human sacrifice forms of feasting are fascinating, unique forms of feasts, but due to their situation within complex, sedentary groups, they may well represent those attachments to existing property rights rather than fit within the narrative for the origin of markets.

To take the heart of the argument of conspicuous destruction / feasting association, conspicuous destruction is undeniably a signal of wealth, but whether it actually suppresses plunder and theft is unclear in these archaeological contexts. As stated above, these early feasting societies did not have large storage of resources, no long-term storage of surplus (c.f. Ingold 1983; Testart et al. 1982). Plundering other groups is relatively rare in hunter-gathering and non-state societies (Kelly 1995; Leeson 2006)—only under extreme environmental distress or sudden influx of population is systematic violence recorded. And in those times of environmental distress or population pressure, feasting is not practiced (Hayden 2014b).

As indicated above, other paradigms that try to understand the emergence of market properties do not satisfactorily fit the historical and archaeological evidence. The narrative presented here, however, does not mean to imply that feasting was the only mechanism that peoples across time and space have adopted to cope with increasing population density. All of the examples presented here, which implemented feasting mechanisms, arose from hunting-gathering-fishing subsistence patterns during periods of relative climate stability and ecological abundance. To contrast feasting, there is archaeological evidence that conflict arises in periods of stable or increasing population density with unstable climates, particularly among agriculturalists (Benson

et al. 2007; Foster 2012). The erupting violence in the Casas Grandes region of the American southwest (Benson et al. 2007) as well as growing militarization in the Levant in the Bronze Age (Drews 1995) speak to how agriculturally dependent societies descend into warfare following ecological uncertainties and amidst population growth.

Conclusions

The origins of market systems lie in the deep human past. The examples presented here showcase how individual motivation of status help drive innovations in conceptions of property as well as technological innovation. The development of feasting mechanisms did not occur at the same chronological point, but rather, this similar framework emerged worldwide in different, desperate societies following increasing population density. As a pro-social, non-violent mechanism, feasting provides an apparatus for cooperation between independent groups of people. Human pro-sociality between non-kin groups (Tomasello 1999; Tomasello and Vaish 2013) is incredibly important for building complex societies, both in prehistory and today.

In discussions of feasting mechanisms, the host of the feast, which Hayden (2014b) refers to as *aggrandizers*, can be equivocated with classical liberal understandings of entrepreneurs (P. Boettke 2004; Kirzner 2013; Storr 2013; Storr 2008). As Hayden (2014b, 17) posits, "...aggrandizers are probably responsible for many of the fundamental transformations of culture that archaeology has been able to chronicle over the last 40,000 years." These entrepreneurs recognize a space for both personal and social advancement. As such, the archaeological evidence indicates that social aspects of the market (Storr 2013; Storr 2010; Storr 2008) were critical to its advancement.

McCloskey (2010a) argues that the cultural shift in associating dignity and respect for the accumulation of material goods and services precipitated the expansion of European capitalism. Her argument champions cultural motives for the acceleration of market processes; in many ways, the argument presented here does the same. Rather than a materialistic urge to collect goods and services, market processes are enhanced by cultural milieu that allows individual dignity and respect in the collection, management, and intensification of such resources. A neo-evolutionary view of human action asserts that all people are motivated by a wish to reproduce, whether that be biological or psychological influence (Richerson and Boyd 2005). Systems in which group fitness is enhanced through individual motivation leads to group expansion, either in the birth rate or in the conversion (willing or otherwise) of others to that system. While this particular perspective, grounded in methodological individualism (Boettke and Coyne 2005; Von Mises 2005), is not a new concept, archaeology can provide substantial material evidence to elucidate mechanisms of the market order.

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TOYAH *MITOTES*: FEASTING IN THE TERMINAL LATE PRE-HISPANIC SOUTHERN PLAINS

While a feast can refer to any gathering of individuals for a special purpose and with special food, the practice of competitive feasting, in which feasting events become the mechanism through which prestige, power, and goods circulate a community, has been studied in communities across the globe, past and present (Hayden, 2014a). Feasting economies are often considered to stimulate transitions from small-scale societies to more complex, hierarchical societies (Arnold et al., 2015; Chacon and Mendoza, 2017; Dietler and Hayden, 2010; Hayden, 2009, 2014a, 2014b) and are therefore an important phenomenon for anthropological study (Hayden and Villeneuve, 2011). Archaeological identification of feasting, however, has mostly focused on individual features or sites (Boethius, 2016; Bogaard et al., 2009; Coupland, 2006; Duncan et al., 2009; Madgwick and Mulville, 2015; Pauketat et al., 2002; Zori et al., 2013), which limits understanding of the economic systems and ramifications of feasting. Discussions of the economic ramifications of feasting are mostly limited to sedentary, pre-state or state-level societies (Arnold, 1999; Bray, 2003a, 2003b; Dietler and Hayden, 2010; Dietrich et al., 2012; Kassabaum, 2014; Underhill, 2002). Feasting behaviors among non-sedentary groups have been difficult to ascertain archaeologically, partly due to the ephemeral nature of their archaeological deposits (Bettinger et al., 2015; Shott, 2001).

A multi-evidenced perspective can elucidate feasting patterns as a regional phenomenon among hunter-gatherers. I argue that through an analysis of cooking feature size and regional trade, the archaeological record complements the ethnohistorical record of indigenous foraging peoples in gathering in large numbers to hold feasts. This methodological approach allows for the

recognition not of individual sites but a recognition of a changing indigenous political and social economy. Identifying feasting behaviors among mobile foraging groups allows for a better understanding into the development of complexity (Arnold et al., 2015; Chacon and Mendoza, 2017; Hayden and Adams, 2004), material culture change (Hayden, 2014a, 1998), and the adoption or production of new technologies (Dozier, 2017; Hayden, 2014b, 2009; Hayden et al., 2013). I utilize data from the terminal late pre-Hispanic (TLP; 1250-1650 CE), also called the Toyah phase, to showcase how a feasting economy can be recognized from archaeological evidence.

Enigmatic Toyah

The terminal late pre-Hispanic and proto-historic archaeological cultures of central and south Texas have distinctly different patterns from the preceding twelve millennia. Although neighbors to the west (Puebloan cultures) and east (Caddo groups) have a deep history of maize agriculture and ceramic production, native peoples in central and south Texas did not produce their own pottery until after 1250 CE. A distinctive lithic toolkit is noted for this period and associated with locally produced bone-tempered pottery, Leon Plain, which together have been recognized as the archaeological culture Toyah (Perttula et al., 1995; Suhm et al., 1954).

With a recognition of Toyah's unique geographical location in the corridor between the Pueblos and Southeastern Complexes (Speth and Newlander, 2012), I propose an explanatory lens for Toyah material culture development, one that is situated in population aggregation (Kenmotsu and Arnn, 2012), resource intensification (Johnson and Hard, 2008; Thoms, 2009), and thereby an complexifying social field (Arnn, 2012a), in Morgan's (2015) *sensu latu* sense. I argue that the archaeological and ethnohistoric record evidences a feasting economy in central and south Texas,

1250-1650 CE, whereas social and economic tensions are mediated through intragroup feasts with large-scale or specialized food production (Arnn, 2012b; Dietler and Hayden, 2010; Hayden, 2014a; Hayden and Adams, 2004). I draw from archaeological patterns of increasing earth oven size (Black and Thoms, 2014; Thompson et al., 2012, pp. 134–141), long-distance trade (Kibler, 2012), and proliferation of new technology (Hayden, 1998) to situate Toyah archaeology as evidence of pre-Hispanic feasting.

As noted by early Spanish documents, feasting was a common event among the indigenous peoples of south Texas, such as Álvaro Núñez Cabeza de Vaca observed in the region in 1528 (Krieger, 2002). I relate the ethnohistorical accounts of feasting events among the groups associated with Toyah material culture; this understanding of Toyah as a feasting community is contrasted with previous theoretical explanations of the TLP. As an example of pottery-producing, mobile hunting-gathering societies that persisted into the historic period, Toyah archaeology provides a unique perspective on the circumstances in which ceramic technology is adopted (Sturm et al., 2016). Studies of forger communities with feasting economies expands anthropological understandings of the mechanisms behind technological revolutions (Dozier, 2017; Hayden, 2014a, 1998; Hayden and Adams, 2004) and socio-economic complexity (Arnold et al., 2015).

Archaeological Definitions of Toyah

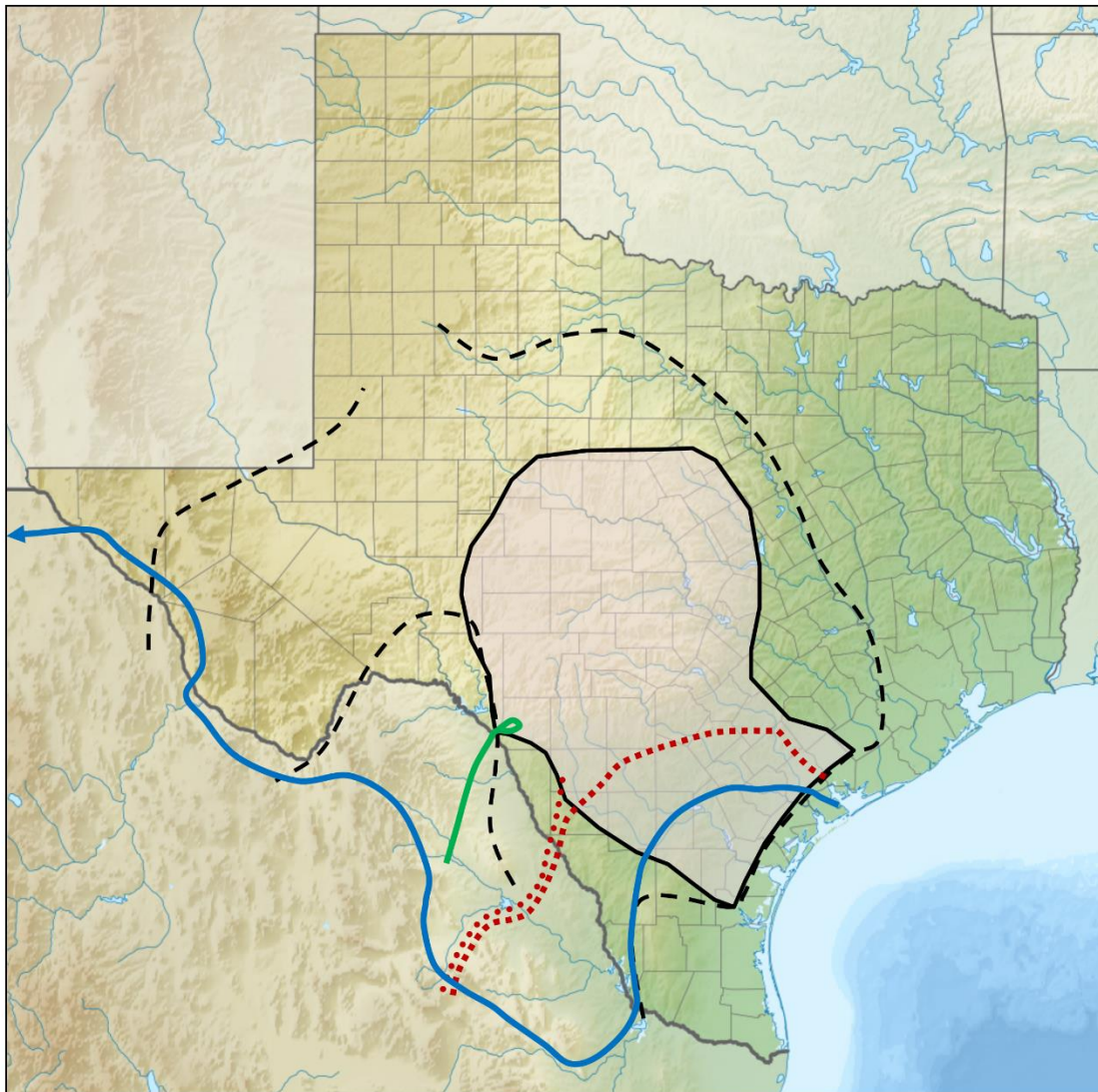
The term Toyah and its recognition as a separate archaeological culture preceded its codification within the *Handbook of Texas Archeology* (Suhm et al., 1954, pp. 112–13) by at least a decade (Kelley, 1947; Krieger, 1946). Figure 1 depicts the traditional and shared Toyah area (Johnson, 1994), with early Spanish travel narratives that mention indigenous groups. The culture-area description was determined by the presence of Perdiz projectile points, beveled lithic knives, “snub-nosed” scrapers, manos and metates, and the emergence of locally-produced bone-tempered

pottery, Leon Plain (Suhm et al., 1954, p. 112). Most Leon Plain ceramic vessels are undecorated, with simple surface polishing treatments (Perttula et al., 1995). Later Texas Spanish mission assemblages, which likely were created by indigenous peoples descended from TLP cultures, indicate a similar technological manufacture as seen in Toyah (Carlson et al., 2016; Hester and Hill, 1971; Tomka, 2017).

Toyah as a Feasting Society

Ethnohistoric Records of Feasting in Central Texas

An abundance of ethnohistoric literature attests to the interconnected social realm of the indigenous peoples during Spanish colonization of what is now known as Texas (Foster, 2008; Krieger, 2002; Minor, 2009; Smith, 2005; Wade, 2003). Large gatherings of people (into the thousands) are a common observation within the ethnohistoric record. The earliest Spanish report in the region by Álvar Núñez Cabeza de Vaca indicates that large gatherings of mobile hunter-gatherers were quite common in the Texas interior in the 1530s. Table 1 relates Cabeza de Vaca's records of either large numbers of people or mentions of feasts from south Texas. He notes groups as large as three to four thousand, with feasts among almost all of the groups with whom he travels. Cabeza de Vaca observed large gatherings of people primarily in the summer, when prickly pear (*Opuntia* spp) fruits were abundant. He also notes the use of psychoactive substances in accompaniment with these *areytos* and *fiestas*, a common feature of feasts worldwide (Hayden and Villeneuve, 2011).









-  Classic Toyah Culture Area, as defined by Johnson (1994, 243)
-  Shared Toyah Culture Area, as defined by Johnson (1994, 243)
-  Journey of Cabeza de Vaca, 1528-1533, from Krieger (2002: 70, 109)
-  Fr. Manuel de la Cruz, 1674, from Wade (2003:11)
-  Alonso de León Expedition, 1688, from Orellano Norris (2017: xii)
-  Alonso de León Expedition, 1689, from Orellano Norris (2017: xii)

Figure 1. Toyah Classic Culture Area, from Johnson (1994), overlaid with published Spanish expeditions into area.

Spanish officials and missionaries of the 17th and 18th centuries were much preoccupied with the rambunctious feasts of indigenous peoples, which they referred to as *mitotes*. These *mitotes* were large gatherings, with dances and food (and often mind-altering substances of varying strengths), and explained by the Spanish as honorary feasts, victory parties, or pagan celebrations (Maestas, 2004). Father Juan Larios led several missionary expeditions into the traditional Toyah area. In 1670, Larios reported a *mitote*, a celebratory dance, with over 300 indigenous people in attendance (Steck, 1932, p. 3) and in 1673, he reports an intertribal group of 543 individuals (Steck, 1932, p. 6). In 1674, Friar Manuel de la Cruz also noted dances and feasts in his journey over the Rio Grande (Wade, 2003, pp. 10–15), as described in Table 2. Writing from Monclova, Mexico, in 1675, Don Antonio de Balcarcel Rivadeneira y Sotomayor requested support for indigenous people, whom also establish intertribal peace celebrated with “a dance (called) the *mitote*. This dance goes on for twenty-four hours and the individual who lasts the longest is considered the most valiant” (Wade, 2003, p. 235). More than a hundred years after Cabeza de Vaca’s journey, Alonso de León led several exploratory expeditions into Texas from Monclova, Mexico from 1686-1690 (Orellano Norris, 2017); his diaries record several mentions of large gatherings of indigenous peoples in the Toyah traditional area in 1688 and 1689, sometimes from different nations, as indicated in Table 3.

The indigenous landscape in Texas drastically changed in the 1700s; influx of Apache groups and later Comanche groups into central and south Texas (Berlandier, 1969; Campbell, 1988; Minor, 2009; Smith, 2005), in conjunction with devastating smallpox and other infectious disease epidemics (Ewers, 1973), drastically altered indigenous demographics within the traditional Toyah area. However, in 1716, Antonio de San Buenaventura y Olivares still wrote about the indigenous peoples inhabiting the mission San Juan Bautista, along the Rio Grande,

noting that intoxicating beverages containing peyote or “other herbs” were still consumed during *mitotes* (Antonio de S. Buenabentura Olivares et al., 1968, p. 198).

It is not my intent to correlate a single nor specific ethnohistoric groups with Toyah. While archaeologists have tied TLP archaeology to Jumano (Kelley, 1947, p. 121; Wade, 2003, pp. 216–223), Coahuiltecan (Johnson, 1994, pp. 278–281), and other groups (Kenmotsu and Arnn, 2012), it is evident that discrete ethnic divisions available in the ethnohistoric record are homogenized within the archaeological record (Wade, 2003, pp. 216–223). Ethnically divergent groups often share a common social field where understood cultural and material norms, which I propose manifested as feasts and gift-giving, are symbols and promises of inter-group cooperation (Arnn, 2012a). With the extreme depopulation of indigenous peoples resulting from European interaction (Ewers, 1973), the diversity of the indigenous peoples is underdocumented—particularly in central Texas, which was not frequented by Europeans until relatively late in the colonization process.

Table 1. Accounts of large groups of people and/or feasts by Cabeza de Vaca in 1530s CE Texas, as translated by Krieger (2002).

Ecoregion	Population	Feasting Type	Season	Food	Page #	Drug use reference
Edwards Plateau	?	“songs and dances [areytos]”	Spring (April)	Blackberries	185	Mescalbean (187)
	?	<i>areytos</i>	Summer	Tuna	195	Black drink or tuna wine (195)
	“village”	“..celebration lasted three days”	Late summer	Tuna	200	
South Texas Plain	50 dwellings		Winter/early spring	Cactus pads	206	
	?	Dances and songs	Late summer	Mesquite bean	212	
	100 dwellings	Dances and songs	Late summer	Deer	213	
Chihuahua	40 dwellings		Summer	Tunas and Pinones	217	
	3-4,000		Summer	Deer, hare, quail, tuna	219	
	“village”	Festivities [<i>fiestas</i>]	?	Beans, calabashes	222	

Table 2. Mentions of large gatherings of indigenous people north of the Rio Grande by Friar Manuel de la Cruz, as translated by Mariah Wade (2003).

Ecoregion	Population	Year	Season	Notes	Page #
South Texas Plains	733	1674	March	Adults and children, “dance”	12
	166	1674	March	Pinanaca* and Tiltiqmaya* alliance, “feast”	13
	82	1674	March	Babusarigame*, share “bead-like fruit”	13

*named band/groups

Table 3. Large populations of South Texas indigenous peoples observed by Alonso de León, 1688 and 1689, north of the Rio Grande, as recorded in his dairy, translated into English by Lola Orellano Norris (2017).

Ecoregion	Population	Year	Season	Notes	Page #
South Texas Plains	500	1688	May	“killing buffalo to make jerky”	148
	300	1688	May	Settlement, large ceremonial room covered with bison hides with 42 attendants for Jean Henri	148
	490	1689	March	60 soldiers, 5 nations (Hapes*, Jumes*, Xiabu*, Mescal*, one unnamed)	158

*named bands/groups

What are the archaeological expectations of feasting?

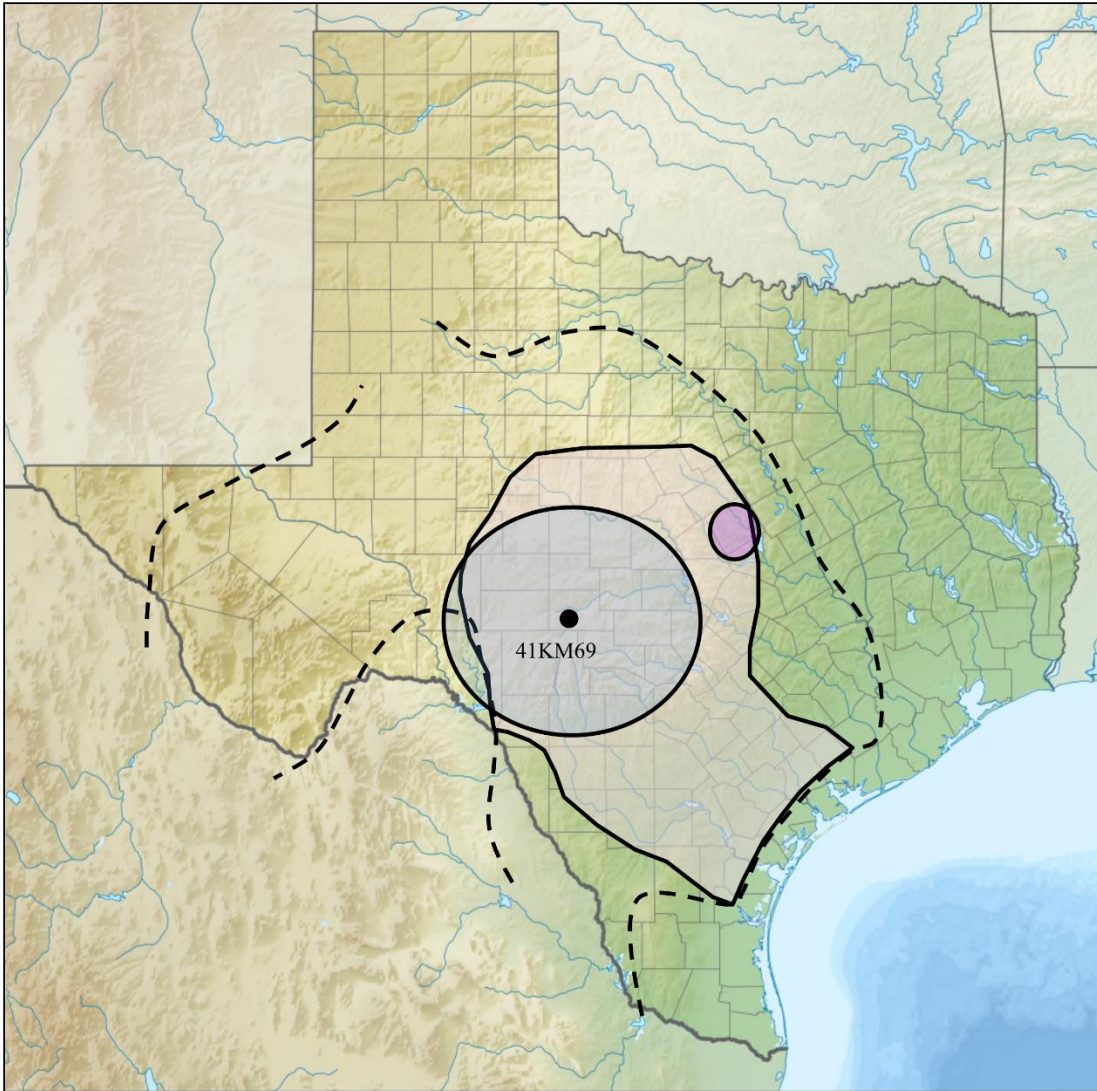
Feasting activities leave distinctive patterns on the archaeological landscape (Dietler and Hayden, 2010; Hayden, 2014a; Hayden and Villeneuve, 2011). As recorded in the ethnohistoric literature, *mitotes* should provide expectations for the types of imprints left in the archaeological record. *Mitotes* were gatherings of large numbers of persons in which dancing, eating, and trading were the main attraction. As these were relatively ephemeral gatherings, little in the way of permanent architecture can be expected. Instead, increased site size with evidence for feeding large numbers of people and evidence of inter or intra-regional trade can be predicted among feasting communities. I shall contend with each of these expectations in turn.

Feeding the Feast

The first expectation of feasting activity can be analyzed through the most prevalent form of archaeological evidence in Texas: rock cooking features. Earth ovens are the predominate form of hot rock cooking in the region over time (Black and Thoms, 2014; Thoms, 2009). It has been well documented that the size of hot rock cooking features, such as earth ovens, directly correlates both with the relative size of the material being cooked as well as the number of people being fed (Black and Thoms, 2014; Thoms, 2009). For example, agave (*Agave spp.*) and sotol (*Dasyllirion spp.*) hearts were and continue to be cooked today in earth ovens; such desert succulents are relatively calorie-poor but require large cooking features; in contrast, geophytes such as camas (*Camassia spp.*) have much smaller mass but are relatively calorie-rich when cooked. However, in order to cook for more peoples, both larger and smaller features would have to increase in size to account for the greater volume of food to be cooked (Black and Thoms, 2014; Thoms, 2008a; Wandsnider, 1997, 1999).

To investigate trends in cooking installation size, I use two case studies. The first is adapted from Thompson et al.'s (2012) study which produced an exhaustive list of fire cracked rock (FCR) features that have been archaeologically documented in a 150 km radius from the Flatrock Road Site (41KM69) in central Texas, heart of the classic Toyah culture area. The second case study uses the Fort Hood Radiocarbon Database to analyze changes in FCR features that have been carbon dated from the United States Army base of Fort Hood, Texas. The geographical extent of these two case studies are presented in Figure 2.

Thompson and colleagues (2012) have produced an impressive regional study that methodologically assessed over 60 site reports in the 150 km radius from the Flatrock Road Site. They catalogued every burned rock feature excavated within the site reports in size, cultural affiliation, and morphology. Excluding burned rock features smaller than 40 cm diameters (which are too small to be always exclusively used for primary cooking activities) and burned rock middens (which do not always contain identifiable individual cooking events and are often re-used over long periods of time), 221 features were utilized in this analysis from Thompspon et al.'s database (2012, pp. 309–319). Using the largest dimension (diameter) recorded, features were assigned into three size classes according to Thoms et al. (2015a, pp. 162–163): family (40-99 cm, 5-49 kg), intermediate (100-175 cm, 50-150 kg), or communal (>176 cm, >151 kg).







-  Classic Toyah Culture Area, as defined by Johnson (1994, 243)
-  Shared Toyah Culture Area, as defined by Johnson (1994, 243)
-  Case Study 1: 150 km radius from 41KM69 (Thompson et al. 2012)
-  Case Study 2: Fort Hood Radiocarbon Database

Figure 2. Extent of the two case studies into burned rock features.

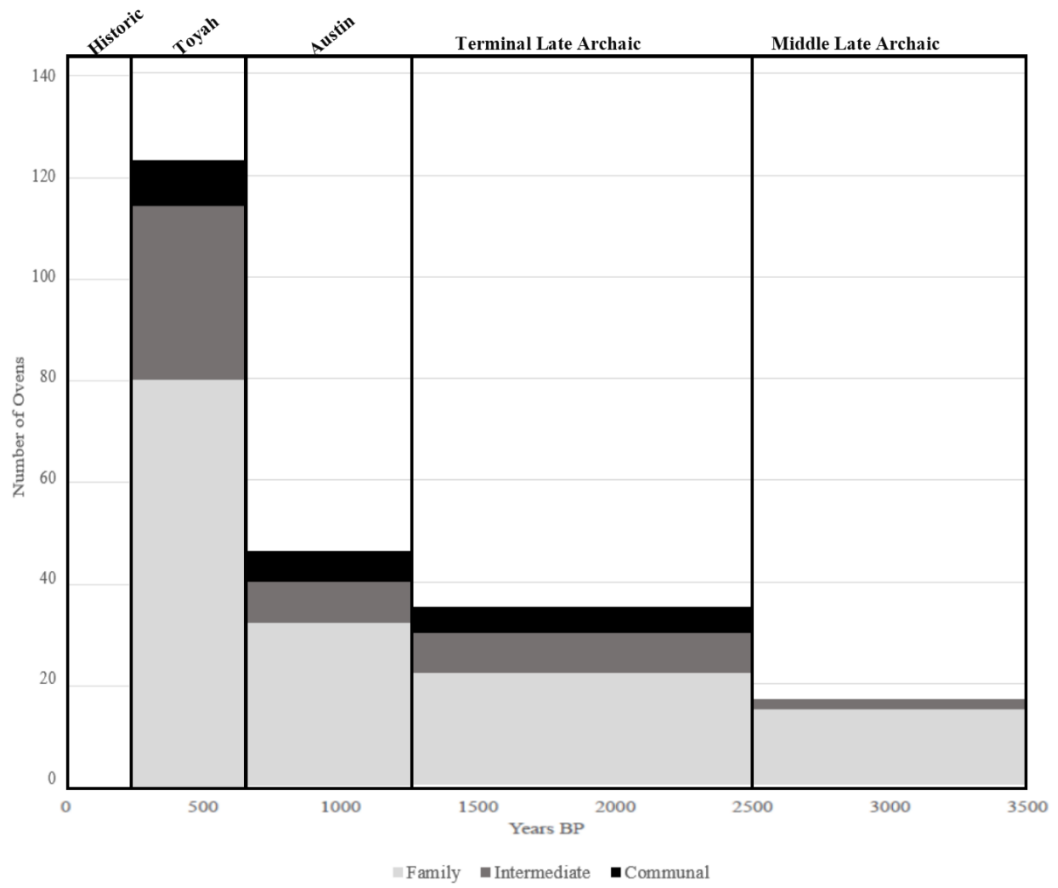


Figure 3. Number of burned rock features by size class in 150 km radius from 41KM69. Number of features explode in Toyah phase.

Table 4. Number of Burned Rock Features within 150 km of Flatrock Road Site (41KM69).

Size Class	Middle Late Archaic	Terminal Late Archaic	Austin	Toyah	
Family	15	22	32	80	
Intermediate	2	8	8	34	
Communal	-	5	6	9	
Totals		17	35	46	123

As shown in Figure 3 and Table 4, the number of cooking features drastically increases during the TLP. The number of all size classes increase during the Toyah phase; from the terminal late Archaic (defined by Thompson et al. 2012 as 550 BCE to 650 CE) to Toyah, family sized features increase by 360%, intermediate sized features by 425%, and communal sized features by 180%. This is especially striking as Toyah phase only lasts 400 years versus the 1200 years in the terminal late Archaic. The distribution of feature sizes is shown in Figure 4.

The period classifications made in Thompson et al.'s (2012) analysis, however, were mostly made by associated cultural material. To allow for greater resolution into the timing of this explosion of cooking features, I utilized the available information from the excavations held on the United States Army's holdings at Fort Hood, Texas. Carpenter and Harnett (2011) compiled an extensive list of burned features that had been radiocarbon dated within the Archaic; I supplemented their data with radiocarbon dated burned rock features from the late pre-Hispanic (Austin and Toyah phase) as recorded in the Fort Hood Radiocarbon Database (Doug Boyd, personal communication, 2017). This dataset is not exhaustive of all burned rock features on Fort Hood—just the features that were chosen for radiocarbon testing through 2011. As with the prior case study, I excluded features smaller than 40 cm or 5 kg, burned rock middens, and any features that had multiple radiocarbon dates that did not fall within the same period. For features with multiple radiocarbon dates within the same archaeological period, I used the date with the smallest range. Feature size was recorded as either longest diameter or kg of burnt rock, again using Thoms et al.'s classification (2015a, pp. 162–163); seventy-five total features were analyzed.

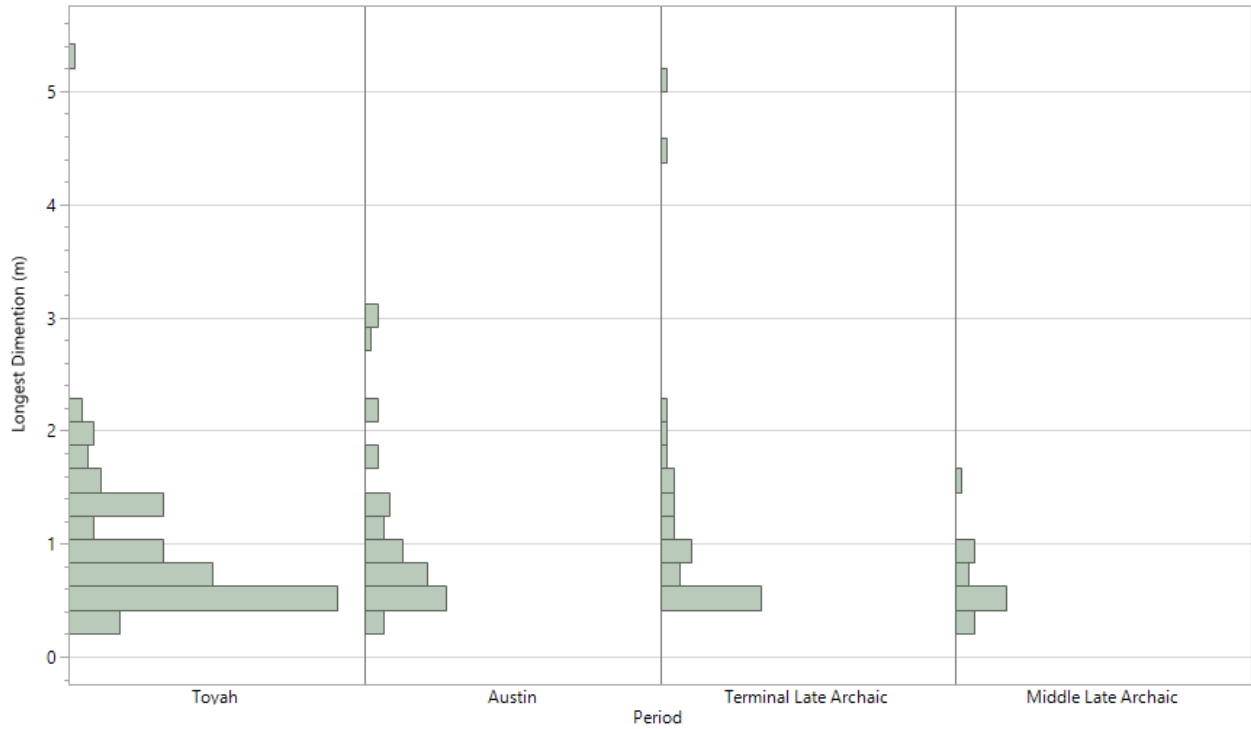


Figure 4. Size distributions of burned rock features by period in 150 km radius from 41KM69.

The patterns seen at Fort Hood mirror those seen near the Flatrock Road site; earth oven size dramatically increases during the transition to the TLP, as shown in Figure 5 and Table 5. The size of FCR features spike in the transition from the Austin to Toyah phase, especially communal-sized features.

Because each case study is constrained to a single ecological zone on the Edwards Plateau, with the same resources, this change in earth oven size indicates a shift in resource choice (towards resources that are physically larger), in feeding larger numbers of people, or both. Determining what resources are cooked in earth ovens can be complicated archaeologically, due to frequent reuse of features, removal of valuable food resources, and issues of contamination and mixing for residue analyses (Black, 1997; Black and Thoms, 2014; Thoms et al., 2015b). Earth ovens for single family groups processing bulky plant foods, such as agave, can range 1-2.5 m in diameter (Wandsnider, 1999). Therefore, increases in intermediate oven size could indicate a shift towards agave or lechuguilla cooking. However, other archaeological studies into Toyah diets do not indicate such a dietary shift.

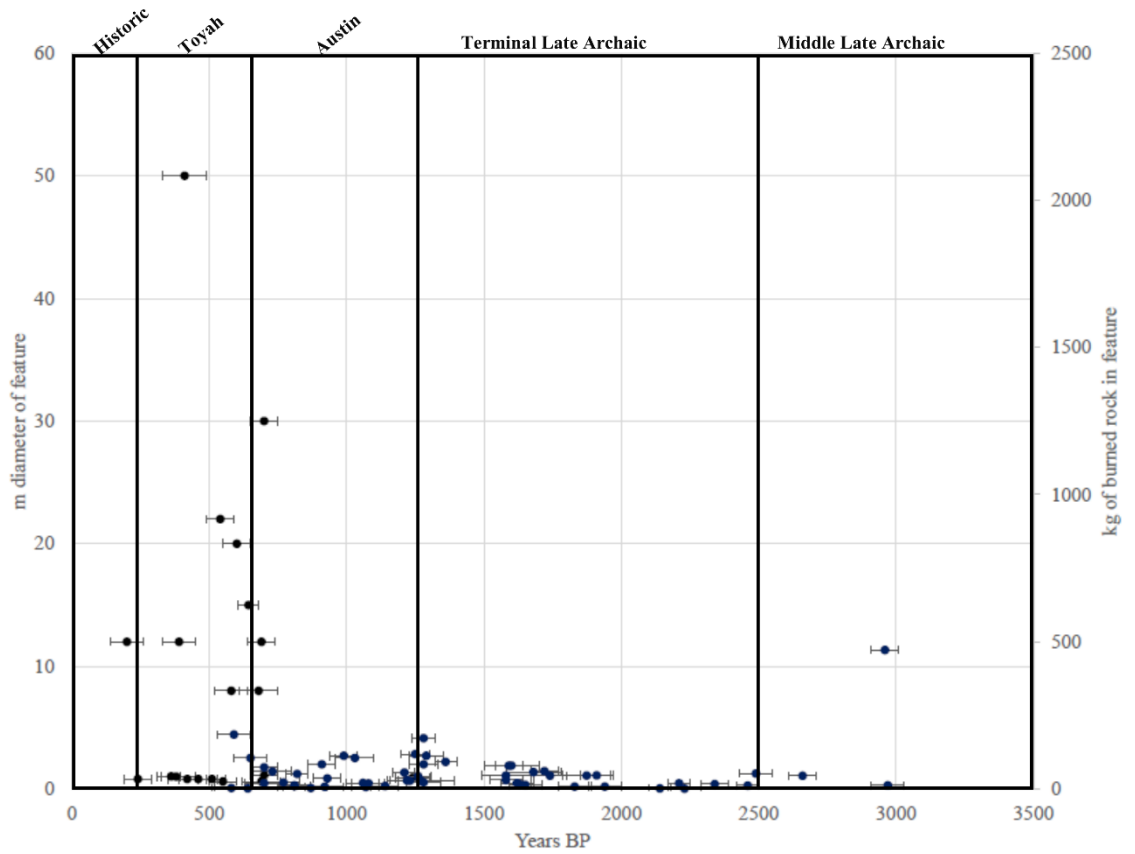


Figure 5. Size distributions of radiocarbon dated FCR features in Fort Hood, Texas. Error bars indicate 1-sigma confidence of age. Large features noticeably increase in the transition from the Austin to the Toyah phase.

Table 5. Number of published radiocarbon dated FCR features since 2011 at Fort Hood.

Size Class	Middle Archaic	Late	Terminal Late Archaic	Austin	Toyah	
Family	2		15	16	8	
Intermediate	-		6	8	7	
Communal	1		-	1	11	
Totals		3		21	25	26

Other than claims of bison intensification (bison were *not* typically cooked in earth ovens), faunal and botanical studies of Toyah sites show no a substantial change in subsistence strategies from the preceding phases. Macrobotanical and faunal analyses from stratified or multi-component sites, such as the Hinojosa Site (41JW8; Black, 1986), Flatrock Road Site (41KM69; Thompson and Mauldin, 2012), and the Little Paint Site (41KM226; Carpenter et al., 2012) show no drastic change in the component of Toyah diets from previous periods. Stable isotope data from the Coleman site (41BX568) indicates that C4 and CAM plants, such as agave and lechuguilla, were part of the dietary regime of Toyah-phase individuals interred there, but are within the same range as that consumed in the Middle Archaic (Mauldin et al., 2013, p. 1378). Thereby, the drastic increase of earth oven size cannot be tied to the change of resource selection, but rather, must be understood as a change in the *amount* of food cooked in these ovens.

Increase in the amount of food processed in earth ovens can be tied to two phenomena: overwintering/storage activities or feeding gratuitous numbers of people. The former is unsupported. All available paleoclimatic proxies indicate that the TLP would not have been particularly stressful for foraging peoples (Mauldin et al., 2012; Nordt et al., 1994; Thompson and Mauldin, 2012); no ethnographic accounts of Coahuiltecan societies nor Spanish observations indicate overwintering activities among the foraging groups of Texas. In addition, even bison processing seen at Toyah sites is inconsistent with bone greasing that is associated with intensive storage practice. Zooarchaeological studies using the freshness factor index as a measure of greasing (Outram, 2001) at Rowe Valley (41WM437, Rush, 2013) and 41SP220 (Gilmore, 2012) indicate that greasing was *not* practiced at these large sites. Therefore, increases in the frequency of large earth ovens should be tied to an increase in the frequency of larger numbers of people fed.

While the data are yet imperfect, general trends in earth oven size indicate that larger gatherings of people at a single locale were increasingly common during the Toyah period, consistent with the expectation of a feasting society. Some archaeologists have already recognized the possibility for large consumption events at Toyah sites. Ricklis and Collins note that the density of bison at 41HY209-T indicate that such a surplus of food that could not have been reasonably consumed only by the presumably small group who would have been involved in the processing. They argue that the site, along with 41HY209-M “...represent contemporaneous activity areas within a larger, more dispersed kind of occupation by a larger resident group” (1994, p. 297), in other words, a feast.

Trade at the Feast

The second expectation of a Toyah feasting society would be the focus on inter or intra-regional trade. Interregional trade, as evidenced by a presence of exotic (extra-regional) materials, is not an uncommon feature of Toyah sites.

While Kibler downplays the utilitarian importance of exotic materials at Toyah sites, he maintains that “...exotic materials in Toyah sites represent the establishment and maintenance of social networks with groups outside the Toyah homeland” (2012, p. 89). He identifies twenty sites with exotic materials, including obsidian, marine shell, and ceramics. These materials come from coastal and east Texas, and as far as New Mexico or Idaho. While most of the sites include materials from an adjacent region, the Jayroe site (41HM51) in the northeast area of the classic Toyah area contains obsidian from two Valles Caldera sources (New Mexico) as well as Caddoan (east Texas) pottery (Kibler and Broehm, 2005). Arnn (2012b, pp. 52–53) identifies thirty-three sites with “mixed assemblages”, meaning containing material culture associated with another distinct archaeological tradition other than Toyah.

The presence of Toyah-associated pottery (Leon Plain) as well as Caddo or Rockport (coastal) wares indicate at least a trading relationship between these disparate groups, which may have included a physical interaction represented at the large Toyah sites mentioned above. Kibler identifies ten sites within the classic Toyah area that contain Caddo ceramics (2012, p. 86). In addition, ceramics from the Toyah Bluff site (41TV441) show three different manufacturing techniques, which Karbula et al. (2001, p. 153) argue may represent different ethnic ceramic traditions. Petrographic and INAA analysis on the ceramics from the Little Paint site (41KM226) also show distinct variability in ceramic technology, though variability due to individual potting choices versus trade is difficult to address without a larger sample (Cecil, 2012, p. 181).

The importance of the bison hide trade has also been implicated at TLP sites, especially as many Toyah lithic assemblages, with their emphasis on snub-nosed scrapers and beveled knives, can be interpreted as representative of late-stage hide curing activities (Ahr, 1998; Thoms and Ahr, 1995). The hide trade was incredibly important to historic Plains groups (Creel et al., 1990), though archaeological evidence for such would be difficult to obtain. Long-distance trade with both Caddo and Puebloan groups are evidenced at Toyah sites, consistent with the ethnohistoric records of *mitotes* featuring trade (Kibler, 2012).

Archaeological Caveats

Equifinality is one of the most difficult aspects of archaeological interpretation. One of the challenges to my interpretation is that most Toyah-age open-air occupations were and are excavated through cultural resource management projects, which for contractual reasons, often cannot always define full extents of the features or site(s) to determine the full size of the occupation period (Kenmotsu and Arnn, 2012, pp. 36, 41). Burned rock features are remarkably resistant to taphonomic alteration and their morphology can reveal much about the types of food

cooked in them (Black and Thoms, 2014; Thoms, 2007; Thoms et al., 2015b); however, archaeologists have only recently paid close attention to recording all the details necessary to understand fully burned rock feature morphology. Analysis of burned rock feature morphology within my assessment of the two case studies may have revealed additional patterns in Toyah phase foodways, but the source data are too variable in level of detail recorded about each feature over fifty years of archaeological investigation into each region. There is yet much to learn about how these cooking features may have been similarly or differentially used in the TLP versus earlier periods.

Temporality is also an important question at many Toyah sites. The relatively recent archaeological phenomenon of Toyah means that there are few deeply stratified sites and that most are near-surface, allowing for palimpsest formation, conflation of individual occupations, and such associated complications. Without extensive radiocarbon sampling over an extended site, it is impossible to tell if such a site is representative of a giant feast with many small encampments or one family returning to the same general area over several decades. As TLP peoples used the landscape in similar ways to Archaic peoples, many Toyah sites overlap older occupations, and some even use the same cooking features for thousands of years. Parsing out cooking features that are used a multitude of times is a complicated and sometimes impossible task (Black and Thoms, 2014).

Finally, grouping the TLP of central and south Texas may be an overgeneralization of the historical patterns within the region. It is likely that some bands or tribes continued to work outside of changing socio-political structures and that some groups more fully bought into the trade and social network of feasting societies than others (Arnn, 2012b, 2012a).

Discussion

Theoretical implications

Three theoretical perspectives have been used to interpret the Toyah archaeological phenomenon: first, the influx of a Plains-adapted people at 1250 CE (Johnson, 1994; Kelley, 1947); second, the widespread adoption of bison-related technocomplex (Ahr, 1998; Karbula et al., 2001; Ricklis, 1992; Ricklis and Collins, 1994); and third, the spread of a common “social field” due to increased population (Arnn, 2012a; Carpenter et al., 2012). Here I discuss each of these positions and conclude that the understanding of Toyah as a social field is currently the most consistent with the archaeological evidence. Moreover, recognizing Toyah as a social field connected through feasting and trade, perhaps with a focus on the bison hide trade, thereby enhances our understanding of the complex relationships maintained by foraging peoples.

While some researchers have posited the Toyah phenomenon represents a discrete population movement of Plains or bison-adapted peoples (Johnson, 1994), radiocarbon dates associated with Toyah indicate that the tradition did not spread geographically through time, nor that Austin-phase traditions were pushed out (Ricklis and Collins, 1994, p. 301). Ricklis and colleagues (1992; 1994) convincingly argued that indigenous peoples on the Texas coast adapted some aspects of the Toyah lithic toolkit, but maintain the same coastal subsistence patterns as seen for thousands of years, indicating that the changes in the TLP were of a social or technological nature, rather than population replacement.

The spatial extent of the Toyah toolkit has been tied to influxes in bison populations in the Southern Plains after the Medieval Climate Anomaly (Drass, 2008; Huebner, 1991; Scheiber, 2007). While it is clear that bison utilization is more visible in TLP sites than in others, it is less clear if this is due to increased availability of bison or choices in predation. Recent survey of the

paleoclimatic and archaeological data, however, suggest that there was no absence of bison (at least in central and south Texas) during the Austin phase (Mauldin et al., 2012; Thompson and Mauldin, 2012). Rather than an influx of bison which spurred technological change, Mauldin et al. (2012) argue that decreases in conditions favorable for bison in the TLP made bison herds more patchy (see Lohse et al., 2014), which affected hunting strategy rather than technology. In this perspective, bison herds may have been more concentrated, allowing for greater numbers of bison to be taken at one time (Thompson and Mauldin, 2012).

The relationship between intensive bison processing for food and the Toyah technocomplex is more tenuous than what many would assume. It is increasingly clear that folks who adopted the Toyah technocomplex continued to use subsistence and cooking strategies that were congruent with earlier periods (Black, 1986; Carpenter et al., 2012; Karbula et al., 2001; Ricklis and Collins, 1994). While bison is present at many Toyah sites (Mauldin et al., 2012), and some claim that the small fracture size of bone indicates greasing activities, only two studies have looked at the zooarchaeological evidence to test directly if the fracture patterns are consistent with greasing. Bison processing for grease is ethnographically well documented among Plains peoples, and the archaeological correlates are being increasingly elucidated (Brink, 1997; Outram, 2001; Scheiber, 2007; Wandsnider, 1997). Both of the zooarchaeological case studies, however, indicate that the bison faunal remains are not fractured fresh to the degree required for greasing and thus are inconsistent with expectations for greasing (Gilmore, 2012; Rush, 2013). While some have argued that Leon Plain served as vessels for bison greasing activity, their relatively small size (10-20 cm; [(Perttula et al., 1995; Rush, 2013)]), thin wall structure (Thompson, 2012, p. 168), and small-mouthed openings (Perttula et al., 1995) makes such an interpretation tenuous. Stable

isotope data from the Coleman Site (41BX568) indicate that Toyah-phase individuals did not rely on bison for protein (Mauldin et al., 2013).

The wide distribution of Toyah-associated artifacts also render an explicit tie between the technocomplex and bison subsistence intensification difficult to ascertain. Perdiz points are found from Northern Mexico and the Pueblos (Mallouf, 1987; Speth and Newlander, 2012) to the Red River (Boyd, 2012) to the Caddo-lands (Perttula, 2004). Perhaps more puzzling is the adoption of the Toyah lithic toolkit, including beveled knives and Perdiz points, in the agricultural Cielo complex of northern Mexico (Mallouf, 1999, 1987).

While it is evident that bison were an important aspect of the Toyah phenomenon, the evidence for intensification on bison primarily as a food source is unsubstantiated. In contrast, Ahr (1998) argues that the Toyah lithic toolkit is more indicative of late-stage bison *hide processing*, rather than intensive focus on bison as a food resource. This functional explanation of the lithic toolkit in hide processing thereby is an explanation of the adoption of the toolkit by peoples who were clearly not reliant on bison for large portions of their diet (Mauldin et al., 2013; Mallouf, 1999).

The bison hide trade has been implicated in the changing economies within the Great Plains during this period as well (Scheiber, 2007, 2005; Vehik, 2002). Judith Habicht-Mauche argues that the Southern High Plains to the north west of Toyah country (Garza Complex) also undergoes such a transition, which affected the political and labor status of women (2005, pp. 39–40, emphasis mine).

...political leaders and competitors for political leadership on the Southern Plains may have exploited the social disruptions and demographic upheavals of these times to enhance their own individual wealth, power, and prestige. Trade, in this context, would have provided ambitious men with the means to accrue the resources and wealth necessary to participate in *increasingly competitive status-building*

activities. At the same time, the relationship of debt, obligation, and dependency that were created by such activities could have been mobilized...nonsubsistence items, such as *tanned hides*, decorated *ceramic vessels*, personal ornaments, and *exotic lithic materials*, probably would have played a more important role in such *competitive* and alliance-building transactions than basic subsistence items because of their greater potential for being converted into *visible symbols of status* and for being accumulated as objects of wealth.

More recent syntheses of the Toyah phenomenon have emphasized the transformations seen in Toyah as indicative of wider changes in the socio-political context of the TLP (Arnn, 2012a, 2012b; Carpenter et al., 2012). Arnn (2012a, 2012b) convincingly argues that Toyah cannot be conceived of as a single ethnic entity; the archaeological record does not have the resolution to distinguish between the likely numerous ethnic and linguistic divisions that existed within the wide extent of the Toyah technocomplex. Rather, Arnn argues, the continuity of material culture (Perdiz points and Leon Plain ware) indicate a common form of interaction on the landscape, which may represent the origins of an ethnogenesis that follows increasing population pressure (Jones, 2010; Kenmotsu and Arnn, 2012). Carpenter and colleagues (2012) take a similar perspective, arguing that Toyah technocomplexes are indicative of shifting socio-political priorities due to shifting bison populations. They argue that "...the social milieu, whether warfare, *political economy*, or otherwise, increasingly trumped the immediate ecological conditions as the prime mover in Toyah evolution and demise" (2012, p. 262, emphasis mine). A focus on the bison hide trade can explain what resource would be attractive enough in order to create such a large regional social field, yet yield relatively few archaeological indicators of ethnic group identification (Arnn, 2012a; Speth and Newlander, 2012).

An understanding of the Toyah technocomplex as indicative of a feasting society is congruent with Arnn's (2012a) conception of Toyah as a social field and fits within greater economic

transformations occurring on the plains (Scheiber, 2007, 2005; Vehik, 2002). Recognition of the Toyah as a feasting political economy has important implications for our understanding of these foraging peoples. The methodological approach employed here, with a focus on trade and cooking feature sizes, can be applied to other regions where hot-rock cooking is practiced (Black and Thoms, 2014; Thoms, 2008b).

What does a feasting lens add to our understanding of Toyah?

In many ways, the assertion that the Toyah phenomenon represents a feasting society develops themes that have already been recognized in the archaeological record. First, it posits an intensification, *sensu latu*, on the physical and social landscape corresponding with a population increase (Johnson and Hard, 2008; Morgan, 2015). The archaeological evidence for feasting during the TLP is consistent with how other hunter-gather groups have responded to increasing population pressures (Dozier, 2017).

The political complexity inherent in feasting resists entrenched misconceptions of the supposed simple forager lifestyles. The multifaceted political relationships necessary for a feasting society belies the cosmopolitan nature of indigenous peoples before colonization (Arnold et al., 2015; Foster, 2008; Wade, 2003). These sets of complex relationships are more common in areas of increasing population density, a demographic conclusion for Toyah that has already been well made and accepted (Kenmotsu and Arnn, 2012). A nuanced understanding of complexity indicates that different aspects of complexity, including higher population density, is important to consider even for mobile foraging groups (Arnold et al., 2015). As such, archaeological evidence from the TLP in Texas should and can be used as a point of contrast or support for understanding the processes through which indigenous peoples manage shifting social and economic responsibilities in archaeological contexts worldwide.

Current anthropological theory contends that ethnic identity is tied to expressions of *difference* between groups (or othering processes), rather than an intensification of an endogenous label (Barth, 1998). As such, the archaeological manifestations of ethnogenesis (Jones, 2010, 1997) may be accessible both in the Toyah phase and in historical native societies following colonization. With growing population densities and increasing socio-political complexity, evidence for violence and inequity is often expected (Chacon and Mendoza, 2017). Little work thus far has been able to parse out patterns of violence within Toyah phase archaeology, especially as it contends with larger systems of warfare in the Southern Plains (Brooks, 1994; Vehik, 2002), warranting further study.

In addition to bolstering our understanding of hunting-gathering social complexity, feasting regimes seem to incentivize technological innovation (Dozier, 2017; Hayden, 2014a, 2009, 1998). The emergence of local pottery production, and the cooking technology that required it, is a possible manifestation of such innovation. Further research into the technological and cultural milieu of the TLP is needed to better understand the emergence of the Leon Plain ceramic tradition.

Conclusions

The ethnohistoric record is ripe with European narratives of large gatherings of indigenous peoples for play and politics in the American Southern Plains. I argue that the archaeological record of Toyah archaeological assemblages and sites reflects the feasting socio-political structures of indigenous peoples prior to European encroachment. This perspective gives agency to indigenous peoples' complex socio-political landscape and provides a different avenue to explain culture and technological change that is not tied to population replacement or environmental

changes. Toyah phase archaeology remains wanting, however, with relatively few studies exploring the technological and culinary requirements for the trademark Leon Plain ceramic tradition. Given that my assertions about feasting are testable, future excavation of Toyah sites may yield data to support or challenge this interpretation. These same assertions are suitable, also, to test for feasting within other mobile foraging archaeological cultures. *Mitotes* are exemplary avenues to explore native agency and cosmopolitan sensibilities of complex foragers grappling with ecological and economical constraints in times of growing population density.

Data Availability

No new data was presented in this current synthesis; please refer to the references cited and appendixes for more information on individual arguments and archaeological sites.

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INDIGENOUS PSYCOACTIVE SUBSTANCES OF TEXAS, 1530-1730 CE: AN
ETHNOGRAPHIC REVIEW

Introduction: Mind-Altering Substances of Indigenous Texas

The desire for intoxication pervades the animal kingdom, and human groups around the world employ mind-altering substances in daily and ritual life (Siegel 2005). From caffeine to nicotine to ethanol to opioids, mind-altering botanical substances affect a person's biological processes, altering their disposition (Perrine 1996). Some substances are used to medicate ill, some are used to enhance performance, some distract from the rigor of everyday life, and some substances assist users to transcend into religious experience. Mind-altering substances play an important role in the creation and maintenance of political economies and social interactions—within indigenous, traditional, historical, and modern societies alike (Dietler 1990, 2006; Dietrich et al. 2012; Guerra-Doce 2015). The greater Texas region encompasses some of the most extreme biogeographical and cultural diversity anywhere in North America. The diversity of indigenous lifeways in a historical perspective affords a unique understanding of the use and preparation of plant-based mind-altering drugs. As such, it is an ideal case study for assessing the diversity and range of North American indigenous traditions that employed psychoactive substances.

Study Focus

The region now known as the state of Texas in the United States has held many geopolitical designations through the past 500 years. The Spanish designations of *Coahuila*, *Nuevo Leon*, *Nuevas Filipinas*, *Nuevo Reino de Filipinas*, and *Thejas* were at different times used to describe the landscape between the Mississippi, Red, and Rio Grande Rivers (de la Teja 2010); the term

Texas originates from a bastardization of the Caddoan term *Tejas* and the many indigenous designations for the diverse native geopolitical entities were not recorded. Within this piece, I shall use the term Texas to imply the current broad geographical boundaries of the Mississippi, Red, and Rio Grande Rivers, to the east, north, and south (respectively) and the Llano Estacado and Guadalupe Mountains to the west.

Indigenous cultural diversity within Texas prior to Spanish invasion was doubtless greater than historical documents imply. Following Cabeza de Vaca's 1528 accidental foray into Texas, the cultural landscape changed rapidly with the flux of European colonists, introduction of new diseases, and shifts in population across the United States (Berlandier 1969; Ewers 1973; W. C. Foster 2008; A. D. Krieger 2002; Newcomb Jr 2010). While many nineteenth and twentieth century historians neglected the rich indigenous cultures present within the historic period in Texas, many ethnographic, ethnohistoric, and archaeological works allow for a nuanced understanding of native lifeways (Newcomb 1956). The study period, 1530-1730 CE, is a crucial period for understanding the diversity of indigenous lifeways during the first colonization efforts, in the first written historical sources of these peoples. After 1730, influx of Euro-American immigrants and indigenous communities from across North America drastically and devastatingly altered the population dynamics of the area. Native peoples indigenous to Texas were subsumed into Spanish missions and Hispanic populations (e.g. Coahuiltecas), forced onto reservations outside of Texas (e.g. Caddo, Lipan Apache), or suffered such great population loss as to no longer exist as a separate ethnic entity (e.g. Karankawa) (Smith 2005; Wade 2003).

This study uses primary and secondary ethnohistorical and ethnographic reports to assess the diversity of native use of psychoactive compounds; translated primary sources from the time period of interest that mention any kind of psychoactive substance are characterized in Table 6.

While more documents from the French and Spanish period do exist (e.g. Rivadeneira y Sotomayor 2003; Flint and Flint 2012; Wade 2003), due to the nature of the colonial interests, these documents do not contain details into drug preparation and usage. Therefore, while the groups of interest are limited to those that would have resided in Texas in 1530-1750, later ethnographies and ethnohistories from the later 18th, 19th, and 20th centuries are used to understand the lifeways of each group as well.

The cultural background and lifeways of each indigenous group was first assessed utilizing the *Handbook of North American Indians*, a standard encyclopedic reference. Ethnographic and historic sources were then sought to supplement, validate, and extrapolate in primary accounts indigenous drug use, manufacture, and social importance. This review should be of interest to those interested in the role of psychoactive substances within traditional societies, comparative understandings of mind-altering substance use, and researchers of Texas indigenous communities past and present.

Table 6. French and Spanish colonial documents that relate information about indigenous psychoactive substances.

Year	Account of	Translator	Indigenous Groups	Citation
1528-1533	Álvar Núñez Cabeza de Vaca	Krieger	Karankawa, Coahuiltecan, Jumano	(A. D. Krieger 2002)
1691	Friar Francisco Casanas de Jesus Maria	Hatcher	Caddo	(Hatcher 1927b, 1927c)
1698	Pierre and Jean Baptiste Talon	Huntington	Karankawa	(Huntington and Franklin 1985)
1710	Friar Francisco Hidalgo	Hatcher	Caddo	(Hatcher 1927a)
1722	Friar Isidro Felis de Espinosa	Hatcher	Caddo	(Hatcher 1927d)

Indigenous Peoples and Lifeways of Texas

The tribal designations used in this paper are based on the terms that are widely used in the literature; it is important to note that the true diversity of indigenous peoples is not reflected in the ethnohistorical record. Rather, these designations refer to a larger social field of shifting alliances and challenges for linguistically similar peoples with similar subsistence patterns, however also likely with distinct ethnic identities (Arnn 2012). Most of the Native nations described by Europeans during the eighteenth and nineteenth centuries, such as the Comanche, were relative newcomers to the greater Texas area as population pressure on all fronts was mounting (Smith 2005; Vehik 2002; Wade 2003). Figure 6 maps the approximate locations of mentioned groups.

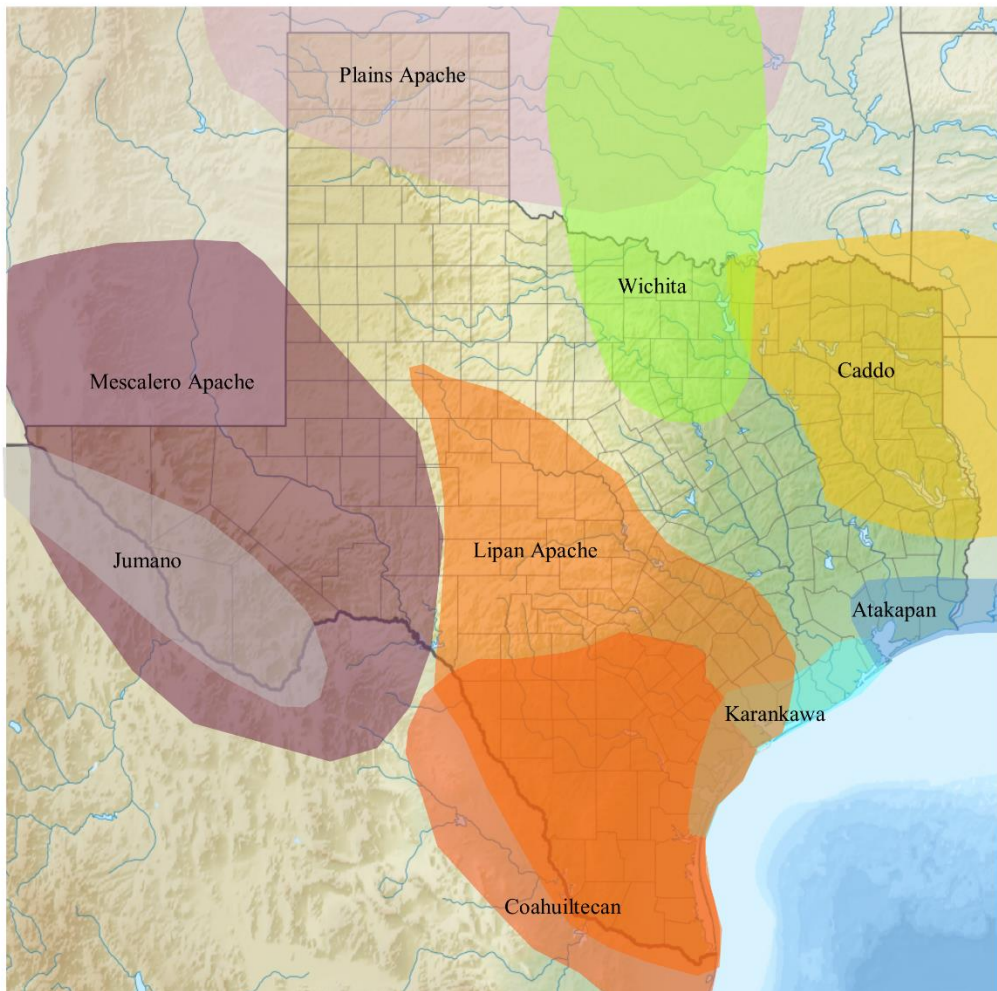


Figure 6. Historical territories (1530-1730 CE) of indigenous groups.

Hunter-Gatherer-Fishers

Coastal (Karankawa)

The Karankawa were coastal peoples, some of the very first that Cabeza de Vaca met in the first foray into Texas by a European (A. D. Krieger 2002). With a number of different bands, Karankawan peoples seasonally accumulated on the Gulf of Mexico to collect coastal resources, such as shellfish, fish, bird eggs, and aquatic plants (Gatschet 1891; Oliver 1891; Ortiz 1983; Ricklis 2010). During the winter, familial groups moved inland to exploit wild game, especially deer, as well as nuts and tubers. Social structure among Karankawan peoples seem to have been fairly fluid; leadership roles were taken on by those most qualified during time of need. With the easy coalescence and diffusion patterns, little hierarchy is observed among Karankawan peoples. Similarly, ceremonial practices seem to have been enacted by a variety of actors; it is unclear if medicinal or ceremonial specialization was practiced.

Great Plains (Plains Apache)

The Plains Apache inhabited the Great Plains, following a foraging subsistence pattern (M. W. Foster and McCollough 2001). Bison was of primary importance, though deer and other wild game was also taken. Plant foods, particularly roots, were also exploited by these nomadic peoples. The social structure for Plains Apache groups were fairly flexible, as bands coalesced and separated at will. A complex system of fraternal orders attended to each group's spiritual needs.

Northern Mexico (Coahuiltecan, Jumano)

The Rio Grande Valley contained a diversity of indigenous groups prior to Spanish colonization. Coahuiltecan languages were spoken by many of these groups, who maintained a mostly foraging subsistence pattern. Native groups seem to have had flexible hierarchies with a mobile residence pattern that exploited a large range of foods. Freshwater fishing and hunting

game, such as deer, bison, and rabbit, was supplemented with plant foods such as manguey, lecheguilla, sotol, mesquite, and a variety of root foods. Many Coahuiltecan groups were subsumed into the Spanish mission system (Griffen 1969; Campbell 1983).

Opportunistic Agriculturalists

Coastal (Atakapan)

Atakapan-speaking groups, including the Bidai, occupied the Texas Gulf coast north of Galveston Bay into Louisiana (Fogelson 2004). The Atakapans were opportunistic farmers, planting maize in sandy river banks, but relied mostly on foraged resources. Like the Karankawa, the Atakapa made seasonal rounds of splitting into smaller familial groups during the summer and larger groups during the winter. Coastal resources, such as fish, bird eggs, and shellfish were of prime importance, though deer and inland resources were exploited during winter months. Spanish efforts to missionize the region after the study period (ca. 1749-1755) were unsuccessful, though eventual depopulation from a series of epidemics caused Atakapan peoples to merge with the Caddo and other groups. Atakapan groups practiced similar residential patterns as Karankawa, coalescing and dissipating as the seasons required. Hierarchies seem to be failed fluid and there is little evidence for specialized religious practice.

Southern Plains (Lipan, Mescalero Apache)

The Lipan are a group of Apache-speaking groups that presumably entered central Texas from the Plains not long before European colonialism and the study period (Morris Edward Opler 2001). While historical records record Lipan interactions with Spanish, Mexican, and Texan governments, thorough ethnographic study of the Lipan were conducted from 1931-1935 by M.E. Opler, when the Lipan were situated at the Mescalero reservation. The Lipan were transitory

foragers that opportunistically planted maize along fertile streams. Bison was a staple protein; agaves, sotol, and mescal were staple plant resources.

Lipan groups had fairly flexible social structures, with an informal, non-inherited leader in the style of a Big Man. The Lipan have a long tradition of feasting with accompanying dances, referred to as *mitotes* (Maestas 2004).

The Mescalero Apache in the Trans-Pecos region of Texas followed much of the same subsistence patterns as seen with Coahuiltecan groups, but their Apachean language speaks to a northern origin, and ethnographic reports that agriculture was practiced in some Mescaleroan communities (Morris Edward Opler 1983). Mescalero groups primarily rely on foraged foods, including deer, elk, rabbit, birds, mescal (agave), sotol, cactus, mesquite pods, and various tubers, seeds, fruits, and herbs. Mescalero political organization was fluid and rather egalitarian; as a small ethnic group, no strong central power emerged in the historical record.

Agriculturalists

North/ East Texas (Caddo, Wichita)

The Caddo are one of the better-known indigenous groups in Texas and Louisiana, due to their strong descendent population; several different groups, including the Kadohadacho, Hasinai, and Kitsais, speak Caddoan languages and employ similar subsistence practices (Parks 2001). The traditional Caddoan homeland stretches from the pineywoods of east Texas into what is now referred to as Louisiana and southern Arkansas and is culturally associated with the larger Southeastern and Mississippian mound-building cultures. Caddoan peoples were semi-sedentary agriculturalists in a chiefdom political system; evidence of maize agriculture, monumental earthenwork constructions, and a strong ceramic tradition of several thousand years indicate a

strong cultural continuity in the region (T. K. Perttula 2004; T. Perttula 2012). A strong hierarchical and religious tradition supported a network of long-distance trade from the southwestern pueblos to the Great Lakes to the Atlantic seaboard. In traditional Caddoan society, a strong headman led a local village in conference with a council of elders—these elite positions were hereditary through the male line (Rogers and Sabo, III 2004; Hatcher 1927b, 1927c, 1927a, 1927d). The Caddo relied on two varieties of maize, which allowed for a double harvest, though other crops, such as squash, sunflowers, beans and tobacco were also grown. The Caddo supplemented their diet with wild plants and animals; deer was the primary game, but bear, rabbits, fowl, and bison were also exploited. Fish were opportunistically taken from seasonal ox-bow lakes which are common in the region.

The Wichita are identified as groups of semi-sedentary, Caddoan-language farmers in modern southern Kansas, Oklahoma, and extreme north Texas since European contact in 1541; Wichita groups moved southward in the 18th century to north-central Texas following pressure with the encroachment of Apachian groups (Newcomb Jr 2001). Wichita peoples hunted bison in the Southern Plains, in addition to raising crops of maize, bean, squash, and tobacco. Crops were raised in gardens along river and stream terraces by women, who also processed and stored plant goods. Men hunted a variety of wild game, including bison. Wild plants (fruits, berries, herbs, and nuts) were also utilized, though the Wichita maintained a Plains tradition of avoiding fish. As with the other groups described here, Wichita is a generalized term to describe a diversity of groups that were once autonomous but were politically consolidated with population loss following terrible epidemics during colonization. The Wichita operated under a chiefdom-style political organization and grappled with increasing violence in the historical period.

Table 7. Mind-altering substances used by indigenous peoples of the greater Texas region.

Substance	Species used	Groups	Usage	Citations
Black Drink	Youpon holly (<i>Ilex vomitoria</i>)	Karankawa, Atakapan; Caddo	Ceremonial, medicinal	Karankawa* (Huntington and Franklin 1985, 106; Oliver 1891, 18), Atakapa (Smithwick 1900, 4); Caddo* (Hatcher 1927d, 169–70)
Mescalbean	Texas mountain laurel / Frijolito (<i>Sophora secundiflora</i>)	Karankawa, Caddo, Coahuiltecan	Ceremonial, purgative	Karankawa* (Huntington and Franklin 1985, 106; Havard 1896), Caddo (Troike 1962); Coahuiltecan (Troike 1962, 954)
Tobacco	<i>Nicotiana tabacum</i>	Likely all groups	Ceremonial, political	Karankawa (Ortiz 1983); Caddo* (Hatcher 1927b, 212); Asinai* (Hatcher 1927a, 57), Wichita (Newcomb Jr 2001), Lipan (Morris Edward Opler 2001; Morris E Opler 1938); Coahuiltecan (Griffen 1969, 110); Atakapan (Fogelson 2004)
Peyote	Peyote (<i>Lophophora williamsii</i>)	Primary: Lipan, Coahuiltecan, Asinai Secondary: Mescalero, Kiowa-Plains Apache, Lipan	Ceremonial, medicinal	Lipan (La Barre 1965, 110); Asinai* (Hatcher 1927a, 55–56); Kiowa-Plains Apache (Jordan 1965, 120–24; La Barre 1965, 43–56); Coahuiltecan (Beals 1932, 215–16; Troike 1962, 954); Mescalero (La Barre 1965, 40; Schaefer 2000, 51–70)
Mescal / Pulque (Aguardiente)	Maguey, centuryplant (<i>Agave Americana</i>), also Sotol (<i>Dasyilirion texanum</i>) and various <i>Agave</i> spp	Coahuiltecan; Mescalero	Ceremonial, feasting	Coahuiltecan (Beals 1932, 168–70; Griffen 1969, 110; Tunnell and Madrid 1990); Mescalero (Castetter and Opler 1936, 4:52–53; Cremony 1868, 217)
Algoroba (Mesquite bean wine)	Mesquite (<i>Prosopis spp.</i>)	Coahuiltecan; Mescalero	Ceremonial, feasting	Coahuiltecan (Griffen 1969, 110); Mescalero (Castetter and Opler 1936, 4:53; Havard 1896)
Tulbai (Tevvino, Chicha)	Maize (<i>Zea mays</i>)	Mescalero	Ceremonial, feasting	Mescalero (Castetter and Opler 1936, 4:49–50; Cremony 1868, 245; Murphy 1867, 347)

*Referenced in colonial documents from Table 6

Psychoactive Substances and Distributions

A variety of native plants with psychoactive properties existed within Texas that were exploited by indigenous peoples. Refer to Table 7 for an overview of different indigenous mind-altering substance use. Figure 7 maps the current extent of taxa related to indigenous drug production. This section introduces the common psycho-physical effects of stimulants and psychotropics, as well as highlighting indigenous use and production of such botanically-derived drugs.

Stimulants

Stimulants are a classification for substances which enhance neurological function, producing effects such as alertness, wakefulness, endurance and depress senses of hunger and fatigue.

Tobacco

Tobacco is made from the leaves of *Nicotiana* genus; the commercial species *N. tabacum* is most common, though other species such as *N. rustica* are also used. The active psychoactive element of tobacco is the alkaloid stimulant nicotine. Nicotine can act as a stimulant or a relaxant; the psychoactive effects of nicotine depends on the dosage and level of addiction (Eriksen, Mackay, and Ross 2013). Simulation, experienced as increased heart rate, alertness, and vasoconstriction results from nicotine binding to nicotinic acetylcholine receptors in the brain, is experienced by users at low dosages and level of addiction. Increases in both result in user experience of relaxation and calmness (Eriksen, Mackay, and Ross 2013).

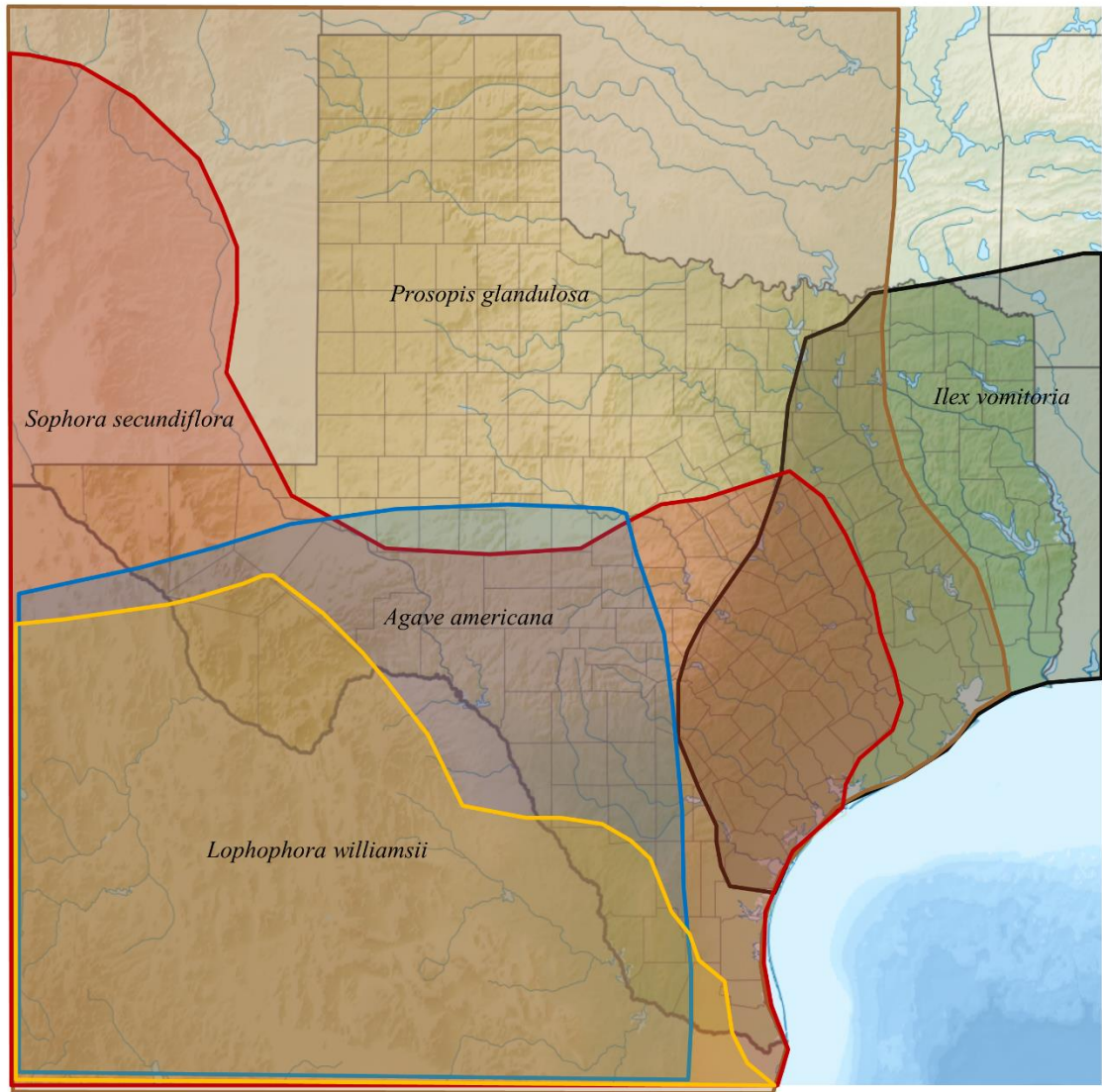


Figure 7. Distribution of various species related to indigenous drug production. Data adapted from the USDA PLANTS Database; plant community change since 1730 CE is assumed to be limited. *Nicotiana* and *Zea* spp. are not included as modern cultigens.

Tobacco is one of the most common mind-altering substances worldwide (Eriksen, Mackay, and Ross 2013) and was used extensively historically by indigenous people of the greater Texas region (Fox 2015). All groups surveyed in this paper were reported as smoking; unfortunately, primary references to the practice do not elaborate on the circumstances for which tobacco would be used. Similarly, preparation methods are not mentioned in the firsthand ethnohistoric literature of the region, there are a variety of preparation methods known from other indigenous groups (Fox 2015). *Nicotiana* leaves are commonly cured and dried before smoking, through pipes made of various materials or rolled into a cigarette with corn husk. Only horticultural and agricultural groups in the greater Texas region cultivated tobacco (Dorsey 1904; Hatcher 1927a, 57, 1927b, 212; Fogelson 2004) — foraging groups are reported as trading for access to the important substance.

Black Drink

Black drink is the common term for a ritual drink made from the leaves of Yaupon Holly (*Ilex vomitoria*) throughout the Southeast and Mississippian cultures. Yaupon Holly leaves impart caffeine when made into a frothy tea, which has been reported to also induce vomiting when consumed in large amounts (Hudson 2004). Caffeine is a stimulant which reduces adenosine transmissions in the brain, thus promoting neural (attention, vigilance, mood) and motor functions (Fisone, Borgkvist, and Usiello 2004); large dosages of caffeine can lead to poisoning, with symptoms including vomiting, abdominal pain, rigidity, altered conscious state, and seizures, and blood concentrations of 100 µg/mL can be lethal (Holmgren, Nordén-Pettersson, and Ahlner 2004). East Texas indigenous groups all consumed black drink—foragers and farmers alike.

A report from the marooned Talon brothers in 1691 indicated that the Karankawa participated in several mind-altering substances, including black drink. Their report notes a distinctive frothy tea, which fits the description of black tea well (Huntington and Franklin 1985, 106). Several early Spanish sources point to Caddoan use of black drink as well. A 1710 account by Spanish missionary Francisco Hidalgo indicates that Tejas (Caddoan) peoples “...drink their brewed herbs, covered with foam...Two or three of them spend the morning in brewing tea from the laurel [holly] leaves while the old men drink the potion” (Hatcher 1927b, 165,168). Recent archaeological residue analysis has revealed that the black drink tradition was employed from Cahokia in the Midwest (Crown et al. 2012) to the southwest Pueblos (Crown et al. 2015), providing support that the Caddo, who participated in the wider Mississippian south-eastern complex, also adopted use of the beverage. Atakapan peoples, also residing in east Texas, are reported as using similar drugs (including tobacco and black drink) as Karankawan and Caddoan groups (Fogelson 2004). The modern extent of Yaupon Holly mirrors its geographic use by Texas indigenous peoples.

Mescalbean

The fruit of the Texas mountain laurel (*Sophora secundiflora*) has been cited as a possible psychotropic precursor to peyote (Howard 1957), though the ethnographic evidence does not quite support that analysis within the Texas landscape, primarily because mescalbean has different psychoactive effects on the human body. The mescalbean contains a variety of alkaloids that produce dizziness, lightheadedness, and nausea—desirable effects for purgative rituals; however, unlike peyote, mescalbean is not a hallucinogen. There is likely confusion over semantics, as *mescalbean* sounds close to *mescaline*, which is the active ingredient in peyote (and not to be confused with mescal, which is a common term for various agave species). It is also possible that

Spanish colonial writers themselves used the term mescalbean to refer to peyote, thereby adding to the confusion. Caddoan, Karankawan, and Coahuiltecan groups are all reported as using mescalbean as a mind-altering substance.

The Karankawa utilized the mind-altering aspects of the mescalbean, apparently as a stimulant, as the Talon brothers reported in 1691 (Huntington and Franklin 1985, 106).

The natives are extremely clownish and fond of ridicule; gay, and addicted to inebrity (for they prepare drinks that go to their head, almost as wine does)...One of their drinks is made from a red bean that they first chew, and then mix with water. They believe that its use makes them more limber, and lighter in running; as a result they drink so much of it that they vomit it up: drinking and vomiting, alternately by turns.

Mescalbean use extends beyond ingestion; caches of mescalbeans have been found in numerous dry cave archaeological sites, in conjunction with other medicinal accretions and rattles in the Trans-Pecos (Adovasio and Fry 1976; Boyd and Dering 1996), though use of this substance was not observed ethnographically among the Mescalero or Lipan Apache. The Kiowa-Apache, a Plains group which arrived in Texas after the study period did not utilize mescal beans as a psychotropic, but rather used the shiny red beans as personal adornment (Jordan 1965).

The modern distribution of Texas Mountain Laurel suggests that the Caddo would have had to trade to gain access to mescalbeans, a trade that would extend into the Plains for the Kiowa-Apache after the study period.

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Psychotropic

Psychotropic (psychopharmaceutical) drugs alter brain functions that result in alterations to mood, consciousness, or perception.

Peyote

The use of peyote (*Lophophora williamsii*) is one of the best studied (and hotly contested) psychotropics of North America. Peyote is a small, spineless cactus that contains psychoactive alkaloids, particularly mescaline, which produces psychedelic experiences in users; the structure of mescaline is similar to neurotransmitters such as dopamine and serotonin, which produces short-term altered perception of time, self-awareness, and visuals (Kovacic and Somanathan 2009).

Peyote use has been especially scrutinized due to the spread peyote ceremonies of the Native American church. While some groups in the natural distribution of the peyote cactus are presumed to have a long use of peyote, northern groups which migrated into the greater Texas region adopted peyote in the 19th century (La Barre 1960). The analysis here supports that understanding, as primary accounts for peyote use are found among Southern groups (Coahuiltecan, Mescaleros), while secondary sources indicate that peyote was adopted in later historical periods by other Texas indigenous communities.

Peyote can be prepared and consumed in a variety of ways, as thoroughly reported by Jordan for the Kiowa-Apache (Jordan 1965, 120–24).

Peyote may be consumed either fresh or dried, or it can be made into tea...They may be eaten plain, though dried buttons are hard and difficult to chew...Sometimes the dried buttons are pounded and the shredded pulp passed around. A small handful of this is moistened with saliva and rolled into a little ball which may be then either chewed or swallowed whole. Sometimes the pulverized buttons are mixed with water in advance, and brought to the meeting in a bottle. Dried peyote, in addition to being hard to chew and swallow, also has a taste that is bitter and extremely unpleasant. Any way to get it down is considered all right...The ingestion of peyote, either as tea or by chewing the buttons, often produces nausea and vomiting.

As shown in Figure 7, *L. williamsii* grows only in the southernmost reaches of Texas; Great Plains groups would have to take a pilgrimage or trade to acquire the cacti.

Alcohol

Ethanol is the principle alcohol found in fermented beverages; alcohol is considered a central nervous system depressant, as it produces relaxation, impaired sensory/motor function, reduced inhibition, and slowed cognition in users (Victor and Adams 1953). Alcohol production among North American Indians has long been a quandary to ethnographers and archaeologists; while fermented products are well recorded in South American and Mesoamerican contexts, evidence for indigenous alcohol production in North America has remained scant (La Barre 1938; Feest 1983). Of the indigenous groups studied here, only southern groups (Mescalero, Coahuiltecan) produced alcohol, as is common in many northern Mexican groups (Bruman 2000; Kennedy 1963; Smalley and Blake 2003; Tunnell and Madrid 1990). Spanish sources of northern Mexican indigenous groups indicate that "...alcoholic beverages [were] made from almost any available plant"(Griffen 1969, 110). In the only exhaustive study of indigenous Mexican brewing practices from the 1930s, Bruman's dissertation (2000) records a variety of fermented beverages, "The agave was the overwhelming favorite for the manufacture of such drinks, but other materials such as maize were used. Apparently drinking always, or practically always, had a ceremonial significance" (Beals 1932, 105).

Mescalero Apache groups have a several detailed ethnobotanical reports of how alcohol was produced among peoples in the region. John Cremony (1868, 217) presents the basic process of making mescal (also called pulque), an alcoholic beverage which was preferentially made with maguey (*Agave spp.*) through it could also be made with sotol (*Dasyliirion spp.*).

...among the Mescaleros and Jicarillas [a New Mexican group]...in order to make an intoxicating beverage of the mescal, the roasted root is macerated in a proportional quantity of water, which is allowed to stand several days, when it ferments rapidly. The liquor is boiled down and produces a strongly intoxicating fluid.

The Mescalero were intensively studied in the 1930s by Morris Opler and his colleagues, which recorded mescal production in more detail (1936, 4:52–53).

The mescal crowns were roasted as described under the section on foods, and the outer leaves removed. The inner portion was cut into pieces, pounded until soft, and the pulp placed in a pouch made of animal hide. This was buried in the ground where it was usually allowed to remain for two days, although the Indians claimed that the longer it was buried the better it became. When removed from the ground the juice was squeezed from the pulp into a container and allowed to ferment for two or three days, when it was ready for use. Thus prepared, the mescal drink was quite potent...Similarly, sotol crowns (*Dasyllirion wheeleri*) formerly were pit-baked for one night only, removed, peeled, crushed, mixed with a small amount of water in a rawhide container, and allowed to ferment underground about a day, or until fermentation had practically ceased, when the drink was ready for use. The concoction was also placed in pitch covered water jars or in wooden jugs cut from trees. Informants reported that the beverage might be allowed to stand for a month before being used. We have not been able to learn from our informants that these Apache ever distilled this or any other alcohol beverage.

Both the Mescalero and Coahuiltecan groups also made alcohol from mesquite (*Prosopis spp.*), a practice that researchers imply is quite of great antiquity (Castetter and Opler 1936, 4:53).

Another mildly intoxicating alcoholic beverage formerly prepared, although at present not in common use, was made by finely grinding cooked mesquite (*Prosopis glandulosa*) pods and seeds. A little waster was added during the grinding process and more to the ground mass, then the mixture allowed to ferment for a day and a night. This is a very old drink among the Apache.

Little more detail than this quote about the production of this beverage is known from southern Texas, though a similar tradition is seen among the Cahuila peoples of California (Bean and Siva Saubel 1972, 109).

Alcohol made from maize is a tradition that is only reported for Mescalero groups; no ethnographic or archaeological evidence for maize beer has been published for Caddoan groups (Timothy Perttula, 2016). Maize beer is known by a variety of terms: tiswin, tesvino, chicha, tułbai,

and Americanized attempts of tulapi and twilt-kah-ye. The Mescalero, the only documented indigenous group to make maize beer in the greater Texas region, employed the term tułbai (Castetter and Opler 1936, 4:49–50). Tułbai is an incredibly important part of social and religious life for Apache groups of the greater Trans-Pecos, being prepared for feasts and special ceremonies such as girls' puberty celebrations (Cremony 1868, 245). The beverage was exclusively produced by women, which may explain the absence of references to its production by early Spanish chroniclers. Castetter and Opler describe the production stream of tułbai (1936, 4:50).

To make the beverage, shelled maize was soaked in water for about twenty-four hours and placed in a narrow trench lined on both sides with grass. The maize was covered with grass and soil, then with a blanket; or sometimes the blanket was laid directly over the corn without the use of grass and soil. Each morning the trench was sprinkled with water to facilitate the germination of the maize. When the corn-sprouts were about one and one-half inches long the seedlings were removed from the trench and finely ground twice between two rocks, then boiled in water until the mixture was reduced to half the original quantity. Enough water was added to fill the vessel and the liquid again boiled for a short time (until about two inches from the top of the vessel), strained through a cloth (at present a flour-sifter is often used), and cooled. It was allowed to ferment in a water jar until about noon of the next day, when it was ready for consumption. According to Hrdlicka (11: 191), as well as Browne (3:411), the general practice was to place the mash in a jar that previously had been used for brewing and which was never washed, the pores of the vessel retaining the organisms necessary to start fermentation. In the absence of sugar, mesquite flour (*Prosopis glandulosa*) or sahuaro syrup (*Carnegiea gigantea*) was used as sweetening. This finished product is known as tułbai and must be drunk within a few hours after it is prepared or "it gets weak and is no good." In other words, the alcohol is converted into acetic acid, giving the beverage a sour taste.

Patterns in Mind-Altering Substance Use

The indigenous peoples of Texas utilized a diversity of psychoactive substances. Table 8 characterizes the different substances used by the diverse groups. Two substances were (eventually) used by all groups: tobacco and peyote. Both tobacco and peyote have ceremonial use within indigenous communities, though tobacco's use is decidedly more flexible, allowing for

recreational, political, and ceremonial use (Fox 2015; Eriksen, Mackay, and Ross 2013). Almost all Texas groups would have had to trade for access to tobacco, but only the Caddoan-speakers (Caddo and Wichita) would have locally grown the important plant.

Peyote usage, in contrast, spread to all descendant communities during the historical period, perhaps in conjunction with the development of the Native American Church (La Barre 1960, 1965). Peyote is used as a mechanism to access the divine (e.g. entheogen) and the plant maintains its status as a healing compound within modern communities as well. While peyote is the only psychedelic drug identified in this study, both mescalbean and black drink were also used in spiritual contexts as purgatives; those substances were used by primarily by communities that would have had local access to the necessary plants. Socio-political complexity or subsistence strategy, therefore, does not seem to have as large of an impact over entheogen choice as local access. Two examples run counter to this trend: Caddoan use of mescalbean and the eventual adoption of peyote by all groups.

Interestingly, alcohol production is limited to south Texas and the Trans-Pecos, though not constricted to agricultural groups. Growing literature indicates that farming is not the only pathway to socio-cultural complexity nor alcohol production (J. E. Arnold et al. 2015; Hayden, Canuel, and Shanse 2013). The production of *mescal* and *algorroba* can be partially explained by the distribution of their parent plants; however, maize beer production is more complex. *Tułbai* is only recorded for Mescalero groups, who would have opportunistically grown maize; no historical nor ethnographical documents record the production of a similar alcoholic beverage of the Caddo or Wichita, who were full-time maize agriculturalists. It is unclear if this distinction is due to the inaccuracies of historical documents, differences due to socio-political organization, or a unique brewing tradition among the peoples of southern Texas / northern Mexico.

Table 8. Mind-altering substance use by regional subsistence strategies.

Regional Subsistence	Ethnic Groups	Drugs	Usage Type
Foragers: Coastal	Karankawa	Tobacco, black drink, mescalbean	Ceremonial, purgative, medicinal, political
Foragers: Great Plains	Plains Apache	Tobacco, peyote	Ceremonial, political
Foragers: Southern Plains	Coahuiltecan	Tobacco, peyote, mescalbean, mescal, algarroba,	Ceremonial, political, purgative, medicinal, feasting
Opportunistic Agriculturalists: Coastal	Atakapan	Tobacco, black drink	Ceremonial, political
Opportunistic Agriculturalists: Southern Plains	Lipan Apache, Mescalero	Tobacco, peyote, mescal, algarroba, tułbai	Ceremonial, political, medicinal, feasting
Maize Agriculturalists	Caddo, Witchita, Asinai	Tobacco, black drink, mescalbean	Ceremonial, political, purgative

Alcoholic beverage knowledge and production often falls under the purview of women in many traditional societies (Arthur 2000; Gastineau, Darby, and Turner 1979; Hastorf 1991; Hayashida 2009). It is possible that knowledge of the production of these substances were hidden from historical and ethnographic study as a vast majority of early writers were male. With Euro-American negative sentiments about alcohol consumption, particularly among indigenous peoples, such practices may have been purposefully shielded from western views in Caddoan contexts. Additionally, the Caddo did not have an intensive ethnobiological study for a time in which they lived in Texas, in contrast to the extensive ethnobiological work by Opler and associates in south Texas.

Another possible interpretation relates access to mind-altering substances with structures of socio-political hierarchies. No fixed hierarchies existed among the communities of south Texas and as such, motivation to participate in the arduous tasks of community gatherings of diverse groups needed some kind of communal benefit (Dietler and Hayden 2010; Dozier 2017; Hayden 2014b); feasts have been understood as mechanisms for individual advancement and socio-political cohesion within complex hunting/gathering groups across the world (Dozier 2017; Hayden 2014b; Hayden and Adams 2004). Among Mescaleran, Lipan, and Coahuiltecan groups, *mitotes*, feasts with dancing and songs, are recorded by the earliest Spanish chroniclers (Maestas 2004). Associations between alcoholic beverage production and feasting behavior have been described around the world (B. Arnold 1999; Dietler 1990; Dietler and Hayden 2010; Dozier 2017; Guerra-Doce 2015; Hayden 2014a; Hayden, Canuel, and Shanse 2013; Hayden and Villeneuve 2011; Jennings and Bowser 2009). The use of fermentation practices among mobile foraging peoples adds to a growing literature on the use of alcohol among complex hunter-gatherers (B. Arnold 1999; J. E. Arnold et al. 2015; Hayden 2014a; Guerra-Doce 2015). In contrast, Caddoan

chiefdoms worked within fairly stable hierarchical groups where the political and religious access was limited to individual elites. The inherited power structures of Caddoan-speaking peoples would therefore not necessitate the promise of alcoholic beverage consumption to secure labor for community gatherings.

Alternatively, the differences between Caddoan and Coahuiltecan groups are not only structural but also diverge in terms of cultural ethos. While Caddoan peoples had the access and technology to practice brewing, perhaps the cultural structure of the greater Southeastern complex downplayed fermentation to the elaboration of other practices. Foci of the Southeastern complex may have supported religious entheogens as more socially accepted practice than other forms of social inebriation. Coahuiltecan groups, however, interacted in a more diverse cultural sphere in Mexico where brewing practices were extremely commonplace.

Conclusions

Ethnographic and historic accounts of indigenous peoples in Texas, 1530-1730 CE, indicate the diversity of mind-altering substance use. All groups used tobacco, and use of peyote among southern groups expanded in the historic period to include all Texas indigenous societies. Native peoples also utilized local Yaupon Holly and Texas Mountain Laurel in the creation of purgatives utilized for ceremonial purposes. Alcoholic beverages were produced among foraging and opportunistic agriculturalists in southern Texas. Native practices predicated and continued through European colonization, changing with the physical and social landscape. A historic perspective on indigenous plant use among diverse communities allows for a greater understanding of the role of mind-altering substances within human societies, past and present.

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CONCLUSIONS

In conclusion, I further discuss the implications for understanding the Toyah Phase as a transition to a feasting economy and avenues for future work.

Toyah as a Feasting Society

Two of the chapters in this work explore the theoretical and archaeological understandings of feasting communities. Feasts are an encompassing socio-economic system, so understanding this mechanism within central and south Texas prior to and during Spanish colonization helps elucidate and recognize the complexity of indigenous political economy. Cabeza de Vaca was the first European to interact with the indigenous peoples of Texas in 1528 (Krieger 2002). During the late summer, he reports large meetings of different groups in the prickly cactus fields to consume the abundant fruit, which he called tunas. He records meetings up to 100 dwellings for songs and dances that go into the night, a presumptive feast; during one of these feasts he refers to a foaming intoxicant, which would could either be the caffeine-rich foaming black drink (*Ilex vomitoria* tea) or foaming (fermenting) beer or wine (Krieger 2002, 195). Cabeza de Vaca also records mescalbean consumption during *areytos* (songs and dances) (Krieger 2002, 187); later ethnographies record that other mind-altering substances (such as mesquite bean [*Prosopis spp.*] pod beer and peyote [*Lophophora williamsii*]) were also produced in the same region, albeit by different ethnic groups (Cremony 1868; Castetter and Opler 1936; Bell and Castetter 1941). The few Spanish colonial reports from the 16th and 17th centuries indicate that inter-national (inter-ethnic) gatherings of indigenous peoples into the thousands were not uncommon (Kenmotsu and Arn 2012; Smith 2005; Wade 2003). Spanish missionary sources indicate that large gatherings

for feasting, singing, and dancing (referred to as *mitotes*) were a common occurrence among missionized indigenous peoples, who were likely descendants of Toyah archaeological culture (Maestas 2004; Schuetz-Miller 1980; Thoms 2001).

With ethnohistorical evidence for feasting behaviors, the archaeological evidence should also reflect those social practices. During the TLP, there is a proliferation of sites with trade goods from both Caddoan and Puebloan sources (Kibler 2012; Kibler and Broehm 2005). Specifically within the Balcones Escarpment, site and feature size also increase in the TLP (Thompson et al. 2012). In acknowledgment of the increased site visibility from the TLP, population growth is nonetheless evident (Kenmotsu and Arnn 2012). These changes are consistent with the expectation for feasting economies, which are evident in the ethnohistorical record (Dozier 2017; Hayden 2014, 1998).

While feasts take on many purposes and styles (Hayden 2014), of primary interest is the role that feasting can take in negotiating inter-group conflict. While one of the chapters explores the evidence and utility of understanding competitive feasting worldwide (Dozier 2017), the crux of the argument is that feasting is a form of intensification *sensu latu* (Morgan 2015) that allows for peaceful interaction between groups. Hosts receive material and marital benefits from hosting feasts, and guests receive material compensation for attendance, which almost always include food, either of incredible volume or luxury (van der Veen 2003). Of importance is the concept that the competitive nature of the feasts incentivize technological innovations, especially in luxury foods (Dozier 2017, 2018, Hayden 2003, 1998). An argument for intensification on high-labor foodstuffs (often framed in terms of alcohol production) as predicating human-plant interactions necessary for domestication or horticulture are in accordance with the archaeological record and gaining traction (Dietrich et al. 2012; Dozier 2018; Hayden 2003, 1995, 2009; Hayden, Canuel,

and Shanse 2013; Smalley and Blake 2003). Feasting behavior can be a mechanism to deal with population pressure, and fits well within intensification paradigms (Hayden 2014; Morgan 2015).

Feasts often utilize the use of mind-altering substances (Arnold 1999; Bray 2003a; Dietrich et al. 2012; Guerra-Doce 2014; Hayden 2014; Siegel 2005), and I explore the diversity of mind-altering substances used by groups indigenous to Texas within the last section. This work showcases a variety of plant-based substances with different levels of preparation and psychoactive effects. Most of the substances were locally acquired and many were used within political or religious contexts. Intoxication seems a universal drive, found within foraging societies through to hierarchical forms of communities, and it is a drive that is found not just among humans (Siegel 2005).

Further Research

To better understand the changing social dynamics during the TLP, I propose that residue analysis of the ceramic tradition may provide insights into changing cooking technologies and food production. Since many feasts highlight the use of luxury foods (van der Veen 2003), I plan and encourage to explore the archaeological evidence of high-valued food production. As ceramic technologies require a higher investment cost to manufacture than alternative forms of liquid storage and cooking, exploration into what kind of foods were cooked/produced in Leon Plain may reflect other high-cost cooking investments.

Fermentation is such an example of high-value luxury foods. The use of alcohol by elites within feasting societies as political currency is well documented historically and ethnographically (Adams 2004; Bray 2003b, 2003a; Dietler 1990; Dietler and Hayden 2010; Jennings 2004; Jennings and Bowser 2009; Zori et al. 2013); a preponderance of alcohol-associated material

culture has been used to identify feasting activities in other archaeological contexts (Rojo-Guerra et al. 2006; Jennings and Chatfield 2009; Bray 2009). Therefore, investigation of residues within Leon Plain must consider such possibilities for fermented foods. The archaeological methods for identifying fermentation in the archeological record are increasing (Biwer and VanDerwarker 2015; Bouby, Boissinot, and Marinval 2011; Correa-Ascencio et al. 2014; Crewe and Hill 2012; Dozier 2016b, 2016a; Isaksson, Karlsson, and Eriksson 2010; Jennings 2004; McGovern 2003). Ethnographical evidence from the last section identifies several different fermented substances known to be produced in this region, including mesquite bean pod beer, corn beer, and agave wines. Microfossil and chemical residue analysis are likely fruitful areas of future research to further understand what substances Leon Plain may have been intended to contain.

Fermented beverages are a common feature of feasting societies, and while the ethnohistoric record indicates that Native North Americans were making beer and wine, limited archaeological evidence has been thoroughly investigated to consider such (Castañeda 2017; King et al. 2017). In most traditional subsistence societies around the world, including North America, brewing and fermentation is a uniquely female trade, which requires the transfer of specialized and powerful knowledge (Hayashida 2009; Hrdlička 1904, 1908; Steinkraus 1994). Fermented alcoholic beverages often play an important and unique role within religious and political realms, which are often considered male fields. Feminist and entrepreneurship theory could provide unique perspectives to recognize the important role that women's labor has had in shaping both cooking technology and political complexity.

In Conclusion

The work presented here represents an attempt to better situate the archaeological and historical understanding of the indigenous peoples of Texas. This region of the world has suffered from mischaracterization as a “cultural sink” (Newcomb 1956) and a supposed “disappearance” of the indigenous peoples who lived there (Smith 2005). The Toyah Phase in the Terminal Late pre-Hispanic (TLP) is particularly poorly understudied yet provides insight into the complex and metropolitan nature of the various groups that occupied central and south Texas.

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