Trading Spaces: The Archaeology of Interaction, Migration, and Exchange

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book

TRADING SPACES

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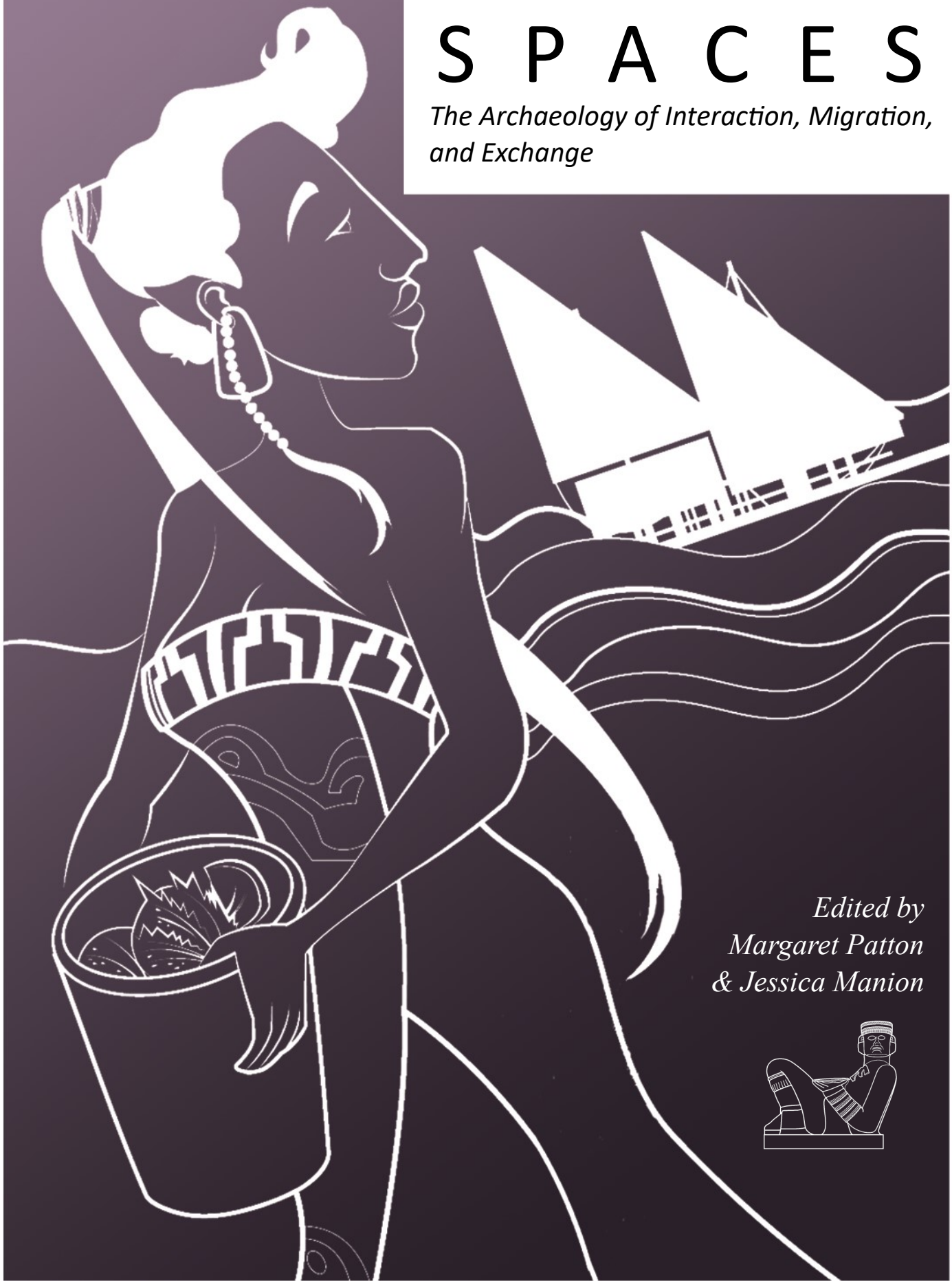

Edited by
Margaret Patton
& Jessica Manion

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Proceedings of the 46th Annual Chacmool Archaeology Conference,
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Chacmool Archaeology Association
Department of Anthropology and Archaeology
The University of Calgary

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Migration

Historical Descriptions of "Pitching Trails" on the Northern Plains

Margaret G. Hanna
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The term "pitching trail," found in historic literature, is most probably adopted from the Cree pitchew ("s/he moves camp; moves his/her belongings and family") and was used to describe a class of trails along which First Nations camps moved across the prairies. The term was used in western Canada primarily by Hudson's Bay Company fur traders until well into the 20th century, and occasionally by explorers. References in historic literature indicate that pitching trails were visible, well-travelled, well-known, and possibly even named trails that connected localities and regions. Two factors were paramount in determining the route of any pitching trail across the northern plains: proximity to water, and the avoidance of major obstacles that would render it difficult for dogs to pull travois. The historic data also indicate that the average distance a camp traveled in a day varied between 9.6 km and 32 km, with the average distance being 19.4 ± 6 km.

Reynolds (2011:343) has described sites as the "beginnings and ends of journeys," a description that emphasizes the connections that exist between sites. It focuses attention on mobility between sites and situates sites as nodes within a "web of pathways over a piece of terrain" (Isaac 1981:131). This paper presents evidence from historic literature of western Canada that provides details about the nature, locations, visibility, and even permanence of trails that connected these "beginnings and ends." It begins with a discussion of the origin, derivation and use of one particular term—"pitching trails"—that appears frequently in this literature. After presenting data derived from historic literature about the nature and permanence of pitching trails, the paper concludes with a discussion of the implications of these data for understanding the distribution of archaeological sites in the northern plains.

"Pitching" Origin and Derivation

The earliest known use of the word "pitch" in the sense of "moving camp" is in Henry Kelsey's journals of 1690 and 1691 (Martin and Doughty 1929). Kelsey was a Hudson's Bay Company employee who was sent into the interior of what is now central Saskatchewan to persuade certain First Nations to come to the Bay to trade. He travelled with both Cree and Assiniboin guides, and recorded his travels in a diary. In this diary, he used the words "pitch" and "pitching" in the sense of *moving* camp rather than setting up camp. For example:

> [July 25] . . . so we pitched about 10 miles and came too.
> [August 17] . . . so we pitcht to day near 14 Miles & came to
> [August 25] Sso [sic] pitching again we came to altogether & in number we were 80 Tents

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> we having travelled to day by Estimation 12 Miles. . .
> [Doughty and Martin 1929:6, 10, 11]

"Moving camp" as a meaning for "pitch" does not appear in the two pages devoted to "pitch" in the Oxford English Dictionary. It is most likely derived from the Cree word *pitchew* which means "s/he moves camp; moves his/her belongings and family" (Wolvengrey 2001, Vol. 1:180). As Kelsey was reasonably fluent in Cree, it is not unlikely that he knew and anglicized this Cree word (Pentland 1991). As evidence of his fluency in Cree, he prepared a Cree-English dictionary, and wrote a few passages in Cree, and he is reputed to have had a Cree wife. That the term is derived from a First Nations language is substantiated by a footnote in Palliser's account, in which he defined pitching as "An expression in general use among the half-breeds and Indians applied to travelling slowly with tents" (Spry 1968:116).

The terms pitching and pitching trails appear predominantly in the published journals of Hudson's Bay Company employees, suggesting that Hudson's Bay Company employees and/or those familiar with Cree, were more likely to use "pitching" than were others. "Pitching" continued to be used into the twentieth century. Sid Keighley, who was the Hudson's Bay Company trader at Stanley Mission, Saskatchewan, in the 1920s, wrote: ". . . the Indians were pitching in to the reserve for the summer. . . When they all pitched in, there would be clusters of teepees everywhere. . . By August most of our customers were outfitted for the coming winter and had pitched off for their traplines" (1988:77). Conversely, "pitching"appears infrequently, if at all, in documents of trading companies other than the Hudson's Bay Company, such as the North-West Company, or in documents written by people who did not trade with the Cree.

The Visibility and Characteristics of "Pitching Trails"

Most authors, beginning with Kelsey, either clearly indicate or imply that pitching trails were visible, well-travelled, well-known, and possibly named trails that connected localities and regions. Both Palliser and Hind commented on the visibility of trails, and both alluded to some tracks having names:

> . . . On the crest of the ridge there is a narrow well-worn path, which, for many generations probably, has been the highway of the Indians passing from Lake Manitobah to the Assinniboine . . . This pitching track is connected with the "ridge pitching track," between Ebb and Flow Lake and Dauphin Lake [Hind 1971, Vol 2:51].

McDonnell, a North-West Company trader, commented on another track and its antiquity, and recorded its name which is well-known today in Manitoba: "*Portage la Prairie*, so called by the Indians time out of mind . . ." [italics in original] (McDonnell 1960, Vol. 1:270).

Isaac Cowie, a HBC employee in southern Saskatchewan, twice made note of the visibility of trails:

> We struck an old trail of the Qu'Appelle Indians, going westerly and not far from the South Saskatchewan . . . The route which the Indians had followed was now marked by four tracks running, with little spaces between, parallel to one another, for in the enemy's country the long line of such a big party travelling in single file would have extended for miles from front to rear [1993:290, 294].

Murray described a pitching trail as being distinguished by:

> two parallel tracks about three and a-half feet apart, not unlike those of a light pair of wheels; these are made by the points of the long curved poles on which their lodges are stretched, the thickest butt end of which are fastened to each side of the pack-saddle [Murray 1839, Vol. 2:39].

Peter Fidler submitted a map drawn by *Ki oo cus* (Little Bear) which encompasses southwestern Saskatchewan, southern Alberta, and Montana from the Missouri River north to the parkland. It shows three major trails that run northward from the Missouri River, one of which goes through (or just west of) Cypress Hills, past Chesterfield House, to the parkland northwest of Sounding Lake in east-central Alberta (Harris 1987:Plate 59).

The physical visibility of trails and the fact that both Europeans and First Nations people plotted them on maps suggests two things. First, people regularly and routinely followed these trails. Schultz marveled at the ease with which people were able to locate campsites, suggesting that the trails, even if not apparently marked, were well-known. He wrote, "How knew they whence to shape their course with such certainty, to go straight to the only camp in all that immense stretch of mountain and butte-sentinelled, rolling plain?" (1907:118).

Second, First Nations regularly and routinely camped at certain sites. Larocque received very explicit instruction about this:

> . . . to remove the objection of my not knowing their lands a few of them assembled and draughted on a dressed skin I believe a very good map of their Country and they showed me *the place at different seasons they were to be found* [Burpee 1910:35; emphasis added].

Relevance of "Pitching Trails" for Archaeological Research

The historic data indicate that two factors were paramount in determining the route of any pitching trail across the northern plains: proximity to water, and the avoidance of major obstacles that would render it difficult for dogs to pull travois.

Water was essential for the dogs when pulling travois, especially on hot days (Henderson 1994:156–157). Avoiding the hottest part of a day may be one reason why pitching days always began at, if not before dawn, as Henry the Elder noted, "At break of day . . . we left our encampment" (Quaife 1921:269). Potable water was often a scarce resource on the north plains as Hendry noted, "The greatest hardships I have yet experienced is the warmness of the weather, and the want of water" (Burpee 1973:26). Cowie paints a vivid picture of the pandemonium that ensued when dehydrated dogs espied water:

> The weather was hot and the dogs drawing and bearing burdens came panting with long, protruding tongues along the trail. On catching scent and sight of water these immediately rushed for it and into it regardless of damage to their loads–which might be partly papoose. Then, frantic mothers would rush to save their babies, and old termagants, while rescuing their property, would vent their wrath on the poor dogs with blows [Cowie 1993:323].

At the same time, these trails avoided obstacles that would make travel with travois extremely difficult, namely hills, valleys, and ravines. Henderson found that going up or down steep slopes could be challenging for a dog

pulling a travois (1994:153–154). Tacking was possible, but required a turning radius of about five meters. Backing up was next to impossible. Even small gullies proved to be an impassible barrier, as were shrubby patches.

This tendency to avoid obstacles is substantiated by the historic records. Palliser comments that they pitched "along the base of the hill" rather than over it (Spry 1968:116). Murray also noted that "in crossing rough or boggy places, this [travois] is often found the most inconvenient part of an Indian camp equipage," and even packs were a problem in this terrain because "In the ascent the packs slipped over our mules' and horses' tails; in the descent, over their necks and ears" (1838, Vol. 2 2, 39).

However, ridges and coulees could be conduit as well as obstacle. Ridges appear to have provided advantage in areas of rugged and/or deeply dissected landscapes in that it was easier for the dogs (and eventually horses) to pull the travois along the crest of ridges rather than up and down the slopes, as Murray (1838, Vol. 2:2) noted. Pitching along ridge tops had another advantage–travellers would have had relief from bugs because of the winds. Coulees could provide access to river valleys if one entered them at their head where the slope was very gentle.

Second, the historic evidence gives us some indication of the average spacing between camping spots. During 1691, Kelsey recorded travelling distances of between 9.6 km and 32 km, with the average distance being 19.4 ± 6 km. Hendry/Henday and the Assiniboine he was travelling with also seem to have covered about the same distance—approximately 16 to 19 km per day, although depending on the circumstances they could travel as little as 4 km or as much as 26 km per day (Burpee 1907).

The 1802 Ki Oo Cus map (Harris 1987:Plate 59) shows camping places, indicated by small circles, along the Blackfoot pitching trails. The distance between each circle indicated the distance covered in a day's march. Although the exact location of "Bull's Nose" (no. 30 on the map) is unknown, it would appear to be somewhere north to north east of present day Coronation, Alberta. If so, then the distance from Chesterfield House at the junction of the Red Deer and South Saskatchewan Rivers is approximately 200 km, as the crow flies, again giving a estimated minimum average distance between camping spots of approximately 20 km.

A camp on the move appears to have been much slower than men traveling on their own. When Kelsey traveled with men only, they were able to cover between 25 and 30 miles (40 to 48 km) per day. Similarly, McDonnell recorded that the distance from the Souris River in Manitoba to the Mandan villages on the Missouri River was 10 to 12 days or about 100 leagues, which suggests that men covered about 40 to 48 km per day (1960, Vol. 1:272). This difference in speed is understandable, given the constraints of moving a camp consisting of men, women, children and hundreds of dogs.

Conclusions

Sites, like people, attain their identity through the complex web of relationships that places them within a universe of the landscape and human activity. It is only by seeing this totality of human activity spread across the landscape that we can understand the significance or "meaning" of any one focus of activity.

Pitching trails comprise a significant part of the web that connects those sites into a network, one that extends across both time and space and that defines the relationships among them. The literature provides many of the parameters that determined the trajectory of pitching trails, and these parameters reveal that the easiest trail/route

between sites is not necessarily the shortest or perhaps even the most obvious (to us). Water sources were a significant factor in determining a trail/route between sites and trails often "detoured" to access them. Trails/routes accommodated landforms either by avoiding obstacles (for example, going around the base of hills) or by exploiting them (for example, using coulees as entrances to deep river valleys).

Finally, the literature provides some data about the distances that could be traveled in a single day. The average distance that the entire camp could travel (20 km) compared to that of a group of hunters (44 km) is significantly different. Thus, we should expect that distances between base camps could be much less than distances between a base camp and an associated resource extraction camp.

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Maya Migration Revisited

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Interpretations of the development of cultural phenomena in the Maya area that stress in-situ factors are preferable to many archaeologists over those that implicate migration. This is in part because explanations that stress migration are thought by some to downplay human creativity. For this and other reasons, methods for the identification of migration and theory about migration remain somewhat underdeveloped in archaeology. This is unfortunate because population movement is a human universal and well-documented among the Maya of the Late Postclassic and Historic periods. In this paper I review some recent work on migration and discuss the nature of the evidence for migration in the Maya area.

Introduction

After decades of relative neglect, migration is once again a topic of much interest in archaeology (Burmeister 2000; Chapman and Hammerow 1997; Crawford and Smith 1996; Hakenbeck 2008; Rockman and Steele 2003). For this paper, I'll define migration as "permanent or semi-permanent change of residence of an individual or group of people" (Johnston 1986:297) based on decisions about the possible benefits of movement versus its drawbacks (Clark 2001). Below, I define some common forms of migration cross-culturally and I describe their possible material correlates in the archaeological record of the Maya area.

Identifying Migration in the Archaeological Record

Recent writers have stressed that migration is a complex process, not an event (Aimers 2003; Beekman and Christensen 2003; Curet 2005). In a provocative article which makes this point, Beekman and Christensen (2003) argued further that migration should not be used simply as an explanation of changes in material culture but that archaeologists should be more concerned with higher level explanations of *why* people move. Yet they also assert that migration is "a conscious strategic response to certain types of problems that leaves a variety of material traces and has repercussions in many areas of society" and that "archaeological data alone are rarely sufficient to establish even that a migration took place" (Beekman and Christensen 2003:113-114). I wonder, then, how we are to get at the causes of migration when we may not always be sure which type of migration occurred, or if migration occurred at all?

Fortunately for Beekman and Christensen they are discussing Precolumbian Nahua (Aztec) migrations which are "one of the best known examples of large-scale population movements in New World culture history" (Fowler 1989) due to rich and varied data including linguistic and ethnohistorical evidence (Fox 1980, 1981, 1983, 1987, 1989; Fox, et al. 1992). In such well

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documented cases it is certainly admirable to seek explanations for migration. In most cases, however, our resources are much weaker, and migration has been challenged in archaeology primarily because of the ambiguity of the data (Burmeister 2000:540; Chapman and Hammerow 1997). Anthony (1990:898) and Curet (2005) both express concern that although archaeologists may be able to identify migration, we may not be able to discern its causes in many cases. This seems particularly true for the Maya area, where we have little explicit method and theory on migration to begin with. Thus, my goals in this paper are methodological rather than explanatory. Although we certainly want to know *why* Maya people moved in the past, we first need to develop methods to evaluate *how* people moved in the past, and how to identify that movement in the archaeological record. This was the challenge I faced in my study of the Maya collapse in the Belize Valley (Aimers 2004a). If we (almost) threw the baby out with the bathwater by neglecting migration as Anthony (1990) suggests, let us not now put the cart before the horse by trying to explain a process—or set of processes—before we have explicitly investigate how to identify them based on material evidence.

How do we separate migration from diffusion? Can we? Back in the 1950's, Emil Haury (1958) presented four conditions that should be met by archaeological evidence of migration:

1. Many new traits appear suddenly without local prototypes.
2. Indigenous forms and styles are modified or used in a different way (i.e., by immigrants).
3. The new elements can be traced to some other area (see also Trigger 1968:9-19).
4. The same forms should occur at approximately the same time in both areas.

Despite useful critiques of Haury (e.g., Anthony 1990; Curet 2005; Duff 1998), there have been relatively few attempts to further identify probable archaeological correlates of population movement. For the Maya area, a first step in this direction is identifying the various forms of migration we know of archaeologically, historically, and ethnographically.

Types of Migration in the Maya area

My preliminary typology of Maya migration is based on those of Tilly (1978) and Anthony (1997). A major challenge central to the issue of migration archaeologically is identifying exactly *who* is moving. Research on identity, agency, and style has shown that identity is shifting and situational (Brumfiel 1994; Shennan 1989). People often express their perceptions of themselves, or their aspirations, in their public activities. In the case of the Aztecs, they self-consciously appropriated styles that would connect them to prestigious sites in Central Mexico (Tula and Teotihuacán) rather than to northern Mexico, from where they came. This tendency towards the situational negotiation of identity is problematic for archaeologists since we have traditionally assumed that sociopolitical identity is relatively fixed and thus migrants should be archaeologically identifiable. It is also apparent that migrations often take place at a small scale, from a community, to a family, to an individual (Curet 2005:33).

Such complexities are rarely going to be addressed by a single artifact class and require the examination of multiple data sets. In the Maya area these include evidence from archaeology, epigraphy, bioanthropology, ethnohistory, ethnography, and linguistics. Here, I focus primarily on evidence from artifacts likely to be found at archaeological sites, but I acknowledge that firm conclusions about population movement in the Maya area require a conjunctive approach

that combines multiple lines of evidence.

1. Local Migration

Most migration is local migration. As the name implies, local migration takes place within a home range or region with which the group or individual is familiar. People might also move quite far, "but remain within a social network of familiar kin, marriage exchange systems, and shared economic/geographic knowledge" (Anthony 1997:26). Historically in the Maya area this category would include "drift" (e.g., migration to other communities under Spanish control) and "dispersals" (movement from parent towns to new ones) as described by Farriss (1984). I believe that Mayanists have been preoccupied with long-distance interaction and have neglected evidence of stylistic interaction at a more local scale, but local migration is also more difficult to detect archaeologically (Curet 2005:34). This is problematic since local migration helps create and maintain regional cultures. In the Maya area, the ceramic sphere and systems concepts in type-variety ceramic classification are potentially very useful here (Ball 1976).

We have only just begun to knit together the many ceramic spheres of the Maya world and this synthesis already reveals even more interaction than we had suspected (Bill 2012). Maya archaeologists have tended to think of migration as being fairly long distance, from Central Mexico, the Gulf Coast or the northern lowlands. However, most of the ceramics I have studied were probably made in villages around the sites at which they are excavated. The fact that pottery typically did not travel far makes me optimistic that we really can say something about identity by mapping ceramic styles and bundles of styles (spheres, in type-variety classification)—over space and topography. As Stark (1998:230) noted in regard to ceramic style on the Gulf Coast: "Contained within … larger regional or macroregional systems were numerous local systems whose participants were economically and socially interdependent It is at this level-- the local level-- that issues of cultural affiliation probably mattered."

We tend to look for this sort of interaction in fancy pottery such as polychromes, but the style of ordinary things (like domestic pottery) and the ways in which they are manufactured is often most revealing of identity. I am optimistic that we can continue to make progress on issues of interaction and identity if we look for it in domestic pottery and think about interaction on somewhat smaller scales. One problem is that if movement is over very short distances, there may be few if any differences in material culture, and our only physical evidence of migration may be changes in the frequency and size of settlements over time.

2. Chain Migration

In chain migration, people move along a known route from a home region to a specific destination, often to join family and large migrations typically are the result of consist of frequent clusters of chain migration (Anthony 1997:27). An ethnohistoric example of this is the indirect and fragmented route of the settlers of the Maya of village of Soccotz in the Belize Valley from the Petén Lakes region after conquest (Thompson 1930:35-37; Willey, et al. 1965:28). Abandonment and migration are related processes (Aimers 2003; Cameron 2003) so an increase or decrease in settlement size and/or number of settlements is the most obvious evidence. Settlements in previously unoccupied areas, or peripheral to older settlements (Lange 2003:187) would also indicate migration on a relatively large scale, even if it occurred gradually. The

time depth of archaeological evidence is of course an advantage here. Chain migrations also often “leapfrog” over sites and areas.

Stylistic or technological change in pottery, particularly those seen in other areas (Snow 1995) may be rapid under these conditions (Anthony 1990:903; Thompson 1973). Changes in artifacts related to food and food preparation techniques are good indications of long-distance chain migration. Yaeger et al. (2004:110) have shown that historically-documented Yucatec Maya immigrants to Belize in the 1850s are recognizable in the record even though they were using European dinnerware bowls and tureens, presumably for communal eating. Plates and individual table settings were relatively rare, as was flatware which suggests they continued to scoop food from bowls with tortillas. European bake ovens best adapted to pibil cooking (a technique where food is baked underground) were also preferred. These newcomers were partially integrated into the Colonial economy but chose which elements of their ethnic identity to maintain--notably foodways. I am convinced that we can use ceramic styles to give us at least broad outlines of these sorts of routes.

3. Return Migration

Cameron (1995:115) Anthony (1990), and Gmelch (1980) have noted the back-and-forth nature of many migration streams. Return migration is more common where comparable economic opportunities are available at end of the migration route. Schele and Mathews (1998:4) have shown that return migrations occurred between Petén and Yucatan from the Late Classic onward. In the17th Century Kowoj Maya came to Petén from Mayapan after its decline around 1441; they may have originally gone to Yucatan from Petén (Barrera Vasquez 1957:107). Pugh (2003:408) notes that Kowoj Maya immigrant populations established their identity on "new or, perhaps, reclaimed lands."

New ways of making things in an area (technological styles) may be evidence of skills that returning migrants learned elsewhere, rather than the immigration of new people. Although immigrant material culture can change quite quickly, Curet (2005:51) notes that migrant communities can be conservative and “the ‘re-appearance’ of some ‘old’ cultural trait in a community may be an indication of return migration.”

4. Elite Migrations

Cross-culturally, economic motives are dominant in most migrations, and wealthy people have a greater ability to move (Burmeister 2000:545). However, Farriss (1984:219) has observed that, at least among the Colonial Maya, elite migrations were unusual, contrasting this “stable core population” with a more-or-less fluid group of migrants, who might eventually become incorporated into the core population of a community but who were as like to move on before that happened.” There is ample evidence of elite contact and elite migration in the Maya world. Demarest and Foias (1993) consider elite contact in the absence of large scale population movement in an examination of *talud-tablero* architecture in the Classic Maya area:

> Probable processes include intermittent highland-lowland alliances, exchanges, pilgrimages, dynastic marriages, or other inter-elite contacts. . . apparently not within the context of a military takeover, military-merchant colony, or other movements of population (Demarest and Foias 1993:166).

These data suggest that stylistic change in the southern Maya lowlands could occur through small-scale, persistent, and diffuse contact among small groups, or even individuals, in a number of

regions (Aimers 2004b). Robles (1986:89) stated that in northern Yucatán "the only innovations brought about by the (Petén) Itzá were in the realm of elite superstructure, the social and cultural base remained unchanged." So, we could expect to see changes in public art and architecture but very little in domestic refuse etc. Exotic elite symbolism conveys power and authority.

5. Career Migration:

Career migration is movement related to any hierarchical profession (Anthony 1997:27). Artists, including vase painters may have moved from site to site. We now have evidence of named artists on Maya polychrome pottery (Reents-Budet 1994) but the portability of pottery makes it difficult to equate the movement of an artist with the dispersal of that artist's product. Non-portable art such as murals would be ideal for this, but mural art is rare. Architectural and monumental stone sculpture (stelae), also rare, might be possible sources of information on this type of migration.

6. Circular or Tethered Migration:

Circular or tethered migration includes migrant laborers and others who move cyclically. These people may be the first to arrive in a chain migration. An example is the "merchant warriors" often proposed for the Terminal Classic in an analogy with the Aztec pochteca itinerant merchants (Bittman and Sullivan 1978). Pochteca -like merchants tended to specialize in expensive, exotic goods although a range of goods moved. Down- the-line trade also complicates this. Large quantities of exotic materials in one place, especially those from limited sources might indicate this sort of movement. Turquoise is a good example, as are metal objects in distinctive styles requiring not just stylistic familiarity but technological know-how.

7. Pilgrimage

Pilgrimage can be considered a form of tethered migration. Many of the stylistic elements of the Early Postclassic have been explained in terms of movement related to Quetzalcoatl (Ringle, et al. 1998) and pilgrimage is often used as a way to explain the infrequency of Early Postclassic remains at Maya sites. Censers and other ritual artifact forms are the most common objects resulting from pilgrimage, but squatter-like refuse in buildings with stratigraphic evidence of abandonment may occur (Pendergast 1982; Siegel 1991). Nelson (2003) and Winter (2003) found evidence that pilgrims engage in religious activities like the deposition of offerings of various types, but also left evidence such as hearths and disturbed tombs. The Aztecs are known to have looted Teotihuacán and Tula because they linked their ethnic identity to these older and impressive settlements.

8. Coerced Migration

There are any number of reasons people could be forced to leave their homes, either social, environmental, or both (e.g., disease). This category includes Farris's (1984:200) flight in the Colonial period (escape across the frontier into unpacified territory). A. Chase (1979) and Rice et al. (1998) have used settlement growth, ceramics, and architecture to argue for the migration of Maya from regions including Yucatán, the Usumacinta drainage (e.g.,Seibal), the Chontalpa region, and the Guatemalan highlands into the Petén in the Terminal Classic-Early Postclassic. Importantly, in the models above, large-scale migrations eventually led to assimilation and hybridization. These sorts of hybridization models are increasingly offered to

explain the presence of Teotihuacan-style architecture and iconography in the Maya area. (Nielsen 2006; Smyth and Rogart 2004; Wright 2012; Wright, et al. 2010)

Graham et al. (1989) found differences in incidences of porotic hyperostosis (an indication of anemia) in two relatively well-documented colonial period populations in Belize. This finding suggests that osteology may be of use in identifying coerced migration

9. Military Invasions

Warfare and invasion each probably included several forms of coerced migration, and are so important in contemporary Maya archaeology that we should consider breaking this category down further. For example, Fox (1980:45) following comments by Landa (see Roys 1962:32 -51; Thompson 1970:13) suggested that warrior groups from the Gulf Coast emigrated to the Maya highlands without women. This type of migration would have led to intermarriage and a certain amount of cultural assimilation even if foreign ancestral ties were stressed. Scholes and Roys (1948:23) made a similar distinction between large migrations and military conquest by small groups in Yucatan and the highlands of Guatemala. Correlates of invasion and war such as skull pits (Colha), burning of buildings (Suhler and Freidel 2003), fortifications (Becan), rapid abandonment leaving intact artifact assemblages are relatively rare. More likely than long-distance invasions are small, localized wars that occurred between single sites or small groups of sites throughout Maya history.

The rejection of Fine Orange Ware ceramics as evidence for invasion at Usumacinta sites has made Mayanists cautious about arguing for invasion or foreign domination when presented with ceramics from other places or in a different style. In addition, ceramic evidence for conquest is often minimal.

The ceramics of the Late Postclassic-to-Historic transition (i.e., the conquest) should surely represent invasion if any would, and yet the Spanish styles are barely visible in the ceramics of both Tipu and Lamanai. The corollary is that a few imported vessels or sherds may be all that is left in the archaeological record of an invasion.

10. Intermarriage

Almost all models of migration include intermarriage, an important form of population exchange that is well documented in most areas of Mesoamerica through archaeology, linguistics, epigraphy, bioanthropology, history, ethnohistory, and ethnography. Intermarriage occurred among local sites or among much more distant sites. In the Books of Chilam Balam (Roys 1933:70), elite male lineage heads entered an area and intermarried. Fox argues that the Quiché-Maya of Postclassic Utatlán were Putun descendants who married into local lineages as part of a purposeful strategy (Fox 1989:659). Ethnohistoric accounts also indicate that the sister of the leader of the Petén Itzá (Canek or Kan Ek) married a man from Tipu in the 17th century (Thompson 1977). According to Jones (1998:83), "Itzá history hints at the possibility that this system coalesced through a policy of integration by conquest, in which the Itzás incorporated newly dominated groups by marrying them to existing elites and granting them positions on the ruling council as *Ach Kate* military religious leaders." Landa (Tozzer 1941:99) stated that intermarriage between ruling families (chi'balob) extended across the Maya world: Such alliances would have fostered both migration and trade.

Isotopic analysis of bones and teeth e.g., (e.g., Wright 2012) have great potential for identifying individuals who moved after

childhood. Marcus (1976) has illustrated the importance of royal intermarriage in the Classic, and Chase has suggested that "intermarriage and assimilation may also account for the broad ceramic homogeneities of Postclassic pottery in the southern Lowlands, as well as the more tenuous resemblances to pottery, particularly censer complexes, in the north." (Chase and Rice 1985:148).

Conclusions

The observations above show that narrow segments of populations often move so they may bring a restricted range of artifacts and material culture. Cross-culturally there is a tendency for disadvantaged young males to move the most frequently (Clark 1986) as Fox (1987, 1989) argued for Mesoamerican Pipil migrations. Even when people move long distances they do tend to stay in contact with their place of origin. New groups who bring new skills or different economic strategies may develop a symbiotic relationship with the group they join, rather than assimilating or dominating/subordinating the other group. Some “ethnic enclaves” (Spence 1996) in Mesoamerica seem to have been occupationally specialized, for example, a pattern evident right up to conquest.

Carr and Neitzel (1995:145) have suggested a “cross-cultural tendency for messages of social units of decreasing scale to be expressed—if they are expressed materially—in attributes of decreasing visibility.” Thus, the traditional culture of immigrants may be more clearly expressed in household cooking vessels than in items used in more public contexts. Similarly, technological style (Gosselain 1998; Lechtman 1977) tends to unconsciously reflect identity and is thus potentially more useful then more public, visible, statements for detecting immigration archaeologically (what Wobst 1977 called emblemic style). In general, recent scholarship suggests that technological style (e.g., in textiles, architecture, and ceramics), domestic architectural forms/decoration, and food choices/ preparation can all provide evidence of migration.

Farriss noted that population instability in the Colonial period may have earlier roots:

> The pattern of population movement during the colonial period suggests that among the Maya a tendency toward physical fragmentation emerges whenever social cohesion weakens at the center: whenever the *quid pro quo* for the inconvenience of clustering together and serving an elite seems inadequate. The well-documented colonial patterns may help to interpret earlier cycles of consolidation and dissolution that are only hinted at in the archaeological record. [Farriss 1984:199]

More than one group may move into a given area at a time, further complicating the record. I think for the Classic Maya period we should assume there was constant interregional movement along routes that probably did not change much until the Terminal Classic, when they moved to rivers and coasts. I think we have to consider a number of different forms of migration at different scales at all times in the Maya area. Before we can explain this movement we must continue to refine our methods for identifying it in the fragmentary record we have. I hope this paper is a modest step in that direction.

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Technologies of Style and Captives: Implications for the Production of Ceramics in Sonora, Mexico

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While controversial, recent research into prehistoric warfare demonstrates the variety of prehistoric societies who took slaves and captives. These captives, usually women, were uniquely positioned: on one hand unable to consciously exhibit identity, they were often tasked with extensive production of utilitarian goods. As such, we see the residue of their natal traditions in the steps of production they employed. Captives are one way of introducing technological change across fluid cultural boundaries. After AD 1300 in Sonora, Mexico, Hohokam populations migrated into the northern area of the state bringing with them new technological traditions. My paper addresses the potential for captives at Cerro de Trincheras, where female centered technological style changed after AD 1300. I argue that both Trincheras and Hohokam settlements prioritized defense, and that changes to Cerro de Trincheras craft production are limited to low status ceramics and ground stone. This case study contributes to understanding captive-taking, a prevalent, but low visibility form of population movement in the late prehistoric Southwest.

Archaeologists discussing migration traditionally assume a strategic and relatively willing movement of peoples across the landscape. These migration narratives focus on the large-scale actions of people, using terms like 'push and pull factors' to describe a group's motivation. However, recent research into prehistoric warfare demonstrates the prevalence of involuntary small-scale movement; numerous authors (Brooks 2000; Cameron 2011; Habicht-Mauche 2008; Kohler and Turner 2006; Martin 2008) demonstrate how captive-taking was a widespread and common occurrence, with captives often comprising up to 30% of the population (DeBoer 2008). These captives, usually women and children, were uniquely positioned: on one hand unable to consciously exhibit identity, they were often tasked with extensive production of utilitarian goods. As such, their contribution to the labour pool of their captures becomes a means for archaeologists to track captives' movements across the landscape.

In this chapter I will first address why it is necessary to identify captives in prehistoric societies. Next, I will develop a series of expectations to identify captives archaeologically, using established examples of captive-taking in the late-prehistoric Greater Southwest. Based on these criteria, I will evaluate the likelihood of captives at Cerro de Trincheras, Sonora.

Cerro de Trincheras is a large Trincheras tradition village, located on the slopes of a basalt outcropping, along the Middle Magdalena River. Of central interest is the large proportion of Hohokam style domestic wares present at the site. Prior to AD 1300, Trincheras tradition populations lived across northern Sonora, Mexico, producing purple-on-red and purple-on-brown ceramics centered in the Altar valley. After AD 1300, Hohokam populations migrated into Altar valley (Figure 1), bringing with them paddle-and-anvil manufactured ceramics, which

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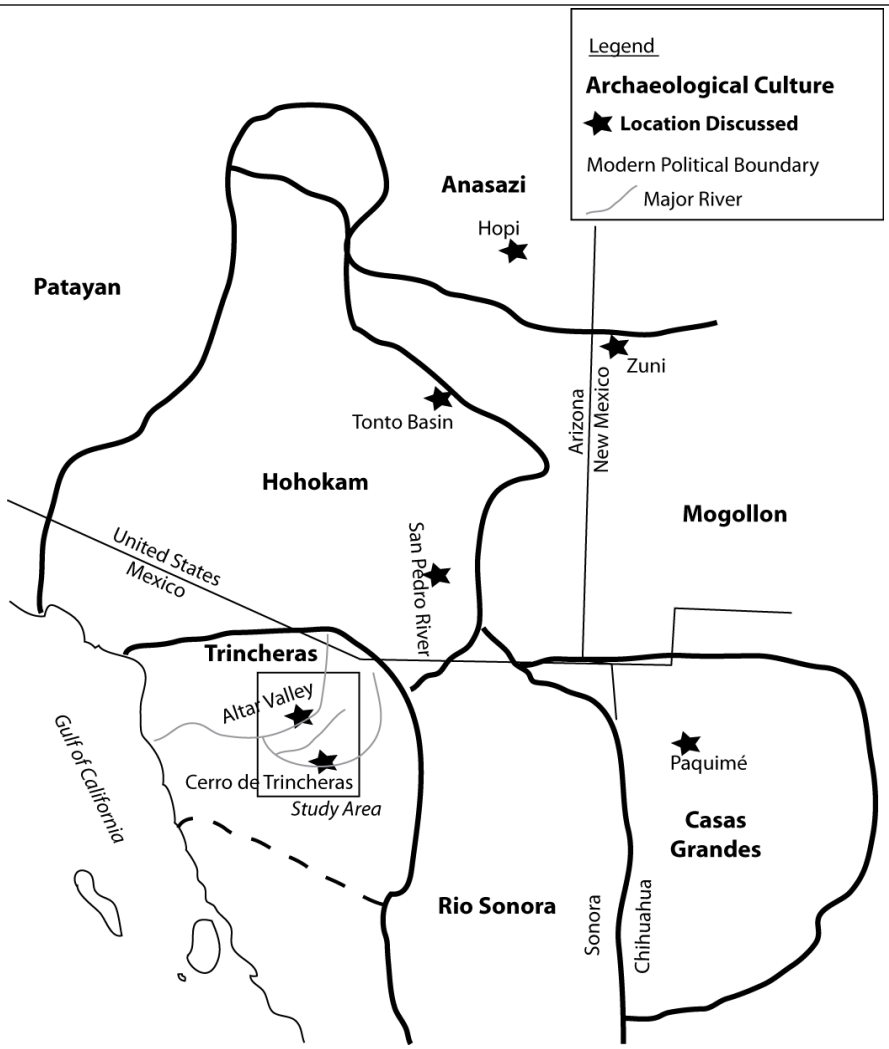

Figure 1: Map of Study area and archaeological sites discussed.

deviated from the Trincheras traditional coil-and-scrape methods (McGuire and Villalpando 1993). The indigenous Trincheras population relocated to the Middle Magdalena valley, aggregating into isolated defensive hilltop settlements; the largest of these was Cerro de Trincheras, which housed upwards of 1000 individuals (McGuire and Villalpando 2011). Despite the geographical separation of Hohokam and Trincheras populations into separate valleys 50 km apart, 31% of plainware ceramics at Cerro de Trincheras were a Hohokam style (Gallaga 2011). This paper evaluates the evidence for captives in domestic production of ceramics at Cerro de Trincheras.

Why Study Captives?

Recent literature (Brooks 2002; Cameron 2011; DeBoer 2008) has demonstrated the widespread prevalence of captive-taking in prehistory. Similar to discussions of pre-state warfare, archaeologists have historically shied away from discussing captives; as an objectionable practice many modern indigenous communities abhor the implication of captive-taking in their past. Nonetheless, warfare, often

for the purposes of gaining captives, was an endemic activity in precontact North America (DeBoer 2008). To overlook the impact of a predatory landscape on the lived experiences of these women and children ignores the contribution these captives had on their captor's society. The use of the word 'captive' rather than slave highlights these women's ambiguity, and the complicated relationship they had within their new community; a kinship style slavery was common in prestate society (Brooks 2002), contrasting with the plantation style ownership usually thought of when researchers use the term 'slave'. In these cases individuals became adopted into their captive's family. Women were frequently incorporated into new households as secondary or 'drudge' wives and became potential bridges between two cultures (Cameron 2013). Therefore there are three key reasons to study captive-taking: it was an endemic practice; it represents the female experience; it affected craft production.

Endemic Practice

The first reason to study captives is that captive-taking was an endemic practice across North America. Using ethnographies and ethnohistories of Western Native American groups DeBoer (2008) found that 66% of ethnic units practiced captive-taking in warfare. Few of the remaining third had confirmed "negative instances", suggesting the practice may have been more widespread than the initial number suggests. In almost all cases these captives were women and children; if caught, males were frequently killed or sacrificed and not incorporated into society (Cameron 2011). In addition to being omnipresent, captive-taking was a recurrent phenomenon. Demographic observations by ethnohistoric sources estimate that captives comprised up to 10% of various populations at time of contact, other areas of the world had numbers as high as 30% (DeBoer 2008). This means that if captive-taking occurred, captives were a significant component of the community.

Questioning the presence of captives is not just about 'finding' them, but also addressing why were not present. Given the widespread prevalence of captive-taking, societies rejecting the practice add to our understanding of how peaceful intercultural interaction functioned. Groups have worked across cultural boundaries, using trade relationships, or intermarriage to strengthen ties, however ethnohistoric texts suggest societies not taking captives were a minority (Brooks 2002). Why these groups chose to reject this method of cultural interaction provide insight into alternative cultural practices.

However, not 'finding' captives does not necessarily demonstrate their absence: as marginalized individuals, their opportunities to impact the archaeological record was subtle. Studies of captive-taking are in their infancy, our means of identifying captives is limited, and our understanding of the range of variation in the captive experience is imperfect (Cameron 2008). As difficult as they are to identify, captives provide a key means of addressing how warfare affected whole societies, as the impact of warfare on women is often overlooked.

Female Experience

Much of the traditional explanation of warfare in the Southwest is male-centric, focusing on weapons (McEwen et al. 1991), alliances (Wilcox et. al 2001), and defense (Kelly et al. 2009). When researchers concentrate on women, it is usually limited to the context of defensive wounds (Kohler and Turner 2006). Captives reorient warfare discussions to the impact of landscapes of violence on women.

Warfare from a female perspective tackles how women separated from their natal traditions incorporated themselves into their captor's communities, focusing on the lived experience of women in conflict situations.

While in a subjugated position, these women were not without agency. They became conduits of culture change and a means of introducing new technologies to the society. In some cases captives completed undifferentiated labour (Cameron 2012), while in other cases captors selected women for particular skill sets, such as pottery production (Habicht-Mauche 2008). Frequently tasked with childcare, secondary, or drudge wives, would have had a direct impact on the education and development of their captors' children. Additionally, captives taken across cultural boundaries would develop proficiency in two languages and customs, making them ideal intercultural mediators if/when active warfare diminished (Cameron 2008).

Craft Production

Craft production is a major means through which to determine the presence of captives. While captives may have produced the same types of items, the ways in which they completed tasks would reflect the technological style of their natal traditions. Technological style reflects the combination of choices made during manufacturing process that reflect a system of learning (Stark 1998); this is generally a passively reproduced style, reflecting enculturated patterns of manufacturing goods (Gosselain 2008). Quotidian craft production is incredibly conservative, so introduction of new technological styles is a concrete means by which archaeologists can track migrants entering a community (Lyons et al. 2008).

In the case of captives, the finished artifact might superficially resemble objects from the captor's society, but the steps used to produce the artifact, the technological style, will remain the same. The process of emulation to avoid negative attention created low-visibility variation in the material cultural record.

Increasing household productivity and control of household labour were major motivations for captive-taking (DeBoer 2008); as such, captives' contribution to material culture was likely subtle yet substantial. Captives would have spent a great deal of time on menial production of goods, for the benefit of their captors (Ames 2008). In the southwest many of the labour intensive activities were already considered women's tasks, dovetailing with the hypothesis that captives often entered the household as drudge wives (Cameron 2011). Potential low status/high labour activities include construction of architecture (Cameron 2012), pottery production (Habicht-Mauche 2008), and food processing (Ames 2008). All these activities are regularly occurring events, and leave material traces in the technological style used to create them.

Cross-cultural studies of captive-taking demonstrate three key points. 1) It was a recurrent and common activity 2) Women were the most likely to be effected and 3) Captives had an impact on material culture. While the traces of captives are subtle, questioning their presence addresses the impact of warfare on women. Many of the following examples occur in the late-prehistoric Southwest, a landscape of migration and violence. The case studies demonstrate that contemporaneous with Cerro de Trincheras, other southwestern cultures engaged in captive-taking.

Captive-Taking in the Greater Southwest

The Trincheras tradition of northern Sonora is one component of the broader cultural category of the Greater Southwest that includes cultures such as the Anasazi, Mogollon, and Hohokam.

The cultures share many similarities, such as sedentary village life, maize based agriculture, and pottery production. Through long-distance trade networks of shell and ceramic exchange, Trincheras tradition participated in wider Southwest ideological systems (Bradley 1999) and these wider cultural phenomena impacted Trincheras development.

In the late prehistoric the Greater Southwest experienced widespread population movement and disruption including the Kayenta migrations into southern Arizona, the Mesa Verde Region depopulation, and the corresponding founding of the Hopi Mesas and Rio Grande pueblos. These movements of people were not always peaceful; there is ample evidence for warfare in the form of defensive settlements (Wilcox et al. 2001), increased rate of defensive injuries (Kohler and Turner 2006), and violent termination of sites (Stone and Lipe 2008).

Traditional rationalization for culture change focus on exchange and migration as explanatory mechanisms for the spread of ceramic styles. The clearest example of Southwest migration is the widely studied Kayenta migration and the spread of polychrome ceramics. Clark (2001) found that these migrant communities established themselves as fulltime pottery specialists, and controlled the exchange of other raw materials from their homeland. In addition to the spread of polychromes, Kayenta migrants are identifiable by the coiled corrugated pottery and presence of perforated plates, likely used in ceramic production. These migrants lived in enclaves on the edges of the settlement system in domestic structures that differed from the indigenous population (Lyons et. al 2008). I bring this up not to debate the argument's validity, but instead as means to contrast changes in material culture due to captives. Kayenta potters maintained control of their domestic space, retained trade relationships with their homeland, and produced visually distinctive polychrome ceramic trade wares. In the following three examples I will present case studies of where this violence resulted in captive women, and the low visibility impact these women had on the archaeological record.

Cameron (2011) has identified the presence of captives at Grasshopper Pueblo in east-central Arizona. Previously, archaeologists explained the new corrugated ceramics introduced to the site, and over representation of females in the burial population, as a result of migration and men dying in warfare (Lowell 2007). Cameron (2008; 2011; 2013) examined a wide range of material from the site and found that the only technological changes related to women's tasks (primarily cooking and pottery production). Additionally, most of these changes were all low visibility traits, such as manufacturing method and tool use. While trying to assimilate into their captor's society captives would be hesitant to actively signal their outsider status through decorated wares, or public architecture. However, technological style (choices made at each stage of production) is incredibly conservative. Once potters learn how to manufacture a vessel, they are unlikely to re-learn a new method (Cameron 2011). The captive produced finished vessels at Grasshopper Pueblo may look similar to local wares from a distance, but the minute technological differences permits us to track these women. Only women migrants, and suppressed identity in a landscape of warfare indicate that captive populations were likely.

Cameron's analysis of Grasshopper Pueblo is not the sole example of captive-taking in the southwest; Debra Martin's (2008) analysis of skeletal remains from the La Plata valley shows a surplus of reproductive age females with a sub section showing a repeating pattern of injuries. Injuries included cranial and post-cranial facture,

muscle hypertrophy, asymmetries of limb and hip portions, and higher frequencies of nutritional anemia. The healed and healing fractures depict a pattern of ongoing trauma that was not sufficiently severe enough to kill the victim. In the case of the cranial trauma, Martin (2008) found that the location and extent of the some of the damage might have been enough to cause mental impairment, preventing the victim from fleeing the community. The muscular evidence demonstrates these women were subject biomechanical strain indicative of hard physical labour and asymmetries. The muscle attachments indicate that women sustain this kind of activity over long periods of time. Finally, there is evidence of higher food restriction and forced poverty seen in higher anemia rates and infection in these women. In short, in the La Plata valley there was a surplus of reproductive age females, some of whom formed a sub-class of women who were abused, malnourished and over worked, suggesting a group of subjugated women outside of the usual kinship structure to protect them. Martin (2008) argues that this subclass represents the victims of endemic warfare between AD 900-1350.

The Plains-Pueblo frontier provides a more recent example of captive-taking in the late prehistoric period. Here, Habicht-Mauche (2008) examined the pueblo style cooking pots found at high plains bison hunting campsites. Unlike the decorated ceramics, such as glazewares and polychromes, which could be geologically sourced to the Galisteo Basin, Pecos, and the Salinas district, the unassuming cooking vessels shared technological style elements with these regions, but were locally produced. The plainwares also showed a marked difference from southern High Plains style vessels. During this period men gained status and prestige through buffalo hide trade, which required the co-opting of women's labour in the hide preparation and tanning stages. Habicht-Mauche (2008) argues that captive Pueblo women filled this labour niche, eventually transferring knowledge of pueblo ceramic to southern High Plains groups.

These three case studies demonstrate that captive-taking in the late prehistoric Southwest had a substantial and direct effect on women. Rather than discuss an abstract landscape of violence, these examples lay out clear criteria to assess the contributions of captive women at archaeological sites. These approaches do not oversimplify; they acknowledge the ways in which women could be incorporated into captor society as secondary wives or other forms of forced kinship. A common means of tracking these women's movement is ceramic production; across all southwest societies women are the primary potters (Crown and Fish 1996), and cross culturally are usually the producers of domestic ceramics (Schriever 2010). An abrupt change in ceramic technology at Cerro de Trincheras then begs the question whether captives were present there as well.

The Trincheras Tradition

In the late prehistoric Southwest population movements disrupted previous cultural boundaries causing ripples of movement across the Southwest (Lekson 2009). In Sonora Hohokam populations migrated south into the Altar valley, which had earlier been the epicenter of the Trincheras tradition. Indigenous populations appear to have left the valley, likely resettling in the Middle Magdalena valley 50 km to the south (McGuire and Villalpando 1993). Previously, the Middle Magdalena area had a very low population, but in the late prehistoric several Trincheras groups founded new settlements, and the population of preexisting settlements increased dramatically; Cerro de

Trincheras was by far the largest of these new settlements. It is a hillside village comprised of at least 1000 people, a large concentration of people for anywhere in the Southwest. The site is a volcanic outcropping on an otherwise flat plain that Trincherańos covered in narrow terraces. Ceramic dating and radiocarbon dates both confirm this site was founded around AD 1300, and abandoned by 1450 (McGuire and Villalpando 2011).

In earlier periods, Trincheras potters decorated coil-and-scrape ceramics with red designs and purple specular paint. However, in the late prehistoric, virtually all of the locally produced pottery was undecorated plainware, including the vessels used in cremation burial. At Cerro de Trincheras, plainwares comprise over a million sherds, and 99% of the ceramics (Gallaga 2011). The majority of these are Lisa 3 type, a plainware made using Trincheras tradition coil-and-scrape production. Interestingly, 30% of the sherds are Sells Plain, a paddle-and-anvil ceramic manufactured by Hohokam potters. One possible explanation for this abundance of foreign manufactured pottery is captives at the site. In the remainder of this paper I will present the support for warfare in northern Sonora and existing evidence for captives at Cerro de Trincheras, ending with future avenues of research to further explore the experiences of captives at the site.

Implications of Warfare

Studying captives at Cerro de Trincheras will add to our understanding of late prehistoric warfare. At present, our study of warfare in northern Sonora is limited to spatial observations. The overall settlement pattern suggests a segregation of Trincheras and Hohokam populations into separate valleys with an unoccupied buffer zone in between. Additionally, site location and orientation support that defense was a concern with sites in both valleys located on highpoints with good visibility. Finally, terrace arrangement at Cerro de Trincheras confirms the defensive characteristics of the site. If warfare can be demonstrated, then researchers need to consider the role of captive-taking within this system of violence.

Firstly, on a regional-scale we see clustering of settlements. Post AD 1300, there is no evidence of Trincheras tradition populations living in the Altar valley (McGuire and Villalpando 1993). That region becomes entirely dominated by Hohokam villages. Meanwhile 50 km away, Trincheras tradition sites in the Middle Magdalena valley increase in both number and size (McGuire and Villalpando 2011). Interestingly the intermediate area between these two regions remains unoccupied. The Bosquillas valley, with the site of La Playa, lies between the two late prehistoric valleys. Trincheras Tradition populations occupied La Playa and the surrounding since the Early Agricultural period (1500 BC to AD 350). However, after AD 1300 there is limited evidence of occupation of the valley by either Trincheras or Hohokam groups. This functionally created a buffer zone between the two cultures, a trait common in other regions of the southwest (LeBlanc 1999; Wilcox et al. 2001).

Secondly, on a valley scale we see a concern with defensible settlement. Trincheras groups started aggregating together on a level not previously observed in the region. They chose to occupy a hillside despite the associated ongoing costs such as hauling water, and traveling to agricultural fields. This demonstrates persistent threats that required living in these defensive settlements. In the Altar valley, Hohokam populations also built fortified hilltop sites and lived on raised benches of land that permitted good vantage points of the valley. Unfortunately,

these have not yet been excavated, so other defensive features, such as palisade walls, cannot be determined.

Finally, on a site level there is clear evidence for enhancing the defensive attributes of Cerro de Trincheras. Inhabitants invested significant labour in constructing terraces; current estimates indicate the effort was comparable to a 700-room pueblo (McGuire and Villalpando 2011). Cost path analysis of the hillside demonstrates that terracing greatly increased the difficulty of traversing the hillside, making it a highly defensible location (Heard and Knight n.d.). It is important to stress that these defensive modifications protected a functioning village, and this site was not just a defensive refuge.

In addition to repelling attackers, the terracing also controlled movement, reinforcing the hierarchy of dominance at the site. As one progresses up the hillside, access becomes more restricted, as the terraces become higher the ramps linking them become fewer (McGuire and Villalpando 2011). This reaches a climax at El Caracol, the walled precinct at the summit of the site, which is accessible by only two entrances. Consequently, activities occurring on the summit would be private, with other inhabitants of the site noticeably excluded. In contrast, the terracing made households on the lower levels visible to their social betters (O'Donovan 1997). Despite the effort to construct the terracing, most of the domestic architecture is relatively ephemeral, so the daily movements and activities of captives would be under constant scrutiny.

What we have is a landscape concerned with ongoing violence. Given the displacement of indigenous Trincheras populations from it is likely this violence was against the encroaching Hohokam. El Mirador (The Look Out) faces west, toward the confluence of the Magdalena and Altar rivers, the direction from which Hohokam groups would travel. Therefore, we have a regional landscape where extensive resources were permanently dedicated to defending the population.

Technological Visibility

The key to identifying captives archaeologically is identifying the low visibility technological changes that occur in quotidian products. Captives generally minimized highlighting their outsider status by conforming to their captors' cultural aesthetics, but would be unable to re-learn the patterns of production from their childhood. Kayenta migrant groups did not have such difficulty and are clearly visible as pottery specialties through their polychromes and kivas. Therefore, when we examine technological change at Cerro de Trincheras we must consider the visibility of new technologies. Overall, we find that potters limited their changes to manufacturing methods not decorative style, and that religious changes are negligible.

Early Trincheras pottery is known for its elaborate purple on brown and purple on red designs. These, as well as plainware vessels termed Lisa 1 and Lisa 2, were all produced by coil-and-scrape manufacture (McGuire and Villalpando 1993). By the late prehistoric period this pattern had changed; Plainware Lisa 3 continued to be manufactured by coil-and-scrape, but local production of painted ceramics ceased in favour of imports from Casas Grandes (Gallaga 2011). At Cerro de Trincheras nearly a third of ceramics are Sells Plain, a Hohokam plainware ceramic type made using paddle-and-anvil manufacture. As previously mentioned, method of pottery manufacture is incredibly conservative, so it is highly unlikely that Trinchereñas potters had learnt a completely foreign technology for the purpose of producing plainware ceramics that are visually similar to a

previously existing method. The ceramics pattern is interesting, since at Cerro de Trincheras there are virtually no Hohokam decorated wares at the site despite the fact that Hohokam groups lived 50 km to the north, and that major epicenters of Hohokam ceramic production were less than 200 km away through interconnected river valleys. In contrast the majority of the polychromes are from Casas Grandes 300 km away, and only accessible through mountainous terrain. The shell work similarly reflects connections to the east, rather than the closer and more geographical accessible Hohokam populations to the north. Therefore, the main evidence for movement of people is of low visibility, with the final product domestic ceramics remained visually similar the cultural norm. This suggests Hohokam producers were deemphasizing their identity, trying to minimize the extent to which they differed from Trincheras populations.

Also missing at Cerro de Trincheras is clear evidence of Hohokam ritual behaviour, such as censers, pallets, and Hohokam shell work (Greenwald 2011; Price 2012; Zavala 2011). The production and use of these items in ritual contexts would have sent a clear signal to the surrounding Trincheras community that the craft producers were outsiders. We find almost no ritual paraphernalia associated with Hohokam religious traditions; even in death there is limited evidence of Hohokam style markers. Instead, all we see is changes to technological style, the low visibility, and difficult to retrain manner of domestic production. Domestic production of ceramic is also a time intensive process with little prestige, a common element of captive labour.

Types of Technological Change

The final line of evidence is the gendered implications of technological change. If the pottery was the result of family groups moving to the site, we expect to find multiple types of craft production change reflecting the entire household. To date there is sufficient analysis to discuss the gendered implication of three kinds of material culture: ceramics; shell work; and ground stone.

Shell production is an effective means of distinguishing between Hohokam and Trincheras tradition populations. Hohokam shell production emphasizes bead production (Bradley 1999), while the Trincheras tradition emphasized *Conus* rings. Both groups made *Glycymeris* bracelets, but differed in manufacturing technique; Trincheras populations used a faceted core removal technique, while Hohokam artisans ground the core (Woodward 1936). It is an artifact class with ritual importance, and economic significance (Vargas 2011), yet evidence of Hohokam style shell production at Cerro de Trincheras is lacking. While production of shell jewelry is not specifically a gendered activity, there is some evidence that acquiring the raw materials is associated with male initiation rituals (Price 2012). The limited quantity of Hohokam shell technology (Price 2012) at Cerro de Trincheras may represent the absence of Hohokam men at the site.

In the Greater Southwest, pottery production is almost exclusively a female activity (Crown and Fish 1996; Schriever 2010). The only instances of male involvement in pottery production are the occasional painting of finished vessels. Therefore, the clearest line of evidence for cultural interaction comes from unmistakably defined women's work. If the producers of Sells Plain were voluntary wives moving into the community, or part of Hohokam artisanal groups, then expression of cultural identity would not necessarily be dangerous. On the other hand repression of natal identities is common in cases of captivity, which may explain the lack of

Hohokam decorated wares.

Ground stone provides an interesting and often overlooked perspective. While the manufacture of ground stone is not gendered, its use is strongly associated with women. Grinding of corn is a cornerstone of female identity in many modern pueblos (Lowell 1991). Most *metates* at the site are concave with irregular *manos*, which corresponds to the pattern found in the Trincheras tradition (Greenwald 2011). However, there are a small number of *metates delgada* and loaf shaped *manos*, associated with the Hohokam, in particular with the southern Desert Hohokam (McGuire and Villalpando 1993) of which the Altar valley migrants are likely to be a part.

So we have two lines of evidence showing that female centric activities changed, while we have no specific evidence of alternation of male activities. Additionally, these changes are all low visibility. Even if somewhat voluntary refugees, the potters were deliberately deemphasizing their identity. If they were not captives, studying the technological style of quotidian ceramics permits us to understand how conflict affected women in the past.

Future Research

There are three future avenues of research that could be particularly fruitful for evaluating the hypothesis that captives produced ceramics at Cerro de Trincheras. 'Proving' the presence of captives is difficult; the most effective means of addressing the question is to eliminate other hypotheses, such as trade, or group emigration to the site. Alternate lines of evidence, including domestic architecture, provenience studies, and bioarchaeology could assist this process.

Construction of domestic architecture

While not specific to the male or female realms, this line of evidence if present would indicate the Hohokam living at the site had sufficient control over their situation to construct their own dwellings and form enclaves. This would provide a great deal of information on the physical autonomy of Hohokam potters and how they integrated into the site. At present there is insufficient excavation of Altar valley Hohokam sites to evaluate this line of evidence (Zavala 2011).

Elimination of the Trade Hypothesis

Trade remains one possible explanation for the Sells Plain ceramics at the site. Most examples of utilitarian exchange networks of domestic goods are restricted to areas within 25 km of each other (Lightfoot 1979). Cerro de Trincheras and the Altar valley are approximately 50 km apart. Extensive trade of quotidian wares at this scale and distance seems unlikely. Fortunately, this can easily be tested with provenience studies. I will be completing petrographic comparisons of the sand tempered sherds to sand samples collected at 5 km intervals in both the Altar and Middle Magdalena valleys to confirm or eliminate trade as an explanation.

Skeletal data

Several examples discussed earlier, notably Cameron (2011) and Martin (2008), made extensive use of skeletal data; I would be remiss if I did not address the glaring absence in this paper. Both the Trincheras and Hohokam traditions cremated their dead, making skeletal analysis impossible (Villalpando 2011). However, the cremations were interred in plainware vessels, so there is an opportunity to address the role of ceramics and death. Recently, in constructing the visitors centre INAH archaeologists have recovered 100 cremations. This may provide a fruitful avenue of future research.

Conclusions

The purpose of this paper was not to prove the

presence of captives at Cerro de Trincheras, but rather to demonstrate why their existence needs to be evaluated. Recent research is demonstrating the prevalence of captives across the Southwest (Cameron 2011; Habicht-Mauche 2008; Martin 2008). This should not be a surprise: cross-culturally, captive-taking was an endemic component of pre-state warfare. Sites in northern Sonora were located in defensive locations, and their internal arrangements suggest that it was a landscape of violence. In this context of hostility, Hohokam migrations from the north relocated Trincheras populations from their traditional centres in the Altar and Bosquillas valleys. Hohokam populations, producing paddle-and-anvil ceramics, firmly occupied the Altar valley, while the Bosquillas valley, including the long occupied site of La Playa, remained a buffer between the two cultures. Despite this apparent segregation, nearly a third of Cerro de Trincheras plainware ceramics are the Hohokam Sells Plain type.

One of the primary motivations of pre-state captive-taking was acquiring secondary wives. These women were incorporated into their captors' kin structure as drudge wives, where they completed low status and labour intensive activities such as food processing and craft production. At Cerro de Trincheras we have ample indication of Hohokam technological traditions; however, the evidence is limited to female-centric and low visibility activities. While trying to de-emphasize their outsider status, relearning basic craft production steps would have been difficult for any Hohokam women at the site.

My discussion of landscapes of violence, and changes to female technological style demonstrates the likelihood of captive women is high and this avenue of research is fruitful. To conclusively identify the captives more research is necessary; this research will be the remainder of my dissertation research. It includes an analysis of other forms of material culture, a closer spatial analysis of Sells Plains at Cerro de Trincheras, and a petrographic analysis of ceramics. These will help eliminate any remaining concerns that the Sells Plain ceramics entered the community through trade or migration of artisan groups. In reality, we are addressing a 200-year period, and all three explanations (trade, migration, and captives) could have occurred simultaneously. Captives are likely present, but only one component of the complicated intercultural interaction occurring between the Hohokam and Trincheras traditions.

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Ancient Maya Mobility at Caledonia, Cayo District, Belize: Evidence from Stable Oxygen Isotope Analysis

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Mobility among the ancient Maya at Caledonia, Cayo District, Belize was investigated using stable oxygen isotope analysis of 15 bone and five tooth enamel carbonate samples. While all samples exhibited values expected for the site area, some variation was detected. Three individuals from Burial 1 had the most positive bone oxygen isotope values, indicating they may have lived elsewhere before moving to Caledonia later in life. The difference between the enamel and bone oxygen isotope values suggests a non-local origin for one individual from Burial 3. Finally, the four individuals who may have consumed marine protein exhibited local bone oxygen isotope values and likely did not move to Caledonia from a coastal region in the last several years of their lives.

Introduction

Isotope analysis of human skeletal and dental tissues has become a common means of addressing archaeological questions of diet and mobility in past populations (see Katzenberg 2008). The stable isotopes of carbon and nitrogen in human skeletal and dental material from the ancient Maya site of Caledonia, located in the Cayo District of Belize, have been previously analyzed to investigate the diet of these individuals (Rand et al. 2013). Stable oxygen isotope values were also obtained as a by-product of analyzing stable carbon isotopes in bone and tooth enamel carbonate. This study examines the oxygen isotope values from 15 bone and five enamel samples from the Caledonia Maya to determine whether any of these individuals moved to the site before their deaths.

Site and Sample Description

Caledonia was a minor Maya centre consisting of four plazas situated at the intersection of the limestone-based Vaca Plateau and the granitic, pine-forested Pine Ridge region in the southern part of the Cayo District in Belize (see Figure 1). The site is located roughly 550 m above sea level and 80 km from the Caribbean coast (Awe 1985:15). Caledonia was constructed on the west bank of the Macal River, which would have provided drinking water and a variety of food resources for the site residents (Awe 1985:31). Although first settled during the Late Preclassic Chichanel phase around 100 C.E., Caledonia primarily dates to the Late and Terminal Classic periods (600 to 1000 C.E.; Awe 1985:388).

Five burials containing the remains of at least 22 individuals were encountered during the 1980 and 1984 excavations (Awe 1985). In order to investigate the diet using stable carbon and nitrogen isotope analysis (Rand et al. 2013), three individuals were sampled from Burial 1, a tomb located in Str. A-1 dating from 500 to 800 C.E. (Healy et al. 1998). An additional four

Rand, Asta J. 2016. Ancient Maya Mobility at Caledonia, Cayo District, Belize: Evidence from Stable Oxygen Isotope Analysis. In Trading Spaces: The Archaeology of Interaction, Migration and Exchange. Proceedings of the 46th Annual Chacmool Archaeology Conference, edited by Margaret Patton and Jessica Manion, pp. 32-43. Chacmool Archaeology Association, University of Calgary, Calgary, Alberta, CA.

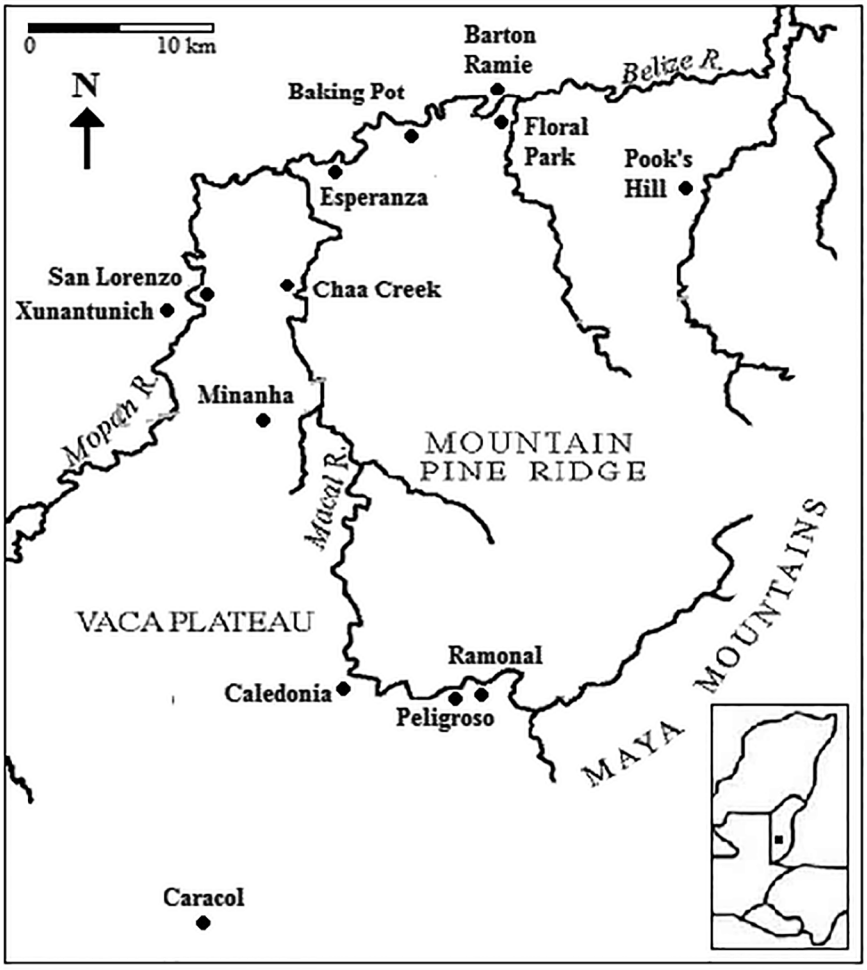

Figure 1: Map detailing the location of Caledonia and nearby Maya sites in Belize (modified from Freiwald 2011).

individuals were sampled from Burial 3, a cist burial dating from 675 to 800 C.E. located in Str. C-2, and seven fibulae and three mandibles were sampled from Burial 4, a tomb located in Str. C-2 dating from 600 to 800 C.E.. Finally, the individual from Burial 5, a simple burial located in Str. C-1 dating from 300 B.C.E. to 250 C.E. was also sampled. A detailed discussion of Caledonia and the sampled individuals can be found elsewhere (Awe 1985; Rand 2012).

Stable Oxygen Isotope Analysis

Stable oxygen isotope analysis can be used to investigate human mobility because the values in skeletal tissues reflect those of water consumed during life (Longinelli 1984; Luz et al. 1984). The ratio of the stable isotopes ^{16}O and ^{18}O in a sample is measured using a mass spectrometer where it is compared to the $^{16}O/^{18}O$ of the standard reference material Vienna Standard Mean Ocean Water (VSMOW) for oxygen isotopes in phosphate (PO_4) and carbonate (CO_3), although oxygen isotopes from CO_3 may also be presented relative to Vienna Pee Dee Belemnite (VPDB) (Coplen 1994). The results are presented as $\delta^{18}O$ values in permil (‰).

Hydroxylapatite ($Ca_5[PO_4]_3OH$), or bioapatite (ap), is the mineral component of bone and tooth

enamel. Oxygen is found in PO_4 and hydroxide (OH) as well as in CO_3 which can substitute for both in bioapatite (LeGeros 1981). Because the P – O bond is strong, bioapatite PO_4 is chemically stable and is considered to be resilient to post-mortem chemical alteration (diagenesis) relative to CO_3 (Nielsen-Marsh and Hedges 2000a, 2000b). Given proper preparation techniques, CO_3 can also produce oxygen isotope values that reflect biogenic $\delta^{13}C$ and $\delta^{18}O$ values (Koch et al. 1997; Nielsen-Marsh and Hedges 2000b). There is also a direct relationship between the $\delta^{18}O$ values of body water, PO_4, and CO_3 from the same individual, and thus these values can be converted using developed equations (Chenery et al. 2012). Any comparison of $\delta^{18}O$ values between individuals and sites is, however, considered tentative as $\delta^{18}O$ values for the same sample obtained from different laboratories can differ by several permil (Pestle et al. 2014).

Stable Oxygen Isotope Analysis in Mesoamerica

Drinking water oxygen isotope ratios ($\delta^{18}O_w$) are a function of the local climate; more negative $\delta^{18}O_w$ values are associated with higher amounts of precipitation, increasing distance from the sea, higher altitude, increasing humidity, and decreasing temperature (Rozanski et al. 1993). In Mesoamerica, atmospheric circulation is dominated by the north easterly trade winds, as well as moisture convergence in the Intertropical Convergence Zone (ITCZ) and the North Atlantic High (Bermuda-Azores High). These fluctuate (Hodell et al. 2005), and so this area experiences a dry season from December to May followed by a wet season from June to November, punctuated by a period of decreased precipitation known as the midsummer drought (Magaña et al. 1999). Seasonal variation in $\delta^{18}O_w$ values due to differential precipitation (i.e., seasonality) is present in Belize and Guatemala (Lachniet and Patterson 2009; Wright 2012:336); however, this should not affect this study as these values are homogenized as they are incorporated into human tissues (see Smith and Tafforeau 2008).

The majority of Mesoamerican studies that have utilized human $\delta^{18}O$ values to assess mobility in the past have focused on high status individuals at major sites (e.g., Price et al. 2010; Wright 2012), although recent research has begun to focus on movement between smaller sites within a single region (e.g., Freiwald 2011 looked at movement within the Belize River Valley). These studies have found that mobility across Mesoamerica was characterized by variability with no apparent relationships between a person's ability to move and his or her age, sex, social status, or time in which he or she lived.

The Effect of Breastfeeding on Enamel Stable Oxygen Isotopes Values

Oxygen isotope ratios become more positive when they are incorporated into the body from drinking water because ^{16}O is preferentially lost in expired water vapour (Bryant et al. 1996). Breast milk is comprised of body water and therefore has elevated $\delta^{18}O$ values, which are passed on to breastfeeding infants and reflected in the tooth enamel that forms during this period. As the infant is weaned, the $\delta^{18}O$ values decrease as more water is ingested. Attempts have been made to counter the effect of breastfeeding by adjusting the $\delta^{18}O_e$ values of teeth that form during the breastfeeding period by -.7‰ to -.35‰ (e.g., Spence 2005; White et al. 2007). However, due to variability in the duration of nursing between individuals and sites (Wright 2012:341), time periods, and the amount by which researchers adjust the $\delta^{18}O_e$ values for different sites, the values obtained from the Caledonia individuals will remain unadjusted here.

Identifying Non-Local Individuals using Stable Oxygen Isotope Values

Enamel forms during infancy and early childhood (Moorrees et al. 1963), and does not remodel, thus preserving $\delta^{18}O_w$ values ingested during early life. In contrast, bone is remodelled throughout life (Parfitt 2001) and reflects the $\delta^{18}O_w$ values consumed several years before death. Therefore, an individual's tooth enamel preserves the isotopic signature of the area in which they grew up, regardless of where they were buried. This childhood $\delta^{18}O_w$ value is temporarily reflected in her or his bone, which over time equilibrates with local $\delta^{18}O_w$ values. The relocation of this individual may therefore be detected if there is a large difference between the $\delta^{18}O$ values in his or her bone and tooth enamel bioapatite ($\Delta^{18}O_{e\text{-}b}$) values.

Alternatively, non-local individuals may be identified as those whose $\delta^{18}O$ values differ from the $\delta^{18}O$ values for local human remains. This centres on establishing the expected local $\delta^{18}O$ values, which can be difficult. One approach is to assigned local status to burials based on the archaeological context. The mean $\delta^{18}O$ value of these "local" individuals is then considered representative of $\delta^{18}O$ values expected from the environment surrounding the site (e.g., Price et al. 2010; White et al. 2007). This is, however, problematic because sampled nonlocal individuals will unknowingly contribute to this "local" average (White et al. 2004). Therefore, researchers have also compared human $\delta^{18}O$ values with modern environmental water oxygen isotope values ($\delta^{18}O_w$) near the site of interest (e.g., Freiwald 2011; Wright 2012). In the absence of $\delta^{18}O_w$ for the Vaca Plateau in Lachniet and Patterson's (2009) study of ground water in Belize and Guatemala, the single value of -6.8‰ (VPDB) obtained for the Macal River (Freiwald 2011:248) is used as the environmental baseline for comparison with the Caledonia data. To do so, the original human Caledonia $\delta^{18}O$ values have been adjusted using the equation in Iacumin et al. (1996; $\delta^{18}O_{ap} = [\delta^{18}O_w * .998] + 33.63$) to reflect local drinking water values. It is recognized that the Caledonia skeletal $\delta^{18}O$ values may differ slightly from the baseline $\delta^{18}O_w$ value due to observed chronological changes in $\delta^{18}O_w$ in this region (Curtis et al. 1996), as well as the inter-laboratory variation in $\delta^{18}O$ values (Pestle et al. 2014) discussed above.

Analytical Techniques

The original sex and age estimates of the Caledonia skeletons (Awe 1985) were confirmed and expanded upon using standard techniques (Buikstra and Ubelaker 1994; see Rand 2012). All sampled individuals were adults at the time of their deaths and the sex of all individuals, excluding the female from Burial 5, remained indeterminate due to the fragmentary condition of the collection.

Samples were prepared for isotope analysis at the Bioarchaeology Laboratory at Trent University. Bone bioapatite was isolated following Koch et al. (1997), where cleaned bone samples were powdered and treated with sodium hypochlorite (NaClO) followed by acetic acid (CH_3COOH) buffered with calcium acetate ($C_4H_6CaO_4$). Tooth enamel bioapatite samples were collected using a diamond-tipped dremel and prepared the same way as bone. Samples were analyzed on a Fison's Optima dual inlet isotope ratio mass spectrometer (DI-IRMS) at McMaster University. The analytical precision was .1‰ and .08‰ or better for tooth enamel and bone bioapatite, respectively. Analytical accuracy could not be calculated because the lab standards were not provided. Details on sample preparation and analysis can be found elsewhere (Rand 2012).

The post-mortem alteration of $\delta^{18}O_b$ and to a lesser extent $\delta^{18}O_e$ values resulting from

Sample #	Bone			Tooth Enamel			
	$\Delta^{13}C_{ap\text{-}col}$ (‰)*	$\delta^{18}O_{b}$ (‰)[a]	CI*[b]	Tooth*	$\delta^{18}O_{e}$ (‰)[a]	CI*	$\Delta^{18}O_{e\text{-}b}$ (‰)
Female							
C1-5-A	4.1	-7.5	3.7	M_2	-7.2	3.5	0.3
Indeterminate							
C2-3-A	4.4	-7.5	-	**M^1**	**-7.5**	**3.6**	**0**
C2-3-B	2.4	-7.7	3.6	-	-	-	-
C2-3-C	3.4	-7.7	-	M_3	-6.5	-	1.2
C2-3-D	2.6	-7.7	-	-	-	-	-
C2-4-A	-	-	-	M_3	-6.5	4.4	-
C2-4-B	-	-	-	M_3	-7.9	3.8	-
C2-4-C	-	-	-	M_3	-7.9	3.6	-
C2-4-F1	1.2	-8.3	-	-	-	-	-
C2-4-F2	5.2	-7.2	-	-	-	-	-
C2-4-F3	4.4	-7.1	-	-	-	-	-
C2-4-F4	4.3	-7.4	3.9	-	-	-	-
C2-4-F5	5.9	-7.6	-	-	-	-	-
C2-4-F6	2.3	-7.1	-	-	-	-	-
C2-4-F7	5.6	-7.1	-	-	-	-	-
A1-1-LM1	4.3	-6.7	-	-	-	-	-
A1-1-LM2	4.2	-6.3	-	-	-	-	-
A1-1-LM3	4.2	-6.6	3.6	-	-	-	-

Note: All values are reported relative to the VPDB standard and bolded values have been removed from this study (see text).

*Data from Rand et al. (2013)

[a] $\delta^{18}O$ values have been adjusted using the equation in Iacumin et al. (1996; see text).

[b] Values were reported for the wrong individuals in Rand et al. (2013) and have been corrected here.

Table 1: $\delta^{18}O_{(VPDB)}$ values and crystallinity indices for human bone and tooth enamel samples from Caledonia.

diagenesis is well known (Nelson et al. 1986; Nielsen-Marsh and Hedges 2000a). Tooth enamel is considered to be less susceptible to diagenesis than is bone; however, diagenetic alteration of both tissues is possible. Sample integrity was testing by calculating the crystallinity index (CI) of as subset of10 samples using Fourier transform infra-red (FTIR) spectrometry (Shemesh 1990). Acceptable CI values of bone mineral range from 2.8 to 4.4 (Wright and Schwarcz 1996) and two modern tooth enamel samples had values of 3.8 and 4.4 (Keenleyside et al. 2011). Samples were prepared following Wright and Schwarcz (1996) and were scanned using a Nicolet 6700 FT-IR Spectrometer

in the Biomaterials Research Laboratory at Trent University.

Finally, relationships among the isotope data were tested using the non-parametric Spearman's rank order correlation (ρ) and Mann-Whitney U (Z) statistical tests due to small sample size. All statistical analyses were run using the IBM SPSS Statistics, Version 20.0.

Results and Discussion

Preservation of the Caledonia Samples

The $\delta^{18}O$ and CI values for the Caledonia individuals can be found in Table 1. The average CI for the bone and enamel samples were 3.7 ± .1 and 3.8 ± .3, respectively, and all values were within acceptable ranges (Rand et al. 2013). If the original biogenic $\delta^{18}O$ values were altered by post-mortem recrystallization they would be correlated with their CI values, which was the case for neither bone (ρ = .8; p > .1) nor enamel (ρ = .5; p > .1). The $\delta^{13}C$ value in the permanent maxillary first molar (M^1) of C2-3-A was removed from a previous analysis because it was an extreme outlier (Rand et al. 2013) and the $\delta^{18}O_e$ value for this tooth was similarly removed here.

Identifying Non-local Individuals at Caledonia

The $\delta^{18}O_b$ values from Caledonia range from -8.3‰ to -6.3‰ (mean -7.3 ± .5‰), while the $\delta^{18}O_e$ values ranged from -7.9‰ to -6.5‰ (mean -7.2 ± .7‰) which encompass the $\delta^{18}O_w$ value for the Macal River (-6.8 ‰; see Figure 2).

While this implies that all individuals have values consistent with the local environment, variation among the samples is present. This variability may be explained by fluctuations in $\delta^{18}O_w$ values related to chronological changes in precipitation (e.g., Curtis et al. 1996), as the Caledonia burials were interred during different periods. Alternative explanations are explored in more detail below.

Outlying $\delta^{18}O$ Values

None of the $\delta^{18}O_e$ values fell beyond one standard deviation of the mean $\delta^{18}O_e$ value. Therefore these individuals likely consumed drinking water available around Caledonia, and thus resided near the site during the formation of these teeth. However, four individuals (C2-4-F1, A1-1-LM1, A1-1-LM2, and A1-1-LM3) had outlying $\delta^{18}O_b$ values that fell beyond one standard deviation of the mean $\delta^{18}O_b$ value. Three of these individuals were interred in Burial 1 and had $\delta^{18}O_b$ values slightly more positive than the value from the Macal River (see Figure 2) and significantly more positive than those from Burial 4 (Z = -2.4; p < .05) and Burial 3 (Z = -2.2; p < .1). While the Burial 1 remains may have been affected by diagenesis due to soil hydrology (Hedges and Millard 1995; Wright and Schwarcz 1996), this is unlikely because the burial was located atop a low hill above the water table and the single individual assessed using FTIR had an acceptable CI value. In contrast, the individuals from Burial 1 may have participated in different cultural practices than others at Caledonia. For example, they may have consumed stored water, which can have more positive $\delta^{18}O$ values due to evaporation (Lachniet and Patterson 2009; Wright and Schwarcz 1996), or plant foods with fluids with much more positive $\delta^{18}O$ values as a result of evapotranspiration (Bariac et al. 1990). Finally, it may be that the Burial 1 individuals moved from an area with more positive $\delta^{18}O_w$ values and their bones were in the process of equilibrating with more negative $\delta^{18}O_w$ values around Caledonia. Such positive $\delta^{18}O_b$ and $\delta^{18}O_e$ values occur at several major Maya sites (Williams et al. 2009; Wright 2012). However, because the majority of Maya mobility likely occurred over short distances (Freiwald 2011) the most probable origin location for these individuals are sites in the nearby Belize River Valley (see Figure 1) although this is difficult to

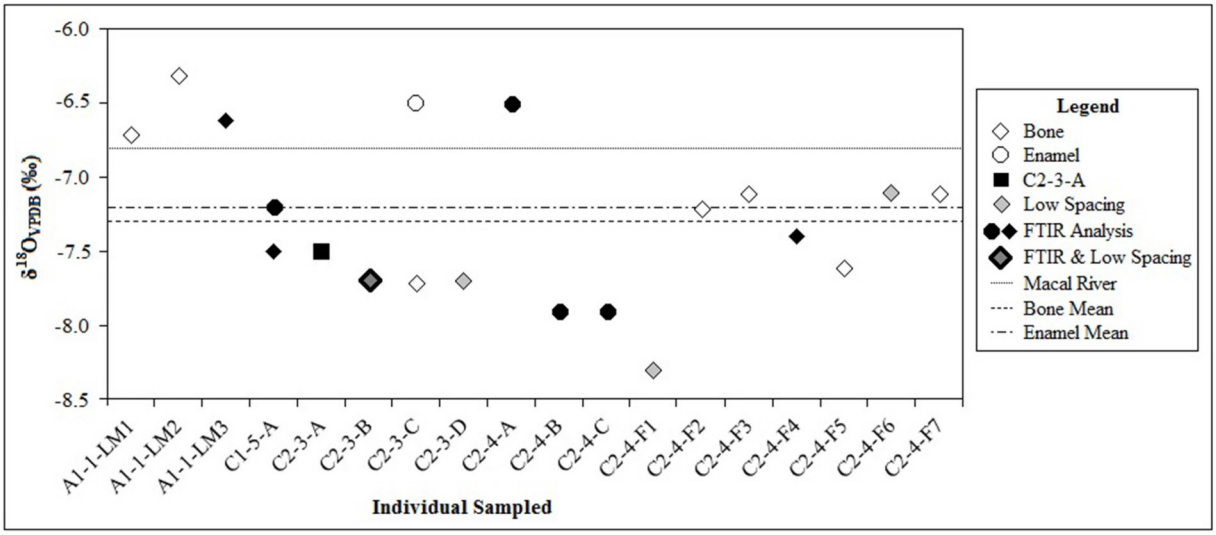

Figure 2: $\delta^{18}O$ values in human bone and tooth enamel samples from Caledonia. The Macal River baseline value of -6.8 ‰ is from Freiwald (2011) and the tooth enamel sample from C2-3-A was removed from this analysis.

confirm. Furthermore, the teeth of these individuals were unavailable for analyses, and therefore childhood $\delta^{18}O$ values could not be investigated.

Comparing $\delta^{18}O$ Values in Multiple Tissues from the Same Individual

As discussed above, the relocation of an individual can be detected if there is a sufficient difference between his or her $\delta^{18}O_b$ and $\delta^{18}O_e$ values ($\Delta^{18}O_{e\text{-}b}$). Due to poor preservation, only two individuals (C2-3-C and C1-5-A) were sampled for both bone and tooth enamel, and therefore these were the only two individuals for whom $\Delta^{18}O_{e\text{-}b}$ values could be calculated.

The permanent mandibular second molar (M_2) from C1-5-A, the older adult female from Burial 5, produced a $\delta^{18}O_e$ value +.3‰ relative to her $\delta^{18}O_b$ value. The enamel of the M_2 crown begins to mineralize around three years and is completed around nine years of age (Moorrees et al. 1963). As discussed above, stable oxygen and nitrogen isotope analyses indicate weaning among the ancient Maya was a highly variable process, likely beginning around age one year and ending anywhere from ages three to six years (Williams et al. 2005; Wright and Schwarcz 1998). Thus, the more positive $\delta^{18}O_e$ value from the C1-5-A's M_2 may reflect some input from breast milk and this individual is considered to be local. Considering C1-5-A is likely one of the first inhabitants of Caledonia (Awe 1985:116), it may be that she moved to the site from a nearby area and/or one with similar $\delta^{18}O_w$ values.

The $\delta^{18}O_e$ value from C2-3-C's permanent mandibular third molar (M_3) lies near that of the Macal River (Figure 2), and was not likely influenced by breastfeeding as the enamel of this tooth forms between the ages of 8 and 15 years (Moorrees et al. 1963). The $\delta^{18}O_b$ value for this individual was more negative than his or her $\delta^{18}O_e$, and is closer to the mean value from Caledonia (Figure 2). Although both could be argued to reflect local $\delta^{18}O_w$ values, the 1.2‰ difference between the sampled tissues suggests this individual consumed water with slightly more positive $\delta^{18}O_w$ values during late childhood compared to the water consumed in early adulthood. While this could reflect differential cultural practices, as was discussed above for the

Burial 1 individuals, it may be that C2-3-C moved to Caledonia from a nearby area with slightly more positive $\delta^{18}O_w$ values.

Consumption of Marine Protein and Mobility at Caledonia

It has been previously proposed that four individuals from Caledonia (C2-3-B, C2-3-D, C2 -4-F1, and C2-4-F6) may have consumed marine protein (Rand et al. 2013). This is based on the small (i.e., under 3‰) difference between the $\delta^{13}C$ values in bone carbonate and collagen ($\delta^{13}C_{ap}$ and $\delta^{13}C_{col}$, respectively), called the collagen-to-bioapatite spacing ($\Delta^{13}C_{ap\text{-}col}$) which can reflect the consumption of marine protein (Lee-Thorp et al. 1989; Williams et al. 2009). This was unexpected because Caledonia is located far inland and its inhabitants likely did not have sufficient political or economic influence to import marine foods. Marine shell ornaments were, however, found on the site (Awe 1985:362-371), and it was theorized that the Caledonia individuals with $\Delta^{13}C_{bio\text{-}col}$ values below 3‰ may have moved to Caledonia from a coastal area, or a site where marine foods were available for consumption (Rand et al. 2013). Teeth were unavailable for these individuals and thus only their $\delta^{18}O_b$ values were examined to assess whether this were the case. Interestingly, these individuals had $\delta^{18}O$ values significantly more negative than individuals with $\Delta^{13}C_{col\text{-}ap}$ values above 3‰ ($Z = -18.4$; $p < .1$), which is the opposite trend of what would be expected had they moved inland from a coastal site (Rozanski et al. 1993). Individual C2-4-F1 exhibited the most negative $\Delta^{13}C_{ap\text{-}col}$ value from Caledonia, falling beyond one standard deviation of the mean. It is possible this individual moved to Caledonia from an area with more negative $\delta^{18}O_w$ values (i.e., Guatemalan Highlands; Lachniet and Patterson 2009); however, the integrity of this sample is questionable as its CI value was not obtained.

The remaining individuals with low spacing values (C2-3-B, C2-3-D, and C2-4-F6) exhibited slightly more negative $\delta^{18}O_b$ values than the Macal River, but similar to the mean value from Caledonia. It is therefore likely these individuals resided in Caledonia or a similar area rather than a coastal one several years before their deaths. However, only C2-3-B was assessed for diagenesis (see Table 1) and none of these individuals had associated teeth so their childhood $\delta^{18}O$ values could not be assessed.

Finally, it is possible that the low $\Delta^{13}C_{ap\text{-}col}$ values do not reflect the consumption of marine resources. Low values may, for example, represent extreme carnivory (Lee-Thorp et al. 1989), although this is unlikely among the Caledonia Maya because previous isotopic investigations at Caledonia suggest the consumption of various food resources (Rand et al. 2013) and isotopic studies of ancient Maya at other sites do not support the consumption of large quantities of meat (White 1999). Alternatively, Hedges (2003) has argued that dietary protein may only account for half of spacing values, and other influencing factors, such as non-equilibrated bone synthesis, may contribute to these low spacing values.

Conclusion

The origins of the individuals sampled from Caledonia, a minor Maya centre located on the Macal River on the Vaca Plateau, were investigated using stable oxygen isotope analysis. The sampled Caledonia individuals had similar mean $\delta^{18}O_b$ and $\delta^{18}O_e$ values that were both slightly more negative than a modern $\delta^{18}O_w$ value from the Macal River. Variation in the values may be explained by chronological changes in $\delta^{18}O_w$ values in drinking water available to site inhabitants, differential cultural practices, or the

arrival of nonlocal individuals at the site. The three individuals sampled from Burial 1 had the most positive $\delta^{18}O_b$ values indicating they may have relocated to Caledonia from elsewhere during adulthood. Both $\delta^{18}O_b$ and $\delta^{18}O_e$ values were analyzed in only two Caledonia individuals: C2-3-C likely moved to the site from a nearby area whereas C1-5-A is considered local. Finally, all of the individuals who may have consumed marine protein, excluding C2-4-F1, exhibited $\delta^{18}O_b$ values slightly more negative than the mean and Macal River values, the opposite of what is expected had they moved from a coastal area. Individual C2-4-F1exhibited the most negative $\delta^{18}O$ value and may have moved to Caledonia from an area with more negative values (i.e., Guatemala Highlands). It should be kept in mind that enamel reflecting childhood $\delta^{18}O_w$ values and the affect of diagenesis were not assessed for all of these individuals and so these interpretations remain tentative.

This research supports the recent argument that mobility among the Maya primarily occurred over relatively short distances within a single region such as the Belize River Valley (Freiwald 2011), or in this case the Vaca Plateau. It also demonstrates how the analysis of $\delta^{18}O$ values in both bone and tooth enamel from curated skeletons excavated from minor Maya sites can contribute to theories about Maya mobility in general. The use of additional diagenetic indicators, sampling bone and enamel from the same individual, analyzing strontium isotopes in tooth enamel, and the collection of more environmental water samples from the area around Caledonia may further the interpretations presented here.

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Modern Human Behavior and the Out of Africa II Migration: Testing Models of Behavioral Evolution

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Although modern human anatomy had evolved by 200 ka, Homo sapiens remained an essentially African species until approximately 50 ka. The eventual departure from Africa by modern humans is frequently associated with the transition from the Middle to Later Stone Age, during which a number of progressive technological, social, and symbolic traits purportedly emerged. Some scholars suggest that the concurrence of these events is explainable by a genetic mutation that occurred at 50 ka; the results of which fundamentally reorganized the brain, improving the cognitive capabilities of African hominins. The benefits conferred by this mutation are theorized to have fueled the outward expansion of modern humans into other regions of the Old World. Others have conversely postulated that the impacts of climate and demography during the Late Pleistocene prompted the development of these new behaviors by early humans and their descendants. The purpose of this paper is to demonstrate the need for well-defined and testable research questions in the study of modern human origins. Given the basic premises developed here, it is argued that genomic change at 50 ka was not likely a significant factor in the evolution of human behavior. Alternately, climatic and demographic models more closely agree with what is observed archaeologically.

Though fossil and genetic evidence indicates that modern human anatomy evolved in Africa around 200 ka (Cann et al. 1987; White et al. 2003; Ingman et al. 2000; McDermott et al. 1996; McDougall et al. 2005; Trinkaus 2005, 2013), early investigators found little archaeological evidence to suggest that the behavior of these early humans was different from other archaic and coeval human species such as Neandertals (McBrearty and Brooks 2000). In particular, there were few suggestions of the sophisticated technological/adaptive strategies, and complex cultural and symbolic behaviors which characterize contemporary human societies (Klein 2009). Because of the low visibility of these practices in the archaeology of Middle Stone Age (MSA) Africa, when anatomically modern humans first emerged, it was argued that many modern behaviors had their origins much later in time, during the Later Stone Age (LSA), around 50 ka (Klein 2009). The apparent lack of modern behavior during the MSA produced the impression of a temporal gap or lag between when *Homo sapiens* as a species, appeared skeletally modern and when they became behaviorally modern as demonstrated archaeologically (McBrearty 2013).

In conjunction with appearance of behavioral modernity, approximately 50 ka, or slightly antedating it, modern humans begin departing and permanently settling other regions of the globe (Klein 2009); an event which is normally referred to as the "Out of Africa II" (OOA II) migration (Stringer and Andrews 1988). Many

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scholars have suggested that the synchrony of the MSA/LSA behavioral transformation and the OOA II migration was not simple coincidence and that the emergence of modern behavior within Africa may have fueled this outward expansion (Bar-Yosef 2002; Klein 1992, 2002; Klein and Edgar 2002; Lahr and Foley 1998; Stringer 2000).

While the manner and timing of this departure is still debated, the causes of the OOA II event are even less well agreed upon (Bednarik 2008). This incongruity has produced a number of theories to explain why modern humans remained in Africa for as long as they did, why they left, and what caused the apparent shift in archaeological behavior during the MSA and LSA. Few however have attempted to produce a set of testable assertions which can be compared to novel and existing information, and instead, data is often incorporated *post hoc*, and sometimes uncritically, into existing frameworks (Binford 1981; Clark 2009; Henshilwood and Marean 2003). This practice makes it difficult to weigh the value of competing theories while simplifying the process of dismissing or ignoring contradictory evidence.

This paper is a discussion of the evolution of modern human behavior as it coincides with the OOA II migration. It is primarily argued that there is a need to proceed with greater rigor in the study of modern human behavior, and to generate well-refined researcher questions capable of being verified or disproved. This is demonstrated by generating and applying several expected archaeological or material outcomes for two theories of behavioral evolution. These deductive statements will be used to assess the validity of each in light of current archaeology evidence. In establishing a few basic testable assertions, it will be shown that short-range, strictly biological models of modern behavior do not adequately reflect what is observed archaeologically and that researchers ought to more strongly consider long-term, demographic and climatic reconstructions of the OOA II migration.

The Middle Stone Age to Later Stone Age Transition

The transition from the MSA to the LSA is typically understood to have taken place over a relatively short interval, generally within the span of 10,000 years, and is characterized by a number of important technological, social and symbolic developments (Klein 2009). Though changes to this notion have been proposed in light of recent theoretical criticisms (Bar-Yosef 2002; Henshilwood and Marean 2003; Shae 2011a, 2011b) and updated information (Burdukiewicz 2013; d'Errico and Henshilwood 2011; McBrearty and Brooks 2000; McBrearty 2013), this narrative continues to be pervasive. It is generally purported that the technological and symbolic behaviors of LSA humans were generally more elaborate and diverse than those of the MSA. By approximately 50 ka, for instance, people had begun crafting technically refined tools such as blades and microliths with greater frequency, and the materials that they employed expanded to include higher quality stones, as well as bone, shell, and ivory with increased regularity. The scale on which people, materials and ideas were transported also escalated, suggesting either larger home ranges and vast landscape knowledge or the novel presence of complex social networks and trade (Klein 2009). Additionally, LSA humans appear to have altered their subsistence strategies to incorporate a wider range of resources, both plant and animal; terrestrial and aquatic, allowing them to flourish in a wider range of environments (Binford 1985). Lastly, there are widespread indications of the ability amongst LSA humans to produce and apprehend symbols in the form of indisputable art, personal adornment, and ritual

practices (Conard 2003; Klein 2009). These practices, taken as incontrovertible signs of behavioral modernity, are often associated with the intensification and exportation of individual and group identity (d'Errico et al. 2005; Klein 2008).

A Genetic Model of Modern Behavior and OOA II

The putative disparity between modern anatomy and behavior is most commonly explained in two ways. The genetic, or "neural hypothesis", has been most advocated for by Klein (1992, 1995, 2008, 2009), who claims that the abrupt transformation in behavior at the beginning of the LSA is best explained by a "fortuitous mutation", responsible for fundamentally reconfiguring the structure of the human brain without affecting its overall dimensions or volume. This change in cognitive potential might then have formed the basis for symbolically mediated culture, syntactical language, and improved behavioral flexibility (Clark 1992). Prior to this event, he argues, MSA humans, though skeletally alike to those of the LSA, lacked the requisite cognitive apparatus necessary to produce a fully modern range of behaviors.

Several possible candidates for Klein's "fortuitous mutation" have been proposed in the last decade. Research into the gene FOXP2, for instance, has shown that present-day inheritors of a faulty gene encounter significant speech difficulties despite normal intelligence (Lai et al. 2001). Furthermore, comparative genetic work has shown that FOXP2 underwent a rapid series of mutations in the latter part of human evolution, the consequences of which potentially correspond to the emergence of complex language (Ayub et al. 2013). More recently however, the discovery of an identical form of this gene in Neandertals has cast doubt on the role of FOXP2 in producing uniquely modern human behavior (Noonan 2010).

The gene *Microcephalin*, known for its role in regulating brain-size, has also been theorized to play a role in the appearance of behavioral modernity. A study by Evans et al. (2005) demonstrated that at 40 ka a variant of this gene underwent significant positive selection in human populations, increasing in frequency at a rate unexplainable by chance mutation or genetic drift. Though what precisely was being selected for in order to disperse this gene or what its effects on cognition would have been is unknown, the authors suggest that it might be associated with the behavioral florescence at the outset of the LSA and the OOA II migration.

Archaeologically Anticipated Outcomes of the Neural Hypothesis

Given the direct claims of authors such as Klein (2009) and a synthesis of the literature on the subject, the effects of a genetic mutation on the brain function of African humans ought to be reflected archaeologically in several ways. 1) If the mutation resulted in significant adaptive and reproductive advantages as proposed, its proliferation in association with advanced archaeological assemblages should be rapid, generally within the range of 10 ka. 2) The disparity between the assemblages of the MSA and LSA ought to be substantial with little or no evidence of modern behavior present in the MSA or overlap between the two. 3) Lastly, these behavioral traits should not be shared by the genetically distinct, archaic relatives of modern humans such as Neandertals who putatively lacked the genetic predisposition for modern behavior.

Socio-Demographic/Climatic Models of Modern Behavior and OOA II

This section distils the key precepts of several related models, each of which emphasises the gradual and non-synchronous accumulation of modern traits (Forster 2004; Forster et al. 2001; Henrich and McElreath 2003; Mellars 2006; Powell et al. 2009; McBrearty 2013; McBrearty and Brooks 2000). The mechanism of change in each scenario is one or both of demography and/or climate.

What has been concluded by a number of authors is that the effects of demographic change during the MSA and LSA would have had widespread impacts on how people organized their subsistence and social activities (Forster 2004; Forster et al. 2001; Watson et al. 1997). Among them, McBrearty and Brooks (2000) argue that population pressure was responsible for the diversification of resource acquisition practices in the LSA, as favoured sources of food and materials became scarcer or were subject to competition from other human groups. As a result of lowered resource availability, humans responded by varying and intensifying their foraging strategies. This included exploiting previously un-accessed resources and making more conservative use of those that were still accessible. As an additional consequence of rising population density, communities found themselves in more frequent contact than before. This is claimed to have produced the rise in symbolically mediated behavior, seen archaeologically, as humans devised new systems to proclaim individual and group identities, and to forge relationships and alliances.

The climate of Late Pleistocene Africa is also thought to have influenced the behavior of modern humans (Blome et al. 2012; Forster 2004; Hetherington and Reid 2011; Lahr and Foley 1994; Oppenheimer 2003; Stewart and Stringer 2012; Stringer 2000). Beginning in the Early Pleistocene, the periodicity of glacial cycling changed dramatically. From that point on, quickly vacillating intervals of warm and cold dominated the next 2.6 mya until present (Raymo and Huybers 2008). What is more, deteriorating conditions around 70 ka coincided with the appearance of many new symbolic behaviors (Ambrose 1998; Lane et al. 2013). Not only would climatic instability have contributed to changes in population pressure as described above, but it would have presented unique constraints and opportunities for human migration. Sea level drop at the mouth of the Red Sea for example might have provided a route for modern human making their way into the Arabian Peninsula (Armitage et al. 2011). Similarly, evidence for ephemerally forming rivers in the Sahara desert during interglacial periods would have presented modern humans with corridors across what is normally a formidable geographic barrier (Drake et al. 2011; Osborne and Rohling 2008).

Archaeological Anticipated Outcomes of Demographic and Climatic Models

If demographic expansion and decline in combination with a rapidly oscillating and harsh climate were responsible for prompting changes in human behavior, several archaeological trends ought to be produced. 1) Unlike the neural hypothesis which can be expected to produce a rapid change, demography/climate should result in a gradual, non-synchronous transition as advancements were added on an as-needed basis. 2) Additionally, this ought to produce multiple, temporally and spatially unique origins for modern behavior. 3) Evidence for increased population pressure and climate transition should also coincide regionally with the emergence of behaviorally modern traits.

Discussion

In the last decade, a growing body of evidence for modern behavior during the MSA has been effectively summarized by a number of authors including d'Errico and Henshilwood (2011), McBrearty (2013), and McBrearty and Brooks (2000). These contributions have already fundamentally changed how the MSA/LSA transition is conceived and altered our understanding of how behavioral modernity emerged and was exported to the rest of the world. The evidence presented here is by no means exhaustive and is intended only to be illustrative as it pertains to the hypotheses outlines above.

Technologically, the behavior of LSA humans is principally associated with the intensification of raw material exploitation (Henshilwood and Marean 2003). The production of blades in the LSA for example is considered to be an extremely efficient use of resources (Bar-Yosef 2002). Nonetheless, a number of excavations at MSA localities have shown that blade industries, though scarce in Middle Palaeolithic Europe, were more common during the African MSA than previously alleged. The oldest example of blade technology, for instance, exists at two sites from the Kapthurin Formation in Kenya that date to between 509 and 545 ka (Johnson and McBrearty 2010). Though these sites actually predate the MSA, more recent finds at sites such as Klasies, Diepkloof, Sibudu, Qesem Cave, and the Kapthurin Formation, Kenya among others, have also shown that blade production was well within the competences of MSA humans (Shimelmitz et al. 2011). This is not to mention other MSA assemblages containing sophisticated artefact types typically considered diagnostic of the LSA, such as backed geometric pieces and bone tools (McBrearty and Brooks 2000).

Another major hallmark of the LSA and Upper Palaeolithic was a general intensification and diversification of resource acquisition practices. This included the addition of marine and riverine elements to the diet, as well as an increased focus on large and dangerous game (Klein 2009). Though, at one time fishing was considered to be absent from the MSA behavioral repertoire, new finds have shown that MSA people occupied littoral bases more than 100 ka before the LSA. Two sites in particular, one along the Red Sea coast of Eritrea (Walter et al. 2000), the other at Pinnacle Point, South Africa (Marean et al. 2007) demonstrate that people were occupying sea caves, fishing and shellfishing long in advance of the LSA. Evidence of advanced hunting practices during the MSA was also uncovered at Klasies, South Africa where a projectile point fragment was found embedded in a bovid cervical vertebra. Because the bovid species from which the projectile point was recovered from is ancestral to the present-day Cape buffalo, it can be concluded that hunting large and dangerous game through complex social procurement strategies was not beyond the capabilities of MSA people as indicated by previous studies (Binford 1985).

Most importantly, symbolic behavior which is largely acknowledged to be unique to modern humans was thought to have developed only in the LSA. Now conversely, evidence for the earliest artwork is dated to 75 ka, from the site of Blombos Cave, South Africa (Henshilwood et al. 2002; Henshilwood et al. 2009). The art piece is a slab of ochre engraved with an abstract, linear motif. Similar designs were also etched into fragments of ostrich eggshell at Diepkloof Rock Shelter (Texier et al. 2010). These eggshell fragments date to 60 ka and are believed to have constituted decorated containers for transporting water.

Evidence of personal adornment, which has been found across Africa and the Near East

dating to the MSA, is also associated with symbolically mediated and therefore modern behavior (Wadley 2001). Ten beads from the site of Jebel Qafzeh, Isreal, were recovered 35 km from the shoreline of the Mediterranean, precluding the possibility that they were part of a natural accumulation (Bar-Yosef Mayer 2009). What is more, 4 or the beads are notched and polished in a way that is consistent with use-wear experiments of stringing and wearing similar beads. Comparable beads from the North Coast of Africa in Morocco even show signs of being stained with ochre (Bouzouggar et al. 2007). Both of these assemblages date to a ten thousand year long period between 90 and 80 ka.

Given the evidence, it is clear that many traits indicative of the behaviorally evolved industries of the LSA and Upper Palaeolithic have their roots firmly in the preceding MSA. Not only are these behaviors contiguous with later periods they appear and decline non-synchronously in nearly every region of Africa and the Near East. This is in contrast with anticipated outcomes 1 and 2 of the genetic model of behavioral evolution which states that this change ought to be rapid and abrupt with little overlap between industries. This pattern of transition is better accounted for by long-range models that propose an independent and gradual accumulation of modern traits as a result of socio-demographic and climatic factors.

Archaic Humans

There is also substantiation of the notion that Neandertals living in Europe, prior to the OOA II migration, experienced a similar behavioral florescence of their own (Burdukiewicz 2013; d'Errico 2003; Hublin et al. 2012; Zilhao 2006; Zilhão et al. 2010). Distinguished Neandertal finds include assemblages of the Châtelperronian from northern France which are comprised of Neandertal remains in association with typologically advanced artefacts such as bone tools and pendants, closer in style to the modern human (Aurignacian) layers stratified above them. Though interpretation of this material suggests that these features were learned from newly arrived modern humans, the fact that Neandertals were apparently avidly incorporating foreign cultural elements into their own is indicate of their capacity for modern behavior.

Two Middle Palaeolithic cave sites in Spain (Cueva de los Aviones and Cueva Antón) also contain unique evidence for symbolically mediated Neandertal behavior (Zilhão et al. 2010). The excavators of these sites recovered perforated and pigment-stained shells, thought to be ornaments, in addition to shells potentially used as "paint cups". What is exceptional is that the artefacts date to 50 ka, antedating the modern human arrival in this part of Europe by 10 ka.

The fact that our human contemporaries in Europe were producing behaviorally modern assemblages refutes the third assumption of the neural hypothesis. This fact has not only changed how Neandertals are studied, but ought to shift the discussion of modern human behavior away from models that assert the genetic and therefore behavioral distinctiveness of *Homo sapiens sensu stricto*.

Climate and Demography

Critics of socio-demography/climate models note that counter to expectations, as signs of advanced behaviors were emerging in Africa, human populations may have been declining not expanding (Klein 2009). This is in correspondence with harsh periods of glaciation that characterized the last 70 ka when many indicators of modern behavior appeared (Ambrose 1998; Lane et al. 2013; Raymo and Huybers 2008). Even if true, which is itself debatable (Powell et al. 2009), this criticism fails to recognize that population pressure is not only produced by demographic increase but also by a

decrease in resource availability, such as that resulting from a glacial climate. As conditions worsened over the last 70 ka, people may have been forced into narrow habitable zones or refugia, the effect of which would have been an increase in population density despite an overall decline in human numbers (Stewart and Stringer 2012; Willoughby 2007, 2009, 2012).

Conclusions

By establishing a set of initial parameters, it is possible to avoid many of the ambiguities caused by the opportunistic and *post hoc* rationalization of archaeological information. As demonstrated, using a basic set of testable hypotheses, the present data is shown to be inconsistent with a scenario such as Klein's (2009), which proposes that MSA humans lacked the ability to successfully adapt to conditions beyond the borders of Africa because of certain genetic/cognitive limitations. Specifically, this model does little to recognize the archaeological depth and complexity of African sites or acknowledge the range of behaviors evinced by European Neandertals. Evidence of a gradual and mosaic process of innovation during the MSA as well as confirmation of modern behavior in other archaic humans is more compatible with demographic or climatic models of change.

Most research into modern human origins has necessarily emphasized a culture-history approach, with most efforts concerned principally with data gathering (Clark 2009). The largely atheoretical basis of this method however has made systematizing and drawing conclusions from the evidence difficult and prone to *post hoc* rationalization. The discipline has now reached a stage however, where the pool of available information is potentially great enough that top-down, and deductive schemes have a chance of yielding solid interpretations about the past behavior of early modern humans. To be accomplished though, there needs to be an increased reliance on hypothesis testing with an onus on verifiability and theoretical robusticity.

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Identity

Constructing Social Identity Through the Past:
Migration Myths and Exchange Systems of the Contact Period Itza

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The Itza Maya in the Petén, Guatemala, claimed to have migrated from Chich'en Itza during the Postclassic period. Although some also likely migrated from Mayapan in northern Yucatán, they tied their heritage to Chich'en Itza more than to Mayapan. The Itza of the Petén appear to have used the Chich'en Itza migration claim as a way of distinguishing themselves from a neighboring group, the Kowoj, who claimed to have migrated from Mayapan. The frequent migrations into the Petén from northern Yucatán likely occurred alongside regional exchange networks. By examining residential and public architectural patterns and associated artifacts, this paper illuminates how Itza elites constructed social identity through the adoption of origin myths. I will discuss the Itza elites' adoption of origin myths as a strategy of emulated ethnogenesis, characterized by the adoption of foreign images for elite identity in order to exert significant power over the socio-political organizational configuration during the Postclassic and Contact period.

Introduction

In the aftermath of the demographic and political collapse of Classic period polities, Postclassic Maya communities experienced continuing processes of social, political, and economic change. Interactions with merchants and immigrants perpetuated many of these changes, which extended into the Contact period. The Spanish invasion of the Maya Lowlands in the fifteenth and sixteenth century compelled many to emigrate far inland escaping beyond Spanish control. The population movement caused the geographical and economic landscape of the network interaction established during the Postclassic period to fall apart. The central Petén lakes region, in northern Guatemala, became a refuge or "frontier" for emigrant groups. This remote frontier within the dense tropical rainforest prevented the Spanish conquest until A.D. 1697. As a result of migrations by different groups into this region, the deterritorialized population needed to distinguish themselves in relation to other groups. They did so by claiming association with their "ethnic homeland", referring to a place of group origin (Tsuda 2000:5). Displaying their connection with a distant ancestral land, groups strove to gain political and economic power over others in the Petén lakes region at the eve of Spanish conquest.

Ethnohistoric documents provide a glimpse of the Late Postclassic population and political geography in this region prior to the Spanish conquest. Recent archaeological research has ground truthed these ethnohistoric accounts with respect to physical evidence of Maya socio-political and economic organization in the Petén lakes region from the Postclassic through Contact period. This paper presents recent archaeological

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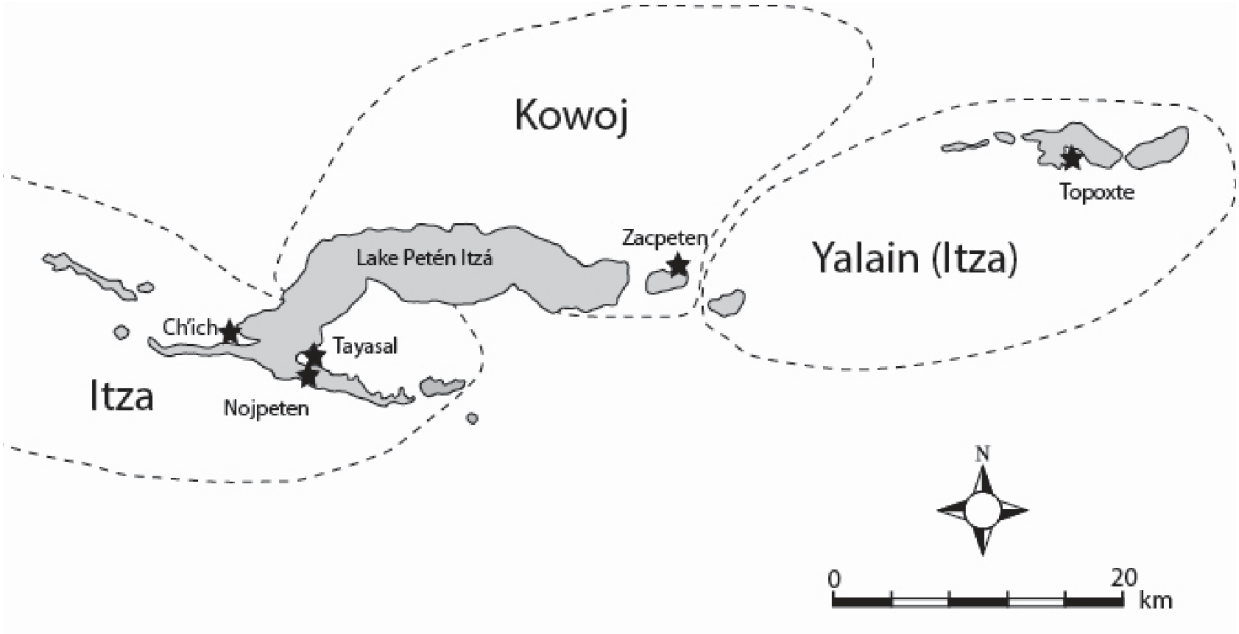

Figure 1: 17th -century political geography of Petén lakes region (Adapted from Jones 1998:Map 3).

data from the eve of the Spanish conquest of the last Maya, examining how the Maya of the Petén lakes region maintained their social identity from the Late Postclassic to the Contact periods.

Social Identity and Migration Myths

At the time of Spanish contact two dominant Maya groups resided in the Petén lakes region: the Itza and Kowoj. The predominant polity, the Itza, inhabited and controlled the south and west of Lake Petén Itzá (Figure 1). Indigenous chronicles such as the books of *Chilam Balam* describe several streams of Itza migration between Yucatán and Petén during the Postclassic period (Edmonson 1982, 1984, 1986; Roys 1967). These chronicles may indicate that the Itza originated in the central Petén region during the Classic Period (A.D. 250-900) (Boot 1995, 1997; Schele and Mathews 1998). Late Classic turmoil in the southern lowlands pushed the Itza into northern Yucatan as refugees. Immigrant groups of Itza helped found Chich'en Itza during the Terminal Classic period (A.D. 600-900). After the fall of Chich'en Itza, some of the Itza migrated back to the original central Petén region and founded *Chak'an Putun*. The location of Chak'an Putun has been postulated to be in the western region of the Lake Petén Itzá (Jones 1998; Rice 2009:42). While some of the Itza who remained in Yucatan went to Mayapan, others remained near abandoned Chich'en Itza. Following the fall of Mayapan, the Itza at Mayapan again joined the Itza of Petén who shared the same lineage factions. At that time, Chak'an Putun was already abandoned but there was another Itza settlement called "*Tan Xuluc Mul*", which is probably in the Petén lakes region (Jones 1998:10; Rice 2009:43).

Thus, according to the chronicles, the Itza of Petén were involved in long-term waves of migration. Despite multiple episodes of migration between Petén and Yucatán, they claimed ancestral descent from Chich'en Itza rather than Mayapan. The Kowoj, on the other hand, inhabited the north and east of the lake when the Spanish missionaries visited this region. The

Kowoj-related lineage also appears in the books of Chilam Balam associated with the historical accounts of Mayapan and the eastern region of Yucatan (Edmonson 1986; Roys 1967). Based on several episodes in the chronicles, it has been suggested that the Xiw in Yucatan may have related to the Kowoj lineage (Pugh 2001:104; Rice 2009:45-46). The chronicles of the Xiw (Chumayel, Mani, and Oxcutzcab) disparage their rivals the Itza and the Kokom, a faction of the Itza, claiming the Itza/Kokom as "foreigners" (Edmonson 1986:3). According to the chronicles, the Kowoj in Petén claimed to have migrated from Mayapan to the neighboring Itza territory after the fall of Mayapan and shortly before the Spanish invasion (Jones 1998:18).

Although both the Itza and Kowoj in the Petén lakes region migrated from Yucatán, the two groups were in conflict with one another. The Kowoj-related Xiw and the Itza-related Kokom ruled Mayapan jointly until K'atun 8 Ajaw (A.D. 1441-1661), when the Xiw overthrew the Itza. The Xiu assumed power forcing the Itza elites out of Mayapan (Edmonson 1982:9n119). Following this incident the Itza lineage group from Mayapan joined the Itza in Petén. Conflicts between the Kokom/Itza and Xiw/Kowoj continued at the new capital Tayasal (Nojpeten) in Petén, which might have had joint rulership (*mul tepal*) as at Mayapan. Due to continuous conflicts between two groups, as well as the Itza massacre of the Xiw in Yucatan in 1536, the Xiw became allied with the Spaniards against the Itza/Kokom in both Yucatan and Petén at the end of the conquest (Edmonson 1982; xvii-xix, 1986:2-3; Roys 1962:47-48; Tozzer 1941:54-56).

Given these long histories and socio-geopolitical dynamics, the Itza and Kowoj each maintained a distinct ethnic identity in the central Petén region. For this reason the Itza emphasized their ancestral ties with Chich'en Itza rather than to the Kowoj-affiliated Mayapan. The historical consciousness of "distinction" expressed itself in material practices emphasizing social identity, especially among elites. Shared social memories of migration and ancestry allowed migrants and former migrants to construct new forms of ethnic identity, or ethnogenesis, in the Petén lakes region. While the Itza's original homeland was the central Petén region, they created a new social identity to contrast themselves with the Kowoj by emphasizing on the great city of Chich'en Itza as their ethnic homeland. Unlike the "natal homeland"—ones' place of birth (Tsuda 2000:5), ethnic homelands are conceived by members as integral to a collective feeling of group affiliation.

This type of deterritorialized and/or reterritorialized ethnic sentiment (Appadurai 1996; Papastergiadis 2000; Tsuda 2003) was reinforced by the migration myths. Origin myths through migration were commonly used as a strategy by which groups distinguished themselves from their neighbors, emphasizing the identification of a distant powerful homeland (Smith 1984). By this practice of ethnogenesis, the Itza elite evoked images of a great homeland using migration myths as a way of legitimizing their social identity. This served to further distinguish their origins, culture and corporate identity with those of Kowoj, producing a notion of "Itzaness".

Exchange Systems

According to existing colonial documents, the first European to encounter Kan Ek', Lord of the Itza, was infamous Hernán Cortés (Villagutierre Soto-Mayo 1983). Passing through the central Petén region in 1525 en route to Yucatan, Cortés (1976) described some of the exchange systems that he encountered. He witnessed the Chontal Maya of Akalan merchants trading salt for clothing from the Kejach region (Cortés

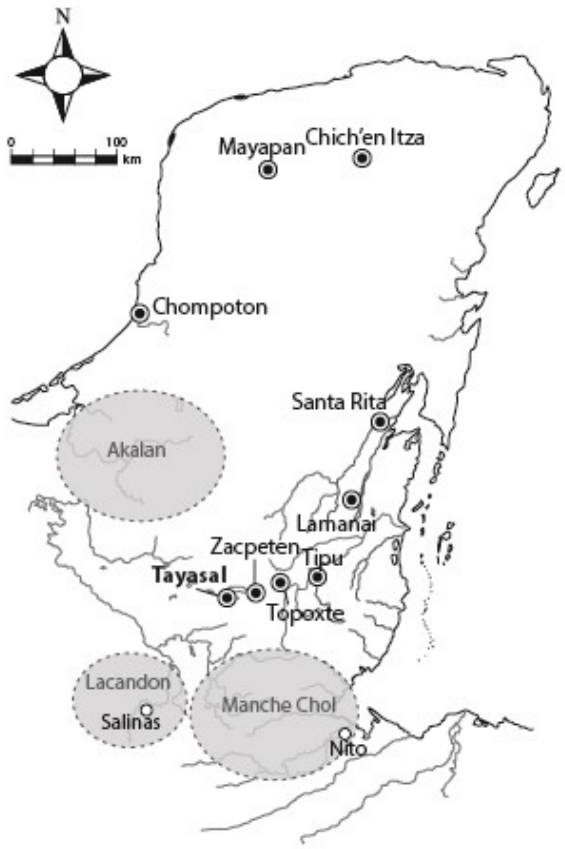

Figure 2. The Mala Lowlands, showing major Late Postclassic sites and political groups.

1976:238) (Figure 2). Akalan merchants were controlling much of the trade in elite agricultural goods such as cacao, cotton, and salt via the long-distance trade between a great trading port of Nito, Honduras, and their homeland in the Gulf coast of Tabasco (Caso Barrera and Aliphat F 2006a; Jones 1982). However, the Spanish invasion of Akalan in the sixteenth century destroyed this trade network through the colonial *reducciones* (reductions) and *encomienda* (trusteeship labor system) which made the local population relocate into the newly built Spanish towns each centered on a church (Jones 1998).

After the collapse of exchange system controlled by the Akalan merchants, the Itza took over power controlling the trade network (Caso Barrera and Aliphat F. 2006b:303). Much of the trade to the south appeared to have been in cacao, which was a luxury product for the Itza elites. Cacao did not grow well in tropical and semi-tropical environment in Petén due to the poor soils, too acidic and deficient in critical nutrients for crops (Caso Barrera and Aliphat F. 2006b:296-303; Jones 1982:281; Schwartz 1990:22-25). In order to obtain symbolically powerful cacao, Itza elites strove to control trade networks with the neighboring polities to their south (Caso Barrera and Aliphat F. 2006b). Although the Itza owned several cacao orchards in the southern fertile land near Nito, there was a group of Manche Chol who were hostile to the Itza located south of Petén along the commercial routes between Nojpeten and Nito. The Manche Chol were specialized cacao producers with technical knowledge and fertile territories (Caso Barrera and Aliphat F. 2006a, 2006b; Feldman 2000). Controlling power over the exchange system, backed by military force, the Itza established a network along with the Manche Chol securing enough cacao for the elite consumption in exchange for salt or metal objects.

Salt was another vital resource for the Itza elites. Several salt production sites have been identified along the Caribbean coast of Belize (McKillop 2002). In addition to the coastal salt production sites, the inland source of this precious mineral, Salinas de los Nueve Cerros, was located along Chixoy River in the territory of the Lacandon who were the refugees from the Spanish control in Chiapas (Figure 2). Like the Manche Chol, the Lacandon were enemies of the Itza continuously in battle over the exchange of salt. However, the strong military force exerted by the Itza placed the Lacandon in the exchange system, like that of the Manche Chol, under the Itza control (Caso Barrera and Aliphat F. 2006a, 2006b).

The Itza also attempted to control other trade routes to the east which led to Tipu, Belize, an

important trade node bringing European goods into Petén (Jones 1989, 1998; Pugh 2009; Scholes and Thompson 1977) (Figure 2). The region to the east of Lake Petén Itzá was the principal territory of the Kowoj. The Kowoj must have controlled the exchange system between Nojpeten and Tipu, which also produced fine quality cacao (Lopez de Cogolludo 1971:219). Furthermore, the Kowoj may have had access to salt from the coastal region in Belize via Tipu. Evidence for this possibility is supported by the large number of European goods recovered at Zacpeten in the Kowoj settlement, as compared with Itza controlled Tayasal where such European goods were scarce. This indicates that the Itza and Kowoj had their own trading routes and exchange network through which agricultural products, religious ideologies, and natural resources entered the Petén lakes region during the Late Postclassic (A.D. 1250-1525) and Contact (A.D. 1525-1697) periods.

The Itza and Kowoj continuously battled until the Spanish conquest of the Itza capital in A.D. 1697. The two groups strove to control trading routes to the east and south, an intensive cacao and salt producing region. The Spanish conquest of these polities in the seventeenth century led to the collapse of the Itza trade network as well as cacao production in these areas by removing the specified local population (Caso Barrera and Aliphat F. 2006b:302-303).

The Petén lakes region served as a refuge or frontier that Spanish power could not breach due to its remoteness. As a "tidal frontier" (Rice and Rice 2005:167) for refugees who were related to lineage families in Yucatan, waves of in-migration joined former migrants emphasizing their common group identities. In addition, the collapse of pre-existing exchange systems after the Spanish invasion into Yucatan led the inhabitants in the region to strive to control regions which produced resources such as cacao and salt. Competition over limited resources caused intensified warfare among groups. Did the dominant Itza emphasize their social identity to legitimize it through their material culture? Recent archaeological excavations in the Petén lakes region provide material evidence that may reflect social identities of the groups from the Late Postclassic to the Contact period.

Archaeological Evidence

Previous archaeological research at Zacpeten identified elite and non-elite residences of the Kowoj. Zacpeten is located on a peninsula in Lake Salpetén to the east of Lake Petén Itzá in Kowoj territory (Figure 1). At Zacpeten, Kowoj elites configured architectural arrangements stylistically linking them to their ancestral city of Mayapan. In doing so, they emulated the actions of group ancestors (Pugh 2003). Recent archaeological investigations at Tayasal, which rests in the Itza region on a peninsula, have further revealed socio-political dynamics of the Itza in this region. Like the Kowoj at Zacpeten, the Itza elites engaged in influential ceremonial activities, and resided in distinct households.

Tayasal was initially occupied in the Middle Preclassic period (1000-400 B.C.) and has been periodically occupied through the present. The site contains at least two ceremonial groups with residential groups tightly arranged around them. The largest of the Postclassic ceremonial group at Tayasal is Group 23, which was excavated by Proyecto Arqueológico Tayasal from 2009 to 2011(Figure 3). This Postclassic ceremonial group was built upon an earlier architectural group, containing a probable Late Preclassic E-group with Late Classic modifications. Our excavation exposed a fragment of Stela 4 on the edge of platform that was built on the E-group. This stela had been reset during the Postclassic

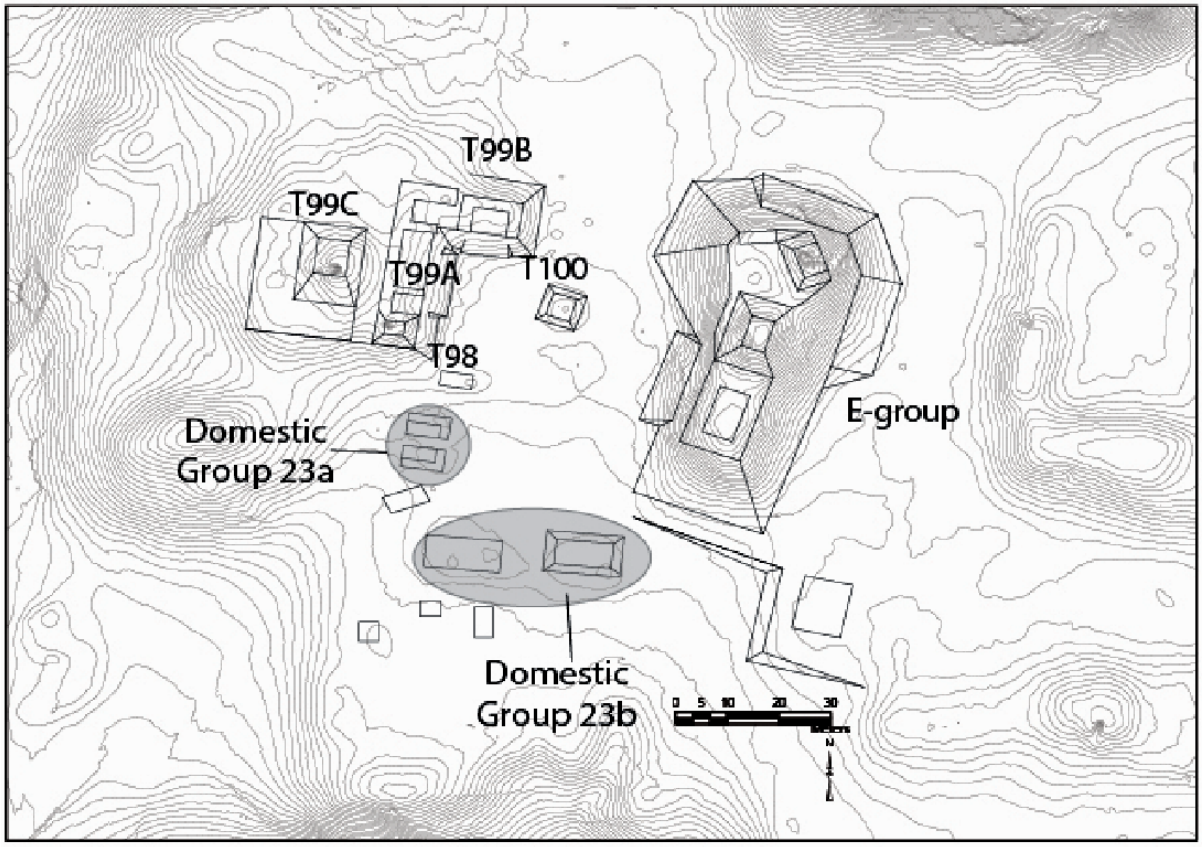

Figure 3: Group 23 at Tayasal.

period, indicating acknowledgement of the local past into communal rituals as a form of social identity (Pugh et al. 2012:9). Architectural, ceramic, and mortuary patterns at Tayasal are examined to identify "the Itzaness" compared with those patterns of the Kowoj at Zacpeten.

Architectural Patterns

The presence of Late Postclassic period architectural arrangements called "temple assemblages" in the Petén lakes region have been recognized as evidence for a connection between Yucatán and Petén (Pugh 2001, 2003). The temple assemblage was first identified in Late Postclassic Mayapan in Yucatán (Proskouriakoff 1962:91). Basic Mayapan-style temple assemblages have a western facing temple with a raised shrine facing a temple and an oratorio rests next to the temple facing the same direction (Figure 4). There is a statue shrine between the temple and raised shrine. An open hall stands at a right angle to the temple and oratorio. The Mayapan-style temple assemblage is also present in the Petén lakes region. At Zacpeten modified arrangements of temple assemblages are considered to be a Petén variant and "ethnospecific" constructions, serving as overt signifiers of ethnic affiliation (Pugh 2003 following Bálint 1994).

Temple assemblages have not been previously identified in the Itza region. However, ceremonial Group 23 at Tayasal shows some kind of architectural arrangement which appears to be a form of temple assemblage: a long structure at the west facing a raised shrine and a probable oratorio at a right angle to the long structure at the north, which in turn faces a small structure at the south (Figure 4). This is different from the

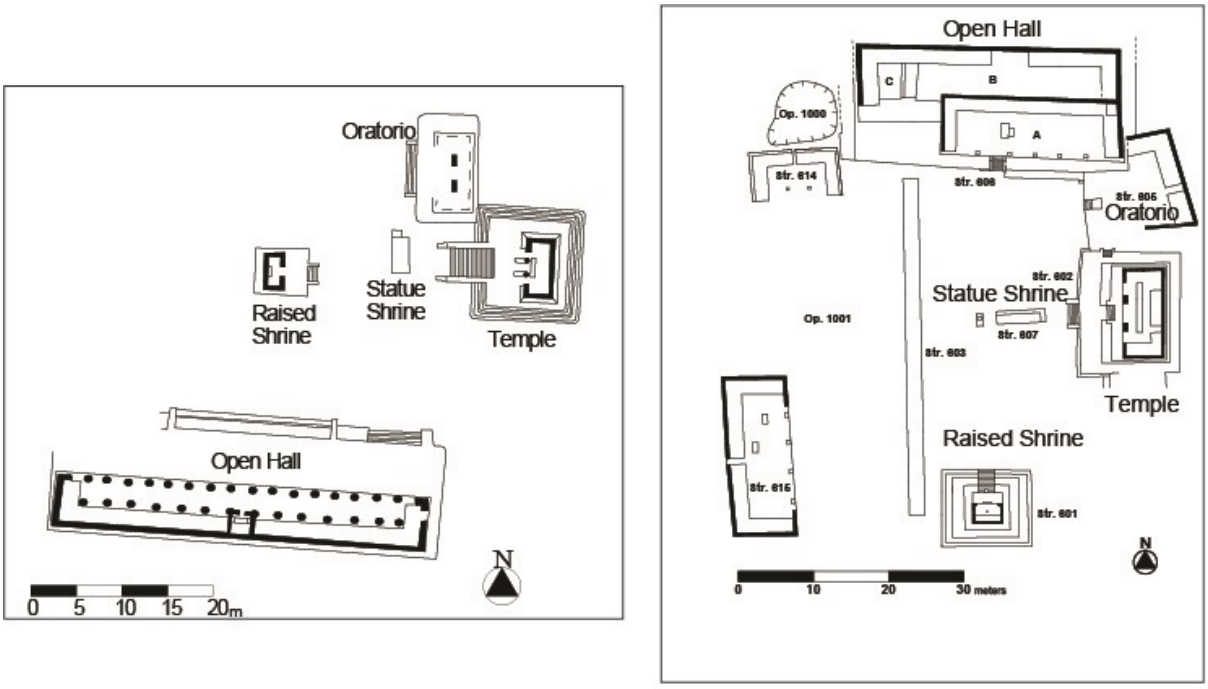

Figure 4: Temple assemblage at Mayapan (left) and Petén variant temple assemblage at Zacpeten (right). (Maps from Pugh 2003:Fig.2 (left) and Pugh 2005:Fig.3-7 (right)). Used with permission.

the Kowoj region in terms of orientation, suggesting that the Itza may have had a different form of temple assemblage. Further research in the Itza territory may suggest a pattern of architectural arrangement unique to the Itza. Since prototypes of Mayapan-style temple assemblage exist in Chich'en Itza as well (Pugh 2001:158-159), the presence of temple assemblages in the Petén lakes region offers archaeological support to the migration myths.

Domestic groups in Group 23 at Tayasal are located to the south of the ceremonial group. Domestic Group 23a consists of two c-shaped structures two meters apart and facing each other (Figure 5). This type of architectural configuration with two closely-spaced structures (or benches) facing each other suggests some sort of duality, and has not been previously reported at Postclassic sites in the eastern lake basins. At the site of Zacpeten, domestic structures were constructed in a "tandem" form, with front and back rooms partitioned by a wall. At Zacpeten, domestic residence pattern appears to have been neolocal, as only one residential structure was found on each platform. In Group 23 at Tayasal, however, domestic groups included multiple residences in each patio group suggesting matrilocal, patrilocal, or another sort of extended family residence patterns. This point indicates a difference in postmarital residence patterns between the organization of Tayasal and Zacpeten and, hence, between Itza and Kowoj community.

Ceramics

The orange-red paste of Augustine Red wares was considered to be a temporal marker of the Early Postclassic period (A.D. 950-1200) in the Petén lakes region (Bullard 1973:227). However, at Tayasal it appears that Augustine Red wares continued into at least the Late Postclassic. Based on technological and decorative styles, the ceramic group consisting of Augustine Red—Vitzil Orange-Red Paste Ware—is specifically

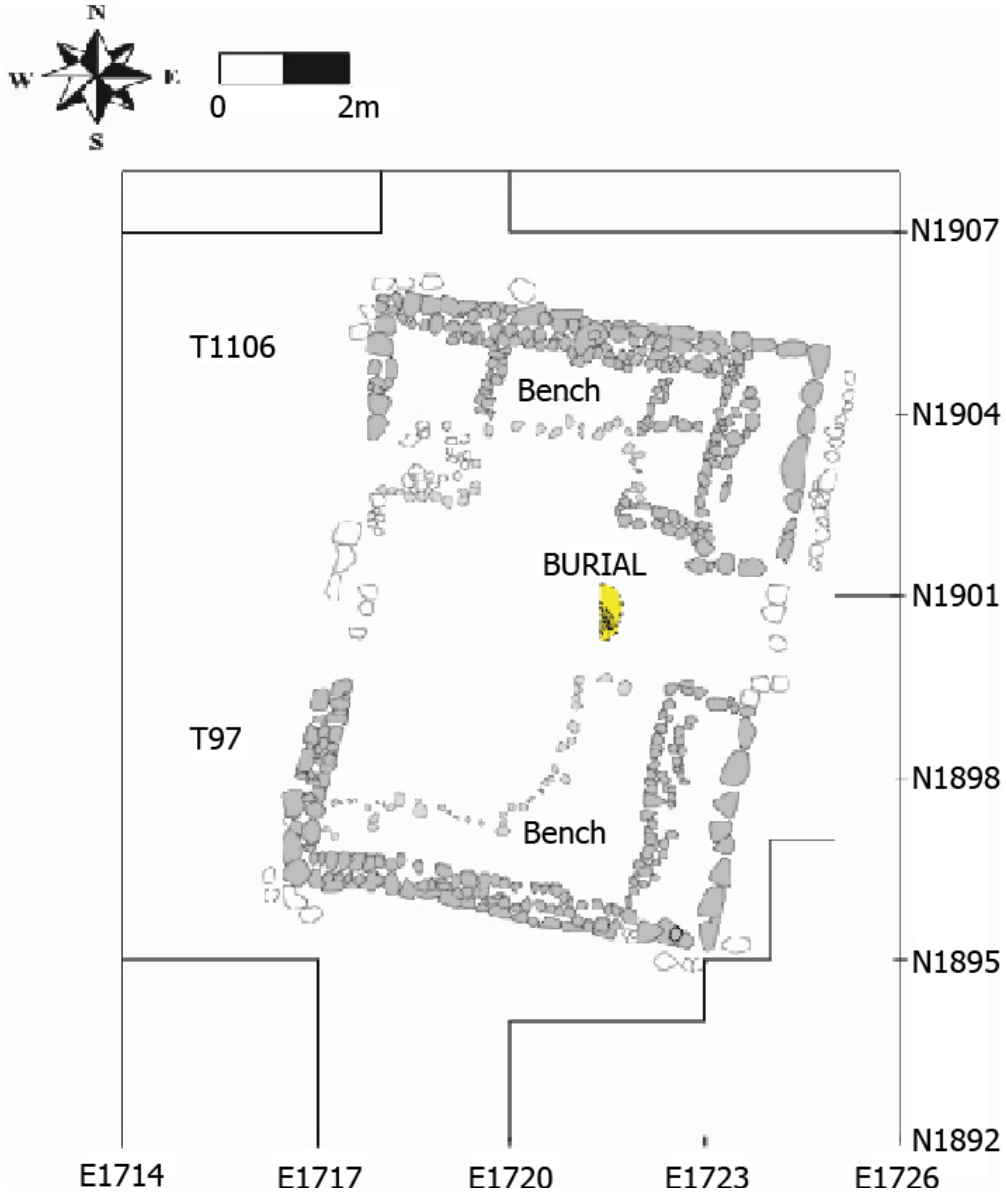

Figure 5: Domestic Group 23a.

associated with the Itza people (Cecil 2001, 2009; Rice and Cecil 2009). Likewise, use of reptile-serpent (*Kan*) motifs on ceramics could be an Itza marker associated with the lord of the Itza, Kan Ek', and his lineages (Cecil 2001:552). A large number of Augustine Red slipped wares were collected from Group 23, especially from Domestic Group 23b. In addition, a concentration of zoomorphic (reptile) tripod vessels of Augustine Red wares were found from the inside room of Structure T52 of Domestic Group 23b. This type of tripod vessel is more common in the Itza capital (Nojpeten) than other sites in the Petén lakes region. The concentration of similar zoomorphic tripods at Tayasal suggests a close relationship with the capital of Itza and some degree of high status group of Itza residing in Group 23. On the contrary, the Augustine Red

wares are significantly rare at Zacpeten in the Kowoj region (Cecil 2001; Rice 1987). In Kowoj territory, Topoxte Red of Clemencia Cream Paste ware was commonly used, while this type of ceramic group is rarely found at Tayasal (Chase 1983). A fine, marly, and cream-colored paste of Clemencia Cream Paste ware is manufactured in the Topoxte Islands, while calcite-tempered and reddish brown-colored paste of Vitzil Orange-Red ware is manufactured in the western portion of Lake Petén Itzá (Cecil 2001, 2007). Following the conflicts over the trading routes and exchange systems between the Itza and Kowoj, each pottery ware may not have been exchanged; or the exchange was very limited.

The occurrence of Mayapan-style effigy censers in Petén during the Postclassic period suggests some degree of religious unity throughout the Maya lowlands. At Zacpeten, the effigy censers recovered from the temples were very similar to those at Mayapan (Pugh 2001). Conversely, very sparse and fragmented effigy censers were recovered at ceremonial group at Tayasal. Rather, the majority of ceremonial censers have an hourglass form. Although it is possible that most of the effigy censers at the Itza capital were largely destroyed by the Spaniards after the conquest (Rice 2009:281), the lack of Mayapan-related effigy censers in the Itza region may indicate avoidance or very restricted use of such objects connected to the Kowoj; thereby reinforcing cultural contrast between the two groups.

Mortuary Practices

Another apparently Itza trait can be found in mortuary practices. In Itza burials seated individuals facing north are placed in cysts overlain with censer fragments, a pattern not previously identified in this region. In Group 23, four burials have been identified: two from the ceremonial group, and two from domestic groups. The burial in the raised shrine (Str. T100) was excavated by the University of Pennsylvania in 1977 and encountered a flexed burial in a cist capped with abundant sherds (Chase 1983: 372-373). The burial from the open hall (Str. T99B) was excavated by a student from *Centro Universitario de Petén* in 1997 and found in seated position in a cist (Ramirez B. 2004). The cranium was found in the west, though the direction of face is unknown, we also do not know if censer sherds capped with interment.

A burial from Domestic Group 23a found in between the two structures was covered by large numbers of smashed Postclassic composite censers. The burial included a middle-aged adult male who was placed in the burial seated and facing to the north. The burial only contained one prismatic obsidian blade resting on the pelvis, a common feature in Tayasal burials (Chase 1983). Another domestic burial from Domestic Group 23b included a seated individual (possibly female) facing to the north. A large number of censer fragments was placed on the top of burial pit. Grave goods included a Terminal Classic period diagnostic vessel, bone awls, prismatic obsidian blades, animal canines, and marine shells. A pattern of burials including the Terminal Classic materials is common in Tayasal (Chase 1983:913-929).

The tradition of seated or flexed burials, presumably bundled, commonly occurs during the Postclassic period throughout the Maya region (Acevedo 1995; Chase and Chase 1988; Masson 2000; Pendergast 1981). The association of smashed censer fragments in conjunction with burials has been also reported from the Late Postclassic sites of Lamanai (Pendergast 1992) and Santa Rita (Chase 1982), Belize. Pendergast (1992:59) refers to this burial practice as “smash-and-scatter”. The smashed censers at Lamanai

and Santa Rita were scattered in the burial, as opposed to "above" the burial at Tayasal. However, this practice is absent in the Kowoj region. The Itza at Tayasal may have shared migration histories with those who inhabited Lamanai and Santa Rita. It is also likely that the Kowoj avoided the use of this burial practice, further differentiating them from the Itza.

Conclusion

Patterns of material distributions in the archaeological record display characteristics of a community. The group shares social memory retaining a sense of ethnic homeland, reinforcing cultural distinctiveness. The similarities in the architectural and ceramic styles between Yucatán and Petén of the Late Postclassic period symbolically replicate notions of Itza social identity, commemorating the ancestral origins of Mayapan and Chich'en Itza. Mayapan-styled temple assemblages were replicated in the variant forms in Petén, suggesting that all the migrants in the Petén lakes region had nostalgic affiliation toward their homelands. Likewise, the religious images from Yucatan were appropriated: they appear in deity effigy censers by the Kowoj and reptile-serpent motifs by the Itza. These representations of appropriated material objects indicate the symbolic foundation of community. In order to legitimize the elite's authority in the community, the elites employed visible images and symbols. The Itza not only appropriated ancestral origins into their social identity, they incorporated the local past into their communal practices. Additionally, the Itza constructed their residential and mortuary patterns linked with an establish community identity.

The demographic movements of the Postclassic period were accelerated by the Spanish conquest. Escaping colonialism, refugees fled to the inland Petén lakes region. Each faction of lineage groups struggled to maintain specified production in order to remain in the exchange system. Constant warfare among the groups over the power and dominance in the exchange systems helped to accentuate notions of community identity. In order to characterize their own distinctiveness, elites appropriated the migration myths in social and material patterns at Tayasal and Zacpeten. This competition between elites as well as that between non-elites resulted in variation in material practices that both reflected and help construct social identities.

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Shifting Burial Practices in the Isola Sacra Necropolis: Ethnicity as a Factor for Cultural Change

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The practice of inhumation at Ostia and Portus began to gradually replace the traditional practice of cremation by the late second century C.E. This shift has often been attributed to the influence of mystery religions, wealth among a particular class in Roman society, ostentatious tastes or fashion trends, or the rising influence of Christianity. It is possible however, that sepulcher owners were subtly referencing their home traditions vis-à-vis sepulchral architectural elements, mythological representations, and names mentioned in inscriptions. After all, funerary monuments both celebrated the lives and identities of people who were buried in them, as well as advertised particular families to passers-by and family members who visited the necropoleis. As a commercial centre in its own right, Alexandria in Egypt provides a valuable basis of comparison for the funerary scene at Ostia and Portus by presenting a useful means to observe the variety of ways in which the dualism and dynamic processes of a multiethnic population manifest in the funerary record.

This paper seeks to investigate the second century C.E.[1] funerary shift from cremation (burning of remains before interment) to inhumation (interment of physical remains) in the burial record at the necropolis of Isola Sacra. At the cemetery, located between Rome's imperial ports of Ostia and Portus in central Italy, the two rites have often been found coexisting in the same sepulchre, and a gradual transition in the funerary record occurs in the span of a single century (Toynbee 1971). It is synonymous with the shift that is visibly seen at Rome and across the Empire around the first century in places like Sicily, Gaul, Africa, and Naples (Morris 1992; Noy 1998); it is generally in the commercial centers of the Mediterranean, and especially among the Greek populace (Mirto 2012; Toynbee 1971).

In the past, the shift in burial customs has been attributed to the rising influence of either mystery religions, the 'moneyed' classes, fashion set by the Roman elite, or the possibility of wealthy patrons anticipating Christian norms (Meiggs 1960; Nock 1932; Toynbee 1971). More recently however, Carroll (2006) and Morris (1992) demonstrate that this phenomenon was owed largely to the fact that inhumation was a 'Greek Custom' and perhaps a trend set by the 'philhellenic emperor Hadrian'. However, rather than a top-down or 'trickle-down' effect of fashion trends from the imperial family, I propose that the transition in burial customs at the Isola Sacra necropolis is likely to have occurred as a result of the influx of Greeks, in particular from the Roman province of Egypt.

There are two main reasons why the Greeks

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might be responsible for initiating the shift in funerary traditions. First, following the construction of the new harbour facilities at Portus in the late first and early second century, Greco-Egyptians travelled to Ostia in large numbers carrying vital grain supplies. Due to Rome's constant need for grain, supplied in great part by its African provinces, a constant flow of traffic thus came and went from Alexandria and Carthage to Ostia and Portus (Keay 2008). Second, there was no uniformity of burial practice among the Greek populace to begin with; both inhumation and cremation were practiced indiscriminately even among members of the same family (Mirto 2012). Similar examples of their dualistic practice can even be found in other places like Greece, Sicily, Southern Italy, and Egypt (Emmerson 2013; Empereur 1995, 1998; Kurtz and Boardman 1971). The Isola Sacra necropolis likewise contains evidence for a specific working class group of artisans, trades-people and professionals who lived in and around Rome's port in the second century; there is also evidence for the simultaneous practice of both funerary customs within the necropolis, and in a single monument (Baldassarre et al. 1996).

My work therefore proposes to highlight the importance of foreign elements in the architecture, epigraphy, and visual representations within tombs at Isola Sacra in hopes that they might reveal the social background of a multicultural population at Ostia and Portus. In so doing, I am hopeful that the shift in burial customs at Isola Sacra will also be illuminated because tombs were not 'empty memorials'; they were carefully planned monuments designed as homes for the deceased who will have them forever (Petersen 2006:92; Mattingly 2011). I will provide a comparison of similar monuments in Alexandria, Egypt so that a connection between the commercial populations can be made. This contact between Egypt and the Roman harbours likely brought about an interchange of culture that appealed to a wide spectrum of people; they advertised their personal lives to each other in one way or another through modest or elaborately decorated funerary monuments. It is my hope that this advertisement moved beyond visual and epigraphic content to include a sharing of burial customs as well.

Unifying Architectural Elements of Isola Sacra and Gabbari

To begin, the architectural elements of Isola Sacra and Gabbari will be highlighted. On the one hand, the main cemetery[2] of Isola Sacra lies on the small strip of land[3] separating Ostia and Portus, formed by way of the Tiber river fluvial paths heading to the sea (Bertacchi 1960). On the other, the necropolis of Gabbari is situated just west of the city of Alexandria in Egypt and is part of the large complex of several underground-style tombs that first led Strabo (Geo. 17.1.10) to describe a "city of the dead." At both cemeteries by the second century, spaces were dedicated to cremation and inhumation practices within funerary chambers on the walls or in the ground. Such tombs with a central square space became the typical sepulcher monuments of the early second century and contained one or more burial chambers (Torres 2008). In general, these *tombe a cella* style monuments (family, house, or chamber tombs) were made with a red-brick exterior (or carved into the bedrock as was the case with the Gabbari necropolis), and then enhanced by architectural elements (columns, façades, architraves, pediments, etc.), and plasterwork (Hope 1997:75). These architectural features of funerary monuments at the Roman harbours and

in Alexandria may allude to the multi-ethnic associations of the cosmopolitan trading centres.

The Isola Sacra house tombs had a standardized form and design: a door admits a visitor into a burial chamber that would have spaces dedicated by the second century for both cremation and inhumation burials (Hope 1997). Even funerary amenities for the performance of tomb cult were included: stone benches, wells, and a cooking area with functioning oven or fire pit (D'Ambra 1988; Hope 1997). Despite the standardized design, some of the earliest forms of the house-tomb existed as *columbaria* (or at least mimicked the style) of which a several examples[4] exist at Isola Sacra and date to the late first and early second century (Baldassare et al. 1996). These columbaria are known for their architectural designs of accommodating burials as a collective organization (Borbonus 2014:12). They are large sepulchres that were meant to be at least partly or wholly underground. At Isola Sacra however, except for one[5], the greater majority of columbaria existed above ground. They all generally contain numerous circular or rectangular niches lining the walls from top to bottom that were intended for the deposition of ash urns (Toynbee 1971:113). Later, during a period of reuse, floor space was even utilized for the deposition of more burials, and always for inhumation (Baldassarre et al. 1996).

Like the standardized architectural forms at Isola Sacra, the underground burial complexes at Gabbari[6] also followed specific outlines of construction. They largely resembled contemporary Greek houses, with the dead and their visitors provided with facilities similar to those they had enjoyed in life. Although two forms[7] of the style did exist, of particular interest to this paper is that of the second type. It was formulated on the much simpler Greek *oikos* house, characteristic of many Classical and later settlements and consisting of a series of communicating rooms set on a single axis; *loculi* of roughly two meters in length dotted the walls (Burn 2004). In addition to the graves themselves, this large complex also included gardens and even embalmers' establishments for inhumation (Burn 2004). As such, an original tomb at Gabbari would be built by its owner for himself "with an atrium open to the sky, a flight of steps leading down into it and a sarcophagus in a chamber with painted decoration" (Empereur 1998:190). Eventually however, the former occupant is overturned and room is made to fit in *loculi*; one makes way for a hundred (Empereur 1998). The Gabbari necropolis had both deep niches for the purpose of depositing the bones of inhumation-style burials and shallower niches in which to set urns that contained ashes of the deceased (Burn 2004; Callot and Nenna 1992).

Although many architectural forms of funerary monuments did exist in the Roman Empire, the *columbaria* and house-tombs became the typical monuments in the second century. At Gabbari, the necropolis was largely underground and constructed on the layout of the Greek *oikos* house with *loculi* dotting the walls and containing mostly inhumations. At Isola Sacra on the other hand, they dominated the funerary landscape and contained spaces allocated for both inhumation and cremation. In both cemeteries however, one occupant (or family) generally gave way for a collective during a period of reuse that saw the repurposing of tombs rather than the construction of new ones. Together, the Egyptian necropolis shares some interesting qualities with the Roman columbaria of Isola Sacra. First, they are collective tombs with a similar capacity for occupation; secondly, they utilize numerous *loculi* to hold cremations or inhumations; lastly, they allow for individual commemorations with funerary epitaphs (Borbonus 2014:57). In order to better understand the connection between Egypt and the two harbours, I will also investigate

epigraphic content of these funerary epitaphs that generally decorated the façades of the Isola Sacra monuments.

The Epigraphic Content at Isola Sacra

Carroll (2006) emphasizes the importance of funerary monuments and their epigraphic content as markers for the dead. Inscriptions on graves once provided the ancient passerby information about the deceased's life, but now offer modern scholars the opportunity to investigate Roman attitudes towards death (Carroll 2006). For the purposes of my research they are markers of identity, providing names with the potential to indicate ethnic[8] heritage; the Isola Sacra necropolis contains inscriptions[9] of such names, complete or fragmentary, of about 800 persons. From this number, Helttula (1995) documented 450 different *cognomina*, in which more than half of them are revealed as Greek. Due to their formulaic nature, I will provide examples from just one tomb, no. 29, in order to highlight some of the more interesting characteristics that are really only made apparent through a closer examination.

Based on Calza's (1940) identification of brick-stamps in the tomb, Tomb no. 29 is dated to the second century and contains the epigraphic content of two interesting dedicatory inscriptions. The first is a commemorative piece visible from the *Via Severiana* and attached above the entrance of the door leading into the burial chamber of the tomb:

> D[is].M[anibus]. VERRIA. ZOSIME. ET. VERRIVS. EVHELPISTVS. FECERVNT. SIBI. ET. LIBERTIS. LIBERTABVSQVE. POSTERISQVE. EORVM.
>
> *To the Gods of the Underworld. Verria Zosime and Verrius Euhelpistus made this (tomb) for themselves and their freedmen and freedwomen and for their descendants.*[10]

Verrius Euhelpistus's *cognomen* alongside that of Verria Zosime's, is indicative of Greek names (Gordon 1924). Slaves also took the *gentilia* of their owners, like "Verrius" and "Verria", upon manumission but kept their calling names as cognomen, like "Zosime" or "Euhelpistus." What "Verrius" and "Verria" are indicating then, is that both spouses were in fact from the same household and likely of freed status. Continuing past the commemoration, and moving into an L-shaped enclosure that surrounds the burial chamber, is the second inscription. This epitaph is visible on the cover of a broken sarcophagus:

> D[is].M[anibus]. BERRIA ZOSIME. FECIT. SIBI. ET. BERRIO. EVHELPISTO. COI[n]VGI. SVO.
>
> *To the Gods of the Underworld. Berria Zosime made this (sarcophagus) for herself and for her spouse Berrius Euhelpistus.*[11]

Here, the names are spelt with the interchangeable Greek "B" instead of the Latin "V". According to Lindsay (2010:50); the beginning of the second century saw a 'confusion' between the two letters so that the b-symbol is used for the v-sound rather than the vowel symbol for 'b'; a preference by Greek speakers who transform the b-symbol into a spirant sound (continuous expulsion of breath). The "B" could therefore be indicative of a presence of Greek craftsman in the area who carved commemorations, or the commemorators themselves uttering the sound of "b" in a characteristic Greek fashion (D'Ambra 1988; Lindsay 2010). Unfortunately, this is only speculation, as Lindsay (2010:51) is also careful to mention that the pronunciation of the phonetic

"b" in the Imperial age is relatively unknown. According to D'Ambra (1998:90) however, a third hypothesis about the variation could also be indicative of a lower-class background, but this hypothesis is just as speculative.

It is at this point that tomb no. 29 becomes even more unusual among the rest of the house-tombs at Isola Sacra. A third inscription has been found but it is problematic to this discussion due to its lack of *in situ* context. It rests instead in tomb no. 15 but was believed by both Calza (1940) and Baldassare et al. (1996) to have been erroneously placed there because the dimensions mentioned match those of the original burial chamber for Tomb no. 29. As a result, I will mention it here:

> D(is) M(anibus) / VER(r)IA ZOSIME FECIT SIBI ET / L(ucio) VERRIO EUCHARISTO MARITO / SUO BENE MERENTI LIBERTIS / LIBERTABUSQUE SUIS POSTE/RISQUE EORUM / H(oc) M (onumentum) H(eredem) EXTERUM N(on) S (equetur) / IN FRONTE P(edes) X IN AGRO P(edes) X
>
> *To the Gods of the Underworld. Verria Zosime made this for herself and for her well deserving (husband?) Lucius Verrius Eucharisto and for their freedmen and freedwomen and for their descendants. This monument may not pass to outsiders. It is 10 Roman feet by 10 Roman feet.*[12]

This inscription mentions that Verria Zosime might have once been married with Lucius Verrius Eucharistus. Now, according to Calza (1940:75-76) and Baldassarre et al. (1996:138), both the chamber and the enclosure were part of the original construction in the early second century, and only the solarium was added later to enlarge the sepulchre. Thylander (1952) therefore believed the *marito* was indicative of 'brother' rather than 'husband'. But it could very well be that Verria was married to both men who appear to have been manumitted from the same household with Verria.

The inscription and funerary monument are interesting not just for the relationships between the three occupants mentioned, but in consideration of the tomb layout as well. On the one hand, the chamber proper (where the third inscription likely hung) contains a central niche with other niches almost entirely dedicated to the use of cremation urns. On the other hand, when the visitor turns into the L-shaped enclosure (where the second inscription is found) the marble sarcophagi becomes a center piece in an area dedicated almost entirely to inhumations. It is pertinent to restate now that the choice here between inhumation and cremation was made on personal preferences of the deceased. If the three named in the inscriptions were in fact Greek, then the group likely incorporated either inhumation or cremation into their funerary monument without a real fundamental difference between the ceremonies. After all, Mirto (2012) did stress that a tomb might often house mixed burials within the same family unit; exactly as the residents of Tomb no. 29 have shown with one funerary practice in chamber and another in enclosure.

Despite complications in the study of onomastics, namely the accuracy of designating identity or ethnicity through *cognomina*, epigraphic evidence nevertheless is capable of providing overall impressions of foreigners at Isola Sacra. The case study of Tomb no. 29, for instance, showcased 'three' rather formulaic inscriptions that include a name of the dedicator, the dedicated, and express a sentiment of some sort about one another or for the future. In addition to the Greek sounding *cognomina,* the variation in the spelling of the names with the appearance of the Greek "B" instead of the Latin

"V" on the interior of the tomb could be seen as an indication of some manner of Greek presence in the area. It could be a form of discrepant identity[13] and indicative of the "multiple life experiences of people" in which the expression of differences or similarities constructs identity and a cultural diversity in any given population (Mattingly 2011:215). This same expression of identity can be seen in visually striking representations painted, tiled, or carved in funerary monuments.

Unifying Visual Elements at Isola Sacra and Kom el-Shugafa

In addition to the architectural elements and epigraphic content of the tomb itself, the design and visual representation of a tomb also aids in the social identification of its occupants. It is not, however, my intention to propose that fashion led some to choose sarcophagi over urns simply for the availability of carving space. Rather, in addition to decoration on sarcophagi and urns, the carved reliefs, figural mosaics, and paintings on tomb walls all bear witness to the artistic expression of the deceased because the entire space of a monument was generally utilized. As such, iconography in a tomb has the ability to offer genuine insight into the cultural concepts associated with foreign influences at the harbours. In particular, elements that are distinctly Egyptian or foreign in the necropolis of Isola Sacra will be the focus here. Such associations might further provide key details about the choice of the owner to utilize inhumation or cremation. I make this suggestion because Graeco-Romans at Isola Sacra practiced both inhumation and cremation, not unlike the Graeco-Romano-Egyptians buried at Kom el-Shugafa in Alexandria. Therefore in this section, the dualistic Graeco-Egyptian elements at Kom el-Shugafa will be tied to the artistic traditions at Isola Sacra, and hopefully further unite the funerary choices made by the owners of the tombs.

In order to best understand the artistic expression of an individual buried at Isola Sacra, the catacombs of Kom el-Shugafa will be investigated first because there the blending of Roman, Greek, and Egyptian elements in the funerary realm are more readily apparent. The catacombs are located outside of Alexandria to the south-west of Diocletian's Column and the Lageion, and are accessed via a set of descending spiral stairs roughly twenty meters below the surface of Alexandria's working-class district (Empereur 1998). Corbelli (2006:17) describes the catacombs as family tombs with layouts that follow the concept of a Greek temple. The surrounding ambulatory provides access to the rear interments, and a portico and *pronaos* exhibits Egyptian (papyri-form bases and capitals with mixed acanthus and lotus buds), Greek (Medusa heads combined with cobras, a Serapis-Agathodaemon hybrid wearing the double crown of Egypt while holding caduceus and thyrsus of Hermes and Dionysus), and Roman elements (Anubis dressed as a Roman soldier). In the chapel, next to the traditional Greek-style garlands and bunches of grapes, are also bas-reliefs depicting traditional Egyptian elements of the worship of the Apis bull and the mummification of Osiris by Horus, Thoth and Anubis (Corbelli 2006:17; Empereur 1998:156). Inside the chambers of the catacombs, examples of two superimposed registers present an Egyptian and a Greek rendering of the theme of death and resurrection, dubbed the 'Persephone Tomb'. In the upper registers, Török (2011:82) describes images of "the mummification of the dead by Anubis" in traditional Egyptian style, whereas the lower registers show the traditional Greek motif of

"the abduction of Persephone." In each scene, the motif of rebirth and victory over death dominates the registers, so that although Persephone is representative of Greek mythology, she simultaneously becomes associated with Isis and brings another element of dualism into the painting (Empereur 1998:156). The catacombs of Kom el-Shugafa also manage to embody unification of local traditions in a mixed population of Greco-Egyptians: sarcophagi and rock-cut *loculi* contain the remains of mummified, inhumed, or cremated individuals either in single, or in some cases, multiple burials (Empereur 1995).

At Isola Sacra, the unification of visual elements is a little more difficult to assess but nevertheless present in the tombs. To begin, although some of the freed population would issue commemorative self-portraits as a symbol of their incorporation in Roman society, a few of the façade reliefs featured at Isola Sacra bear occupation-motifs that drew attention to toil and hard work (George 2006). The exterior reliefs on Tomb nos. 29, 30, 78, 90, and 100, for example, showcase professions associated with a class of people often engaged in occupations that cater to travellers, merchants, artisans, and locals and foreigners alike. Mosaics in tomb nos. 11, 16, 34, 42, 55, and 86 each display a dynamic example of stylized flowers and leaves (i.e. Ivy or acanthus)[14]; tomb nos. 29, 34, and 88 portray a variety of fauna that include local and exotic birds, fishes, and reptiles[15]; and tomb nos. 29, 34, 43, 75, 80, 86, and 87 show a bit more of the figurative designs with representations of people (i.e. Roman, pygmies, cupids, etc.) or places (i.e. harbour, Nile, etc.), lighthouses and ships, or members of mythological origin (i.e. muses, seasons, gods and goddesses).[16] Wall paintings in tomb nos. 11[17], 26[18] and 30[19] and 78[20] also include numerous mythological scenes and associated figures (heroes, the muses, and different divinities from the Roman and Egyptian pantheon), aspects of aquatic life, funerary banquets, wild animals, geometric designs, and personifications of nature (seasons, the winds, Ocean, etc.). Just like at Kom el-Shugafa, the tombs at Isola Sacra contained mixed burials of cremation and inhumation.

It is useful to observe the variety of ways in which the dualism and dynamic processes of a multiethnic population manifested. The art and iconography created during this interconnection creatively displayed the multiple cultural derivations of foreigners and locals alike, contributing greatly to the contemporary existence of the inhabitants at each commercial centre (Riggs 2002:99). At Alexandria, in the catacombs of Kom el-Shugafa, this was made blatantly apparent with numerous references to Greek, Roman, and Egyptian iconography, as well as display of Egyptian and Greek funerary cult practices on two registers in the 'Persephone Tomb'. At Isola Sacra, allusions were a little less clear-cut but certainly not nonexistent. 'Worker reliefs' acknowledged the life of a labourer or artisan in a cosmopolitan harbour, mythological-themed sarcophagi exemplified Greek, Roman, and on occasion Egyptian assimilation of iconography. Nilotic scenes, images of ships and the harbour, can be readily associated with the harbours and trade. It is fair to say then, that the visual blending at Alexandria is mimicked in small part at Isola Sacra, weighing more heavily the Roman traditions being on Roman soil; whereas Egyptian and Greek motifs appeared more frequently in Alexandria being on Egyptian soil.

Conclusions

This paper was presented with the hopes of addressing the way scholars have previously viewed the shift in burial practices from cremation to inhumation, specifically at the necropolis of Isola Sacra. By harnessing a variety of methods to

analyze a necropolis – architectural, epigraphic, and visual – the study of tomb cult can be traced to funerary practices conducted by a mixed population of locals and foreigners alike; a demographic heavily influenced by a migrating Greek population. The comparison with similar necropoleis at Alexandria further allowed the study to demonstrate a complex unification of multicultural elements in a place that had already been linked to the very diverse population in a cosmopolitan centre. Given that both Alexandria and the harbours of Rome were characterized by overseas trade, resultant immigrant populations, and a blending of cultural traditions, it is not farfetched to posit how 'similar conditions triggered similar responses' (Borbonus 2014). Therefore, the use of cremation and inhumation at Isola Scara was likely the result of a large body of Greeks settling in the area and indiscriminately practicing either burial custom.

Future work needs to be done on the complex topic of inhumation and cremation, with closer attention paid to not only isolated components of the tomb but processing these individual components as a *whole*. By knowing the identities of a tomb owner, historians are one step closer to understanding the motivations behind burial customs utilized. The important role Greeks from Egypt played on the transmission of burial customs also need to be revaluated, as it was likely their influence that helped introduce the practice of inhumation to a population previously content with the use of cremation.

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NOTES

[1] Unless otherwise specified, all dates will be in C.E.

[2] This includes 100 tombs Baldassarre et al. (1996) numbered based on Calza's (1940) original excavations, although the number does not include the roughly 650 cinerary urns, tombs on the eastern side of the Via Flavia-Severiana, nor a series of canal tombs further down the road towards Portus. For the purposes of this study however, I will address the best-preserved monuments numbered 1 to 100 on Calza's (1940) original plans, and the 650 cinerary urns uncovered by Baldassarre et al. (1996) in her excavations from late 80's as they are located in the same area on the western side of the Via Flavia-Severiana.

[3] When the area was under initial excavation by Calza (1940) in the late 1920s, he designated the Isola Sacra necropolis as solely servicing the Portus inhabitants because not only had Ostia already three other well-established cemeteries (Laurentina, Romana, and Marina), but that this particular area was at least 1500 meters from the town. According to Bruun (2010:113) however, new archaeological evidence suggests Claudius built the canals separating Portus from the cemetery before the necropolis had even been fully formed: "the cemetery was always physically separated from Portus, as it was from Ostia, and there is no reason why residents in Ostia (a colonia, of which Portus was one district) should not have used it." He also provides an inscription [In Thylander (1952:57, 34, 85), the inscription referring to Ostia: no. A 50a; two other inscriptions with references to Portus: nos. A 19 and A 92] that confirms the presence of an individual at Isola Sacra who is simultaneously also found to have lived in Ostia, whereas the majority of dedications mention individuals from neither Ostia nor Portus.

[4] Tomb nos. 57, 78, 79, 85, 90, 92, and 94 for example.

[5] Tomb no. 86 is the only example of a *cella*-style tomb with a subterranean floor accessed via a set of stairs.

[6] For a good overview of the archaeological material and architectural analysis of Gabarri, see (Callot and Nenna 1992).

[7] One of two types of tomb complexes looked much like the *peristyle* house. It was designed with rooms set about a central courtyard, where one side was sometimes furnished and decorated with a colonnade (Burn 2004).

[8] The study of onomastics (inferring ethnicity through epigraphy) has long since been contested. Some scholars suggest that there is no relationship between epigraphy and ethnicity, and MacDonald (1998:187-188) warns of three inconsistences associated with such a study: linguistic idiosyncrasies in the particular language of the bearer, the association of a name with a specific ancient ethnic group, and that fashions in name -giving were not necessarily limited to specific communities with no means of influencing fashions elsewhere. Slave masters or sellers could have also changed a slave's name due to personal preference, or in some cases, to even increase the value of a slave's status to potential buyers (Gordon, 1924; Hughes, 2007). A Greek slave, for example was more highly prized than say a Punic or Gaulic labourer (Hughes, 2007). These men and women would then keep these names and only add onto them in order to symbolize their freedom once manumitted. Yet, many scholars (Carroll 2006; Helttula 1995; Hope 1997; Meyer 1990; Mouritsen 2005, 2011) could also not deny the usefulness of the practice because with limited evidence available, cultural affiliation based on epigraphic material is a valuable addition to any work. It should, however, be taken as a tentative suggestion rather than absolute fact.

[9] Helttula (1995) based her numbers on all the published inscriptions of the Isola Sacra.

[10] IPOstie-A, 00274 = ISIS 00038. All Latin translations are my own.

[11] IPOstie-A, 00275 = ISIS 00039.

[12] IPOstie-A, 00273 = ISIS 00037

[13] 'Romanization', stresses Mattingly (2011:203-217, 207), is outdated and problematic because the term is "used to describe both process and outcome, so that [it] becomes [its] own explanation."

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Cylinder Seals: The Window Into Mesopotamia's Soul

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Cylinder seals were an important administrative tool during the Akkadian, Post-Akkadian, and Ur III periods, and are now a valuable source of information for archaeologists. The material used to make cylinder seals and the imagery engraved on them are evidence for decreased trade activity during the Post-Akkadian period and its slow revival during the Ur III period. The size of cylinder seals and the quality of the material from which they are made are a reflection of the political upheaval that marked the end of the Akkadian period and lasted until the Ur III period. Each of these attributes can also provide evidence for political support during each of the three periods. Lastly, through an analysis of material and inscriptions, it was found that 13.3% of Akkadian cylinder seals, 25.7% of Post-Akkadian cylinder seals, and 12.1% of Ur III cylinder seals belonged to individuals of a lower class and that cylinder seals can, therefore, represent individuals of all statuses. By looking at trade networks, political upheaval, the symbolic and political relevance of cylinder seals, and ownership, it is clear that cylinder seals are excellent indicators of social and political structures in southern Mesopotamia during the Akkadian, Post-Akkadian, and Ur III periods.

The development of writing and seals during the Jemdet Nasr Period (c. 3100-2900 BCE) changed the way people in Mesopotamia interacted with each other and those outside its borders. For archaeologists, it means an improved understanding of social and political relationships amongst ancient peoples. Cylinder seals, invented c. 3500 BCE, were an essential administrative tool that became increasingly important as writing developed. As Pittman explains (1998:75), they were used for administrative purposes—rolled across wet clay to act as signatures and verify the contents of documents. They were also used as locks when impressed on doors or containers, and dedicated in temples (Pittman 1998:75). They could even be worn as jewellry when strung through the hole that was typically drilled through their centres. Given their wide range of uses, how do cylinder seals reflect evolving social and political structures in southern Mesopotamia? Through an analysis of cylinder seals published by Pierre Amiet (1980), Dominique Collon (1990 and 2005), the British Museum, the Metropolitan Museum of Art, and the Musée de Louvre, in conjunction with theories proposed by other scholars, this paper will explore the importance of cylinder seals to archaeologists' understanding of trade, political upheaval, political support, and social status in southern Mesopotamia from the Akkadian (c. 2334-2193 BCE) through to the Ur III (2112-2004 BCE) periods.

Cylinder seals during the Akkadian period were numerous and skillfully made. Many were too large for practical use and would have served

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as status symbols, possibly worn as jewellry or dedicated in temples (Sax et al. 1993:77-78). Collon (2005:32-35) notes that figures were carved in deeper relief and that there was a greater focus on detail and musculature than during the Early Dynastic period. She also explains that the imagery of Akkadian cylinder seals was dominated by contest and presentation scenes. Earlier contest scenes depicted a number of groups engaged in combat, but over time these groups became more independent until there were two pairs of well-matched opponents by the reign of Naram Sin (Collon 2005:32-35). By comparison, presentation scenes were more hastily done and depicted worshippers before a deity (Collon 2005:32-35). During this period, the Akkadians reorganised the Sumerian terrestrial gods and the Akkadian astral gods into an official pantheon, which resulted in an increased number of deities being depicted on seals (Kist 2003:5-6; Collon 2005:35). Daily life, hunting, and mythology scenes were also popular during the Akkadian period (Collon 2005:35).

Immediately following the Akkadian period, cylinder seals underwent a number of changes. The seals became smaller (Sax et al. 1993:77-78) and old stone was frequently reworked due to a lack of resources (Kist 2005:5-6). In terms of iconography, there was a revival of the eagle and prey motif which had been popular during the Early Dynastic period (Kist 2003:5-6). Collon (2005:35-39) points out that the quality of artwork diminished during the Post-Akkadian and Ur III periods. She also notes that contest scenes began depicting two heroes combating a single beast, while presentation scenes remained basically the same as their Akkadian precursor with the addition of a second register depicting swimming geese. In the Ur III period these presentation scenes were standardized to show a worshipper led by a goddess to a deity or deified king enthroned below a crescent moon (Collon 2005:35-39). Birds, boats, and figures on either side of an altar or tree were also popular scenes during the Post-Akkadian and Ur III periods (Collon 2005:35-39).

Trade Networks

There is little textual evidence, as Sax et al. (1993:87-88) point out, to provide archaeologists with an understanding of trade during the Akkadian period. There is archaeological evidence for southern Mesopotamian influence in Iran, Syria, Assyria and the Gulf, which suggests that trade took place between these venues. According to Sax et al. (1993:87-88), this trade would have been affected by the Gutian invasions that began c. 2250 BCE and continued toward the end of the Akkadian period, at which time trade networks had disintegrated. The Gutians were a group of "mountain-dwellers" whose origins are uncertain—they are believed to have come from the north, in the central Zagros region (Bryce 2009:265). Though they are often blamed for the collapse of the Akkadian empire, evidence suggests that this was not the case. McMahon (2012:666) argues that internal instability was a major contributor, and that the Gutians were merely a "symptom" of the collapse. Cullen et al. (2000:382) demonstrate that climate change brought about a period of aridity that resulted in migrations within Mesopotamia to more productive regions—also contributing significantly to the collapse. Trade was eventually re-established during the Ur III period (Sax et al. 1993:87-88).

While textual evidence may be lacking, seals and sealings are not. The imagery used on cylinder seals can provide evidence for bureaucratic and trade relations between Mesopotamia and its neighbours. For example, an Akkadian cylinder seal housed at the Metropolitan Museum of Art (1999.325.4) bears the popular contest scene in which a man battles a

water buffalo. The water buffalo's horns are depicted frontally—this stylistic feature and the animal itself were native to the Indus Valley (Metropolitan Museum of Art 2000a). The cylinder seal of Ibni-Sharrum, currently at the Louvre (AO 22303), also depicts water buffalo. These animals were first included on cylinder seals during Sargon's reign (François ca. 2000s), suggesting that there was increased contact with the Indus Valley during the Akkadian period. On the Post-Akkadian and Ur III cylinder seals studied for this paper, the water buffalo disappears from contest scenes in favour of lions (which were also depicted during the Akkadian period). This is to be expected from Post-Akkadian period seals, during which time trade with the Indus Valley had been interrupted.

Another example of how imagery can be indicative of trade relations comes from an Akkadian shell cylinder seal from the 'Tigris'-group (Collon 2005:34-35, Figure 109; Iraq Museum IM 14334). Its iconography, as Møller (1991:38) notes, is reminiscent of that used in the Diyala and Elam. However, she also notes that it bears similarities to those from the Early Dynastic in northern Mesopotamia and northern Syria. This group features borders with hatching or triangles, stubby human figures, and two-dimensional animals carved in a linear fashion (Møller 1991:38). These examples suggest that southern Mesopotamia was in contact with the Indus Valley, the Diyala, Elam, northern Mesopotamia, and/or northern Syria either directly or indirectly. For the imagery of cylinder seals to be affected by these relations, there must have been frequent contact between these locales which suggests frequent trade until the collapse of the empire.

Archaeologists can also study the stone used to make cylinder seals to determine trade networks. Sax et al. (1993:82) did a study to determine popular mediums for cylinder seals. They discovered that serpentine and greenstone were the most popular mediums during the Akkadian period, lapis lazuli and chlorite during the Post-Akkadian period, and carbonates and chlorite during the Ur III period. Both serpentine and chlorite are found in the Zagros Mountains and in northern Syria. However, the significant decrease in the use of serpentine at the end of the Akkadian period suggests that the two materials came from different locations. The change from serpentine to chlorite could have been a result of material availability (Sax et al. 1993:82). Evidently, southern Mesopotamia had greater access to chlorite during the Post-Akkadian period than to serpentine. Moorey (1994:75) notes that serie récente chlorite vessels appeared at this time in Sumer as well, suggesting the two occurrences may be connected. The chlorite used for these vessels was obtained from the south, in Oman on the Gulf (Moorey1994:75), which is the opposite direction from which the Gutians came. This suggests that southern trade networks remained accessible during the Post-Akkadian period.

In conclusion, seal imagery and the materials used throughout the Akkadian, Post-Akkadian and Ur III periods reflect changes in trade relations. Also important to note is that, despite a revival during the Ur III period, southern Mesopotamia's access to resources was not as extensive as it had been in the Akkadian period.

Material Usage: Reflection of Political Upheaval

Toward the end of the Akkadian period, after its apex during the reign of Naram-Sin (c. 2260-2223 BCE), the empire gradually lost all of its territory aside from the area surrounding the city of Akkad (Metropolitan Museum of Art 2000b). This period came to a tumultuous demise with the end of Shar-kali-sharri's reign. Climate change and internal instability caused a brief period of

decentralization (Cullen et al. 2000:382; McMahon 2012:666), during which Mesopotamia's city states went their separate ways (Collon 2005:36). Mesopotamia was eventually reunified under Ur-Nammu with the start of the Ur III Dynasty (Collon 2005:36). Sax et al. (1993:82) note changes in the size of cylinder seals over each of the three periods. They discovered that at the end of the Akkadian period, seal sizes were reduced, only to be slightly increased again during the Ur III period. Although size varied per medium, the most significant changes in size are noted during the Post-Akkadian period with no obvious relation to decoration or hardness of material. At this time, seals became long and thin rather than short and thick, which means that the volume of material was reduced without sacrificing any of the surface area. Sax et al. (1993:82) suggest that this may be indicative of a need to maximize raw materials. The reduction in size during the Post-Akkadian period can be attributed to the political upheaval and economic decline that occurred with the collapse of the Akkadian empire. The continued use of smaller seals during the Ur III period, at which time trade had been re-established and southern Mesopotamia was reunified under Ur-Nammu, occurred for less obvious reasons. The Ur III period was short-lived and its rulers were responsible for a lot of damage control after the Post-Akkadian period. They had to re-establish trade networks which would have taken some time. Thus, they would have needed to make this reduction in material until a steady flow of resources became available. Also, by using raw materials more efficiently they could build a stronger economy and hopefully reduce the risk of another empire collapse.

The changes in the types of materials used to make cylinder seals, as described above, is evidence for both the trade and political situations in Mesopotamia during the Akkadian, Post-Akkadian, and Ur III periods. Contact with northern Serpentine producers appears to have been cut off due to migrations of people and economic decline, while access to chlorite remained open. Evidence for re-working old material in the Post-Akkadian period reflects their limited access to resources (Sax et al. 1993:80-81, 89) and limited wealth. This was a period of political turmoil when trading networks were temporarily abandoned and there was no central rule. Studying the materials used for cylinder seals is important because, as demonstrated, it directly reflects the political and economic situations occurring in ancient Mesopotamia from the Akkadian through Ur III periods.

The hardness of the materials used to make cylinder seals also bears significance in the context of political upheaval. Chlorite and carbonates are softer than serpentine, greenstone, and lapis lazuli (see Table 1). The softer the material, the less valuable it was (Gorelick and Gwinnett 1990:45, 54). This shift to softer materials in the Post-Akkadian and Ur III periods indicates that cylinder seals were no longer as highly valued as they had been during the Akkadian period. Trade routes had shifted due to the collapse of the Akkadian empire and southern Mesopotamia's wealth had diminished as a result of this political upheaval. The decreased quality of artwork on seals at this time, as mentioned in the introduction, is further support of a shift in priorities. Therefore, cylinder seal size, material, and hardness all reflect political upheaval in Mesopotamia.

Political Support

Gorelick and Gwinnett (1990:45) discuss the cylinder seal as a "social emblem" which may be defined as: a "social contract," which is when a political entity enters a contract "regarding the relations of the members to each other and to the

Cylinder Seals: Mohs Values and Absence of Inscriptions

Material	Mohs	Akkadian		Post-Akkadian		Ur III	
		all	Not inscribed	all	Not inscribed	all	Not inscribed
Chert	7	1	0	0	0	0	0
Lydite	7?	1	0	0	0	0	0
Macroquartz	7						
Quartz		1	1	1	1	1	0
Rock crystal		5	4	0	0	1	0
Agate	6.5-7	1	0	0	0	0	0
Microquartz	6.5-7						
Jasper		4	1	1	0	0	0
Jadeite	6-7	1	1	0	0	0	0
Metadiorite	6-7?	1	1	0	0	0	0
Albite	6-6.5	1	0	0	0	0	0
Diorite	c. 6	2	0	0	0	0	0
Lapis lazuli	5.5-6	9	4	3	3	3	0
Serpentine	5-5.5	62	43	3	2	1	0
Greenstone	5-5.5	16	6	3	1	1	0
Hematite	3.5-6	2	1	1	0	6	2
Aragonite	3.5-4	1	1	0	0	0	0
Shell	c. 3.5	9	9	0	0	0	0
Coral	c. 3.5	0	0	0	0	0	0
Carbonates	3-3.5						
Marble		3	2	0	0	0	0
Dolomite		0	0	0	0	4	0
Limestone		4	3	2	2	2	0
Calcite		0	0	2	2	1	0
Alabaster		1	0	0	0	0	0
Goethite	3	0	0	0	0	1	1
Sandstone	3	1	0	0	0	0	0
Chlorite	2.5	3	0	5	3	5	3
Gypsum	2	0	0	0	0	0	0
Misc. rock	c. 2	0	0	0	0	0	0
Talc	1						
Steatite/soapstone		8	6	2	2	0	0
Unknown	---	13	5	11	5	7	3
Faience	---	0	0	0	0	0	0
Clay	---	0	0	1	0	0	0
Total		150	88	35	21	33	9
% without inscription			59%		60%		27%

Table 1: Cylinder Seals: Mohs Values and Absence of Inscriptions. Note: Mohs values from: Healy 1999:232; Mineralogical Society of America 2004-2015; Sax et al. 1993:Table 1; Stocks 2003:74; United States Department of Agriculture Soil Conservation Service 1980:75; University of Arizona 2011.

government"; or "emblem," which is a symbol of an individual's plan "to hold forth some moral or political instruction." Their theory works in two ways. The cylinder seal as used in economic transactions indicated that the owner of the seal had an obligation to follow through with the deal that was made. The cylinder seal as used for jewellery, particularly when depicting a presentation scene, represented the relationship between the seal owner and that individual's king or god. Therefore, cylinder seals are important factors in determining relationships of economic, political, and social natures.

Gorelick and Gwinnett (1990:46) propose that when a cylinder seal was worn it served as an individual's "pledge of allegiance" to both their

government and religion. In the context of earlier Sumerian society, which was plagued by conflict, they claim that the cylinder seal was a proponent of enforcing control and unification (Gorelick and Gwinnett 1990:46). This seems like an extreme role for such a small artefact to fill. However, through cylinder seals, images of the king would have been able to travel more extensively than statues or steles. This would have caused individuals in other cities to feel closer to their king, despite the physical distance. In turn, this would have helped to create a sense of nationalism, and thus unification, even throughout later periods.

Cylinder seals can also provide evidence for how the king was perceived by his people. An inscription on an Akkadian cylinder seal from Akkad translates as, "O Shargalisharri strong hero, King of Akkad: Lugalushumgal, governor of Lagash, is thy servant" (Collon 2005:125-126, Figure 537). Thus, a relationship—most likely political—between Shargalisharri and Lugalushumgal is established (Gorelick and Gwinnett 1990:45-47). By declaring himself Shargalisharri's servant, Lugalushumgal pledged his support for the king. This support would have been made public through use of the seal as jewellery or as a signature on official documents and transactions.

During the Post-Akkadian period there is a decline in the quality of craftsmanship (Collon 2005:35-39) which is a reflection of how individuals in society perceived their government. Figures are presented in as little detail as possible (Møller 1990:42). This implies that individuals were taking less pride in these seals—suggesting they were no longer valued as status symbols. The decreased size of cylinder seals during this period (Sax et al. 1993:82) indicates that they were used primarily for practical purposes. Because of the political uncertainty of the Post-Akkadian period, there would have been decreased political support which would mean fewer seals manufactured purely for the purpose of dedication or adornment. Despite this, some cylinder seals were dedicated to city-state rulers, like a green serpentine cylinder seal dedicated by the scribe Abba for Gudea of Lagash (Collon 2005:36-37, Figure 114). However, Post-Akkadian cylinder seals had ultimately shed their role as status symbols and vehicles of political support, retaining primarily their practicality.

Similarly to Lugalushumgal's Akkadian cylinder seal, an Ur III dolomite cylinder seal from the British Museum (Collon 1982:169-170, Plate LII, Figure 471; British Museum ca. 2000s,a:ME 116719) expresses support for the king through a temple dedication. The inscription reads: "From Meslamta-ea, his master; for the life of Shulgi, god of his country, king of Ur, king of the Four Parts." The inscription is incomplete and does not name the dedicator of the seal (Collon 1982:169-170). However, this cylinder seal is significant because, by being dedicated in a temple, it was a public declaration of support for Shulgi. It also describes Shulgi as a god—indicating a greater reverence for the king. This seal measures 10.6 cm high and 6.7 cm in diameter, which is quite large for a cylinder seal. Therefore, it was made solely for the purpose of dedication and not to serve any practical purpose. According to Sax et al. (1993:85), dolomite was a popular medium during the Ur III period, falling second to chlorite. It comes in a variety of colours and patterns suggesting that it came from a number of sources (Sax et al. 1993:85). It is a relatively soft material, which made it less valuable (Gorelick and Gwinnett 1990:45, 54). The accessibility and popularity of dolomite suggest that the individual who owned this seal was not particularly wealthy. Although wealth is difficult to measure based on one small factor alone, if the owner of this seal was indeed of a lower status, the dedication of a large seal which

required resources and craftsmanship to create further emphasizes this individual's support for the king.

Changes in the imagery of cylinder seals can also provide evidence of changing social structures. The appearance of deities on cylinder seals during the reign of Sargon (Kist 2003:5-6) is indicative of a growing interest in seeking divine favour during the Akkadian period. Depictions of interactions between individuals and deities is evidence for a developing need to associate oneself with a higher power. At the beginning of the Akkadian period, Naram-Sin took on divine characteristics in some images and inscriptions. For example, another seal of Lugalushumgal describes Naram-Sin as the "god of Akkad" (Collon 1987:125). Therefore, the king took on a more powerful role which demanded greater reverence from his people. His height on cylinder seals emulated his position of ultimate power. Worshippers are depicted, in these presentation scenes, approaching deities or divine kings in a show of respect. Through inscriptions, size, and imagery it becomes evident that cylinder seals were an important medium for political support.

Who do Cylinder Seals Represent?

Cylinder seals were considered so important that they were included among grave goods so they could continue to be used in the afterlife. Leonard Woolley's excavations of the cemetery at Ur produced over four hundred cylinder seals—thirty of which were attributed to the royal burials (Pittman 1998:75-76). According to Gorelick and Gwinnett (1990:53) cylinder seals were also recorded in the possession of cooks, innkeepers, shepherds, slaves and craftsmen. Usually low-status individuals had only one, while wealthy individuals had multiple of which many were inscribed (Gorelick and Gwinnett 1990:53). This is important evidence because it means that quantity and quality were indications of wealth. An individual who owned a multitude of seals was more important than an individual who possessed only one. An individual whose seals were inscribed, in addition to the usual artwork, was also of greater importance than an individual whose seals were not inscribed. These seals from Ur are extremely important, since most cylinder seals lack inscriptions and are of an unknown provenience meaning that archaeologists cannot determine whom they belonged to. These cylinder seals from Ur provide a much clearer perspective of who owned them.

Because the iconography would have reflected the ideologies of the ruling class, Gorelick and Gwinnett (1990:49) acknowledge that the common people may not have understood or appreciated the imagery used in art during the Sumerian and Akkadian periods like the priestly and elite classes would have. In fact, Collon (1990:46) explains that earlier seals did not always identify an owner—instead, they usually belonged to temple-run administrations. With an increase in secularity during the second half of the Early Dynastic period came an increase in the number of personal seals (Collon 1990:46). This is important, because it means that individuals in the Akkadian and following periods could express themselves and their personal beliefs more than ever before. This is evident in presentation scenes on cylinder seals where worshippers are led by personal gods or goddesses (known as Lama) to patron deities or deified kings (Collon 1990:46).

With this increasing individuality comes evidence for cylinder seals having belonged to individuals of the lower class. For example, the British Museum houses a greenstone seal which belonged to the servant of prince Bin-kali-sharri, son of Naram-Sin (Collon 1982:64-65, Plate XVI, Figure 116; British Museum ca. 2000s,b:ME 136842). It bears the popular contest scene with two bulls combatting two heroes (Collon 1982:64-65). Greenstone was a hard stone, and thus more

valuable (Gorelick and Gwinnett 1990:45, 54). Another example comes from a chair-bearer who dedicated his cylinder seal to Meslamtaea for the life of Shulgi (Collon 2005:133, Figure 567; British Museum ca. 2000s,c:ME 89131). Both of these men worked within the vicinity of their kings or someone connected to the king, which meant they had greater exposure to his political ideals than someone who lived in a further-removed village. Did seals belong to individuals who were not as closely associated with their king?

As discussed above, the cemetery at Ur offered examples of cylinder seals in the tombs of low and high status individuals. The majority of inscribed cylinder seals researched for this paper were owned by scribes or governors. Since, as previously mentioned, seals from individuals of lesser status are not often inscribed, it is impossible to say exactly who might have owned cylinder seals which lack inscriptions. There are seals from the Akkadian period with inscriptions indicating that they belonged to a singer (Collon 2005:152-153, Figure 672; British Museum ca. 2000s,d:BM 89096), a wet nurse (Collon 2005:148-149, Figure 642), and a married woman of unknown status (Collon 2005:34-35, Figure 110; Louvre AO 22011). From the Post-Akkadian period, inscribed seals belonged to a carpenter (Collon 2005:36-37, Figure 116; British Museum ca. 2000s,e:BM 89042), and physician (Collon 2005:147, Figure 638; Louvre MNB 1350). In the Ur III period, inscribed seals belonged to the shepherd of fat sheep (Collon 2005:169-170, Figure 797; Louvre AO 4359), a stone cutter (Collon 2005:133-134, Figure 566; British Museum ca. 2000s,f:BM 113871), and a courier (Collon 2005:106-107, Figure 458). According to the translations provided by Collon, the physician dedicated his cylinder seal to the vizier of the god of Shakkan (associated with childbirth), the shepherd to Ningizzida (a chthonic deity associated with "pastures and fields" (Stone 2013)) for the life of Shulgi, the stone cutter to the god Meslamtaea (also a chthonic god), and the courier to Shulgi, while the remainder listed only the name of the seal owner and sometimes familial relations. Only two of these individuals expressed support for the king, while the others pertained to more personal matters. Given this evidence, individuals of lower status were more likely to dedicate their cylinder seals to a god or individual of personal importance rather than the king. The two who did dedicate their cylinder seals to their king did so during the Ur III period. Mesopotamia had only just recovered from the decentralization of the Post-Akkadian period. Individuals would certainly have felt greater appreciation toward their kings who had reunified their region and re-established trade networks after emerging from a brief dark age.

A significant number of the cylinder seals which lack inscriptions could be attributed to individuals of the lower class, meaning that seals represent a greater percentage of the population than initially thought. The quality of the stone or material used may provide insight into whom these seals belonged to. The harder the material used to make cylinder seals, the more valuable. Given that those of a higher status were more likely to own inscribed cylinder seals made of a harder stone, it can be inferred that cylinder seals made from soft stone and lacking inscriptions belonged to those of a lower status. From the cylinder seals examined for this paper, 19% from the Akkadian period, 31% from the Post-Akkadian period and 40% from the Ur III period fall between a 1 and 3.5 on Mohs scale of hardness (see Table 1). During the Akkadian period, cylinder seals whose hardness falls between a 1 and 3.5 would have been the cheapest and thus most likely to be owned by individuals of a lower status. This range of hardness was chosen because serpentine and

greenstone (the most popular stones for Akkadian cylinder seals) fell between a 5 and 5.5 on Mohs scale. Stones that were significantly softer than these two materials were much less desirable and were not likely seen in the hands of the elite. Since most cylinder seals from the Post-Akkadian period were made from chlorite, which is relatively soft, it cannot be said with certainty whom these seals belonged to. The shift to a softer stone is attributable to the collapse of the Akkadian empire. The continued use of soft stone in the Ur III period is again, not entirely reflective of who owned them, but rather of southern Mesopotamia's economic situation.

The stone used for cylinder seals only seems to reflect ownership during the Akkadian period. Do inscriptions follow the same pattern? Sixty-nine percent of Akkadian, 82% of Post-Akkadian, and 31% of Ur III soft cylinder seals (made from stone falling between 1 and 3.5 on Mohs scale) lacked inscriptions (see Table 1). Therefore, 13.3% of Akkadian, 25.7% of Post-Akkadian and 12.1% of Ur III cylinder seals lacked inscriptions and were made of a soft stone suggesting that they belonged to low status individuals. The increased number of "low-status" seals during the Post-Akkadian period supports the theory that their value as status symbols was temporarily forgotten. It also reflects the decrease in wealth and trade in southern Mesopotamia following the collapse of the Akkadian empire. There is a drastic increase in the number of inscribed cylinder seals during the Ur III period, for both hard and soft stone. This counterbalances the fact that stone hardness does not appear to correlate with ownership to the extent it does in the Akkadian period, because names and professions are frequently listed. This could also represent an increase in literacy.

Conclusion: Are Cylinder Seals a Reliable Indication of Social and Political Structures?

One problem affecting the reliability of cylinder seals in indicating social and political structures is reuse. Cylinder seals were frequently reused, which presents a minor problem in terms of chronology. For example, Collon (2005:35) mentions Acemhöyük, Anatolia where an Akkadian seal was discovered in a later deposit. Similarly, in the tomb of a pharaoh from Egypt's Twenty-Second Dynasty, a lapis lazuli seal was discovered attached to a gold bracelet (Collon 2005:35, Figure 568). Whether these examples resulted from trade during the Akkadian through Ur III periods or at a later time is not clear. Seals were also re-inscribed and re-carved throughout different periods. For example, an Akkadian cylinder seal from Tell Suliemeh, Iraq was re-cut in the Ur III and old Babylonian periods (Collon 2005:120, Figure 520; Iraq Museum IM 83701). However, despite these problems, there are iconographic and stylistic differences between periods which can often help to determine the dates of the seals in question.

Also important to note, is that the data used to determine the above frequencies was limited to that which was available to me at the time of writing. There were more Akkadian cylinder seals available for analysis than Post-Akkadian and Ur III cylinder seals. I chose to analyse only those seals for which a photograph was available, so I could see the decoration and inscriptions for myself. Based on this preliminary research, an analysis of a broader assemblage of seals for each of these periods would provide an even better picture of the political, social, and economic situation in Mesopotamia during these three periods.

Based on the evidence used, cylinder seals are excellent indicators of political and social structures. They provide evidence for trade networks which is a reflection of a society's wealth and the stability of its government. Changes in material, size, and imagery were directly affected by political upheaval—evident in the sudden change in size, material, and quality seen following

the Akkadian empire's collapse. Cylinder seals also provide evidence of the degree to which individuals in Mesopotamian society supported their king and his ideals. Inscriptions indicate that seals were frequently dedicated to the king himself. The use of seals as jewellery or temple dedications was evidence of public support. Lastly, cylinder seals do, in fact, represent individuals of all statuses. However, more often than not, seals belonging to individuals of the lower class are dedicated to personal gods, list only the owner's name and possibly family members, or they are not inscribed at all. Therefore, they are not good indicators of how the common people perceived their king and his political ideals. The Akkadian, Post-Akkadian, and Ur III periods saw many new changes and innovations, despite the collapse of the Akkadian empire. Cylinder seals are, in effect, the window into southern Mesopotamia's soul.

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Highland and Coastal Cultural Interaction: New Evidence from the Ancient City of Huari, Ayacucho, Peru

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Early in the history of archaeological studies in the Ayacucho Valley of the Peruvian central highlands, archaeologists noticed the occurrence of design elements associated with the Nasca culture of the Peruvian south coast region. Such an occurrence has been interpreted as the Nasca influence. Archaeologists discussing the emergence of the Wari State in particular make frequent reference to the Nasca influence, arguing that following the south coast influence, the local ceramic style of the Ayacucho valley gained technological sophistication and resembled late Nasca ceramic shapes. In addition to innovations in ceramic technology, it has become apparent that following the Nasca influence the local cultural development in the Ayacucho Valley underwent significant transformation, including the shift from a rural to a predominantly urban life style. Recently, an archaeological excavation was carried out on a hilltop on the western side of the city of Huari which revealed evidence for a dense human occupation beginning about the middle of the Early Horizon (ca. 300 BCE – 50 CE), then continuing during the Early Intermediate Period (ca. 50 – 600 CE). However, shortly after interaction with the south coast was established, the hilltop was abandoned. This paper explores the nature of the interaction between the south coast and the central highlands and its role in the establishment of the city of Huari.

Introduction

In 1946 John Rowe, Donald Collier and Gordon Willey paid a brief visit to the partially unknown site of Huari, in the Ayacucho Valley of the Peruvian central highlands (Figure 1). In their report published in 1950, Rowe et al. (1950:122) wrote that they had "visited only the small corner of the huge site near the so-called La Capilla sector on the north side. The site is so large that it would take months to explore in its entirety and we were only there a little over an hour. As seen from the highway across the valley, the area covered by the ruins is at least two miles long from north to south and quite possibly it cover an equal distance from east to west."

Subsequent researchers who carried out archaeological studies at Huari have confirmed its large size (Bennett 1953; Lumbreras 1959, 1960; Menzel 1964:7; Isbell and Schreiber 1978; Isbell 1988:173; Schreiber 2001). Currently, most agree that Huari is one of the largest archaeological sites of western South America. More importantly, during the Middle Horizon (ca. 550 – 1100 C.E.) Huari was the most influential city of the entire Central Andes. Researchers argue that the establishment and growth of Huari

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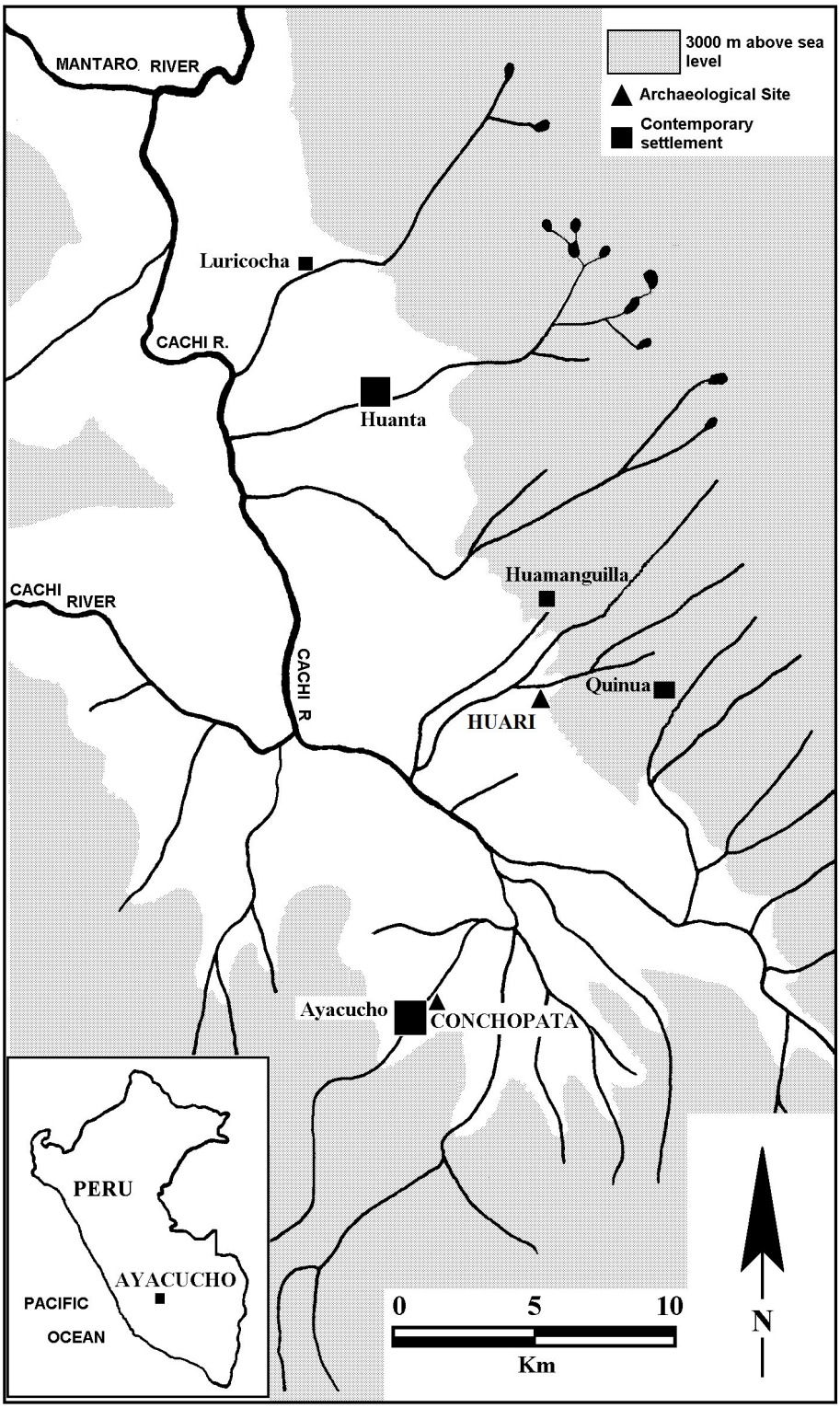

Figure 1: Location of the Middle Horizon site of Wari in relation to Conchopata in the Ayacucho Valley (drawing by L. M. Valdez).

paralleled the emergence of a new political authority named the Wari State. Scholarly research shows that early in its development the Wari State reorganized its hinterland, the Ayacucho Valley, and began one of the most ambitious and unprecedented projects the whole region had ever seen: the establishment of political and economic control over most of the Central Andes (Lumbreras 1980; Schreiber 1992). Most agree that during this period the site of Huari became the capital city of a pan-Andean state – the Wari State – that exercised political authority in the region several centuries before the rise of the Inka State.

The emergence of the Wari State was a turning point in the development of the indigenous cultures of the Central Andes. With some exceptions, notably on the coastal regions, prior to Wari settlements across the Central Andes were generally small and predominantly rural; with the establishment of Wari, there was a gradual shift toward urban life when many small and rural settlements were left vacant and replaced by fewer but larger settlements. In this process, we assert that the interaction between the inhabitants of the Ayacucho Valley and the south coast that emerged about the end of the Early Intermediate period (ca. 50 – 550 C.E.) played a key role. The focus of this discussion is to assess the nature of the interaction just noted. We also make an attempt to answer questions such as who was involved in the interaction with the south coast and how this interaction altered existing society in the Ayacucho Valley. To contextualize our discussion, first we present a brief overview of previous studies with regards to the Nasca influence in the Ayacucho Valley.

The Nasca Influence in the Ayacucho Valley

During the 1956 visit to the site of Wari, Rowe et al. (1950:127) made a small ceramic collection from the site's surface and produced the first ever ceramic classification of Huari ceramics. With this initial classification they distinguished three main ceramic groups: *Huari Series*, *Huarpa Black on White Series* and the *Huamanguilla Series*. The *Huari Series,* comprised of more than one ceramic style, was the most representative compared to the other two series; consequently, taking into consideration wall thickness, colour combinations and design motives, the *Huari Series* was sub-divided into smaller categories. One of these sub-groups was the *Huari Polychrome N* made up of "sherds which have definite and rather striking affinities to some of the more aberrant Nazca pieces which Gayton and Kroeber included in their Nazca Y class" (Rowe et al. 1950:128).[1]

Another ceramic sub-group was the *Huari Polychrome T* which exhibited similarities with Coast Tiahuanaco. Assessing these two sub-groups Rowe et al. (1950:133) observed that the similarities with Coast Tiahuanaco were stronger than with Nasca, where the latter was made up only by a small number of sherds and that the resemblances was weaker and involved "only a few of Gayton and Kroeber's Nazca Y 1-2 pieces." Nevertheless, assuming that Coastal Tiahuanaco was more recent than Nasca and the former was more likely contemporaneous with the *Huari Series*, they stressed that despite the Nasca style being earlier, its "influences were still being felt upon it even after the disappearance of the Nazca style" on the south coast (Rowe et al. 1950:133).

When the chronological sequence of the Ayacucho Valley was still a work in progress, Lumbreras (1959) made the first attempt to organize the various ceramic styles known until then for the region. In contrast to Bennett (1953), who felt that Huarpa Black on White ceramics were later than Wari ceramics, Lumbreras identified the Huarpa Black on White as a ceramic style that preceded in time the Wari ceramic style. Lumbreras (1959:78) was able to observe resemblances in vessel shapes between the Huarpa Black on White and other styles that, in his view,

were manufactured during the Early Horizon, thus suggesting an earlier chronological placement for Huarpa Black on White. It was at this point that Lumbreras (1959:78) noted that the first Nasca designs in the Ayacucho Valley appeared about the end of the Huarpa sequence and hence before the emergence of the Wari ceramic style (Lumbreras 1959:78-79). In this stylistic sequence, the Tiahuanaco influence previously noticed by Rowe et al. (1950), was posterior to the Nasca influence.

When discussing the origins of Huari, Lumbreras (1960:200) was very cautious, largely due to the fact that the available archaeological information was fragmentary. Instead, Lumbreras discussed the cultural relationships, including the interaction between the Ayacucho Valley and the Nasca of the south coast, that in his view were already evident at Huari. As Rowe et al. (1950) previously did, Lumbreras (1960:200) also pointed out that the Nasca influence in the region was manifested in the occurrence of vessels forms and decorative designs that resembled late Nasca shapes and decorative motifs; in addition, a set of colours also associated with the late Nasca style was present in the Ayacucho Valley. Lumbreras (1960:201) argued that the Nasca influence must have been due to the geographical proximity between the south coast and the Ayacucho Valley.

Following Lumbreras' (1959, 1960) discussion, Menzel (1964) produced the most complete classification of Middle Horizon Wari ceramics from both the central highlands and the coast. In agreement with previous researchers, Menzel (1964:3-4, 8) observed that the Nasca style influenced the Ayacucho Valley beginning at the end of the Early Intermediate period and continuing during the early phases of the Middle Horizon. Indeed, Menzel noted that the Chakipampa and Okros styles, both of early Wari times (Middle Horizon 1), exhibit strong Nasca influence. As other researchers argued previously, Menzel (1964:4, 9) also pointed out that the Nasca influence occurred during Nasca phases 7 and 8 (late Nasca).

Furthermore, Menzel (1964:66) asserted that "a local tradition of large urban settlements developed in this area in the latter part of the Early Intermediate Period, associated with pottery which reflects strong influences from Nasca." Thus, Menzel was one of the first to point out that the Nasca design elements had been incorporated into the Wari style and were part of the Ayacucho Valley influences in other regions of the Central Andes. At this point, Menzel (1964:67) wrote that "Nasca thus seems to have enjoyed a special privileged position in the new empire, sharing its prestige in the provinces, perhaps somewhat in the way in which Greece shared in the prestige of the Roman Empire."

From this overview, it is apparent that archaeological information gathered over the years has demonstrated that the Nasca influence in the Ayacucho Valley had a profound impact in the developments that occurred thereafter in the region. As will be discussed in more detail below, the interaction with the south coast did not result only in the technological sophistication of the Ayacucho Valley ceramics, but also accelerated the development of social complexity in the region. Indeed, as noted by Menzel (1964:66), following the interaction with the south coast, the local settlement pattern of the Ayacucho Valley witnessed a dramatic shift, when the previously rural oriented settlements were abandoned and replaced by fewer but larger settlements that are identified as urban centres (Lumbreras 2010:37).

In the remainder of this paper, it is our aim to further discuss the Nasca influence in the Ayacucho Valley. Our discussion is based on information recently gathered from Huaqanmarka, a small rural settlement that was

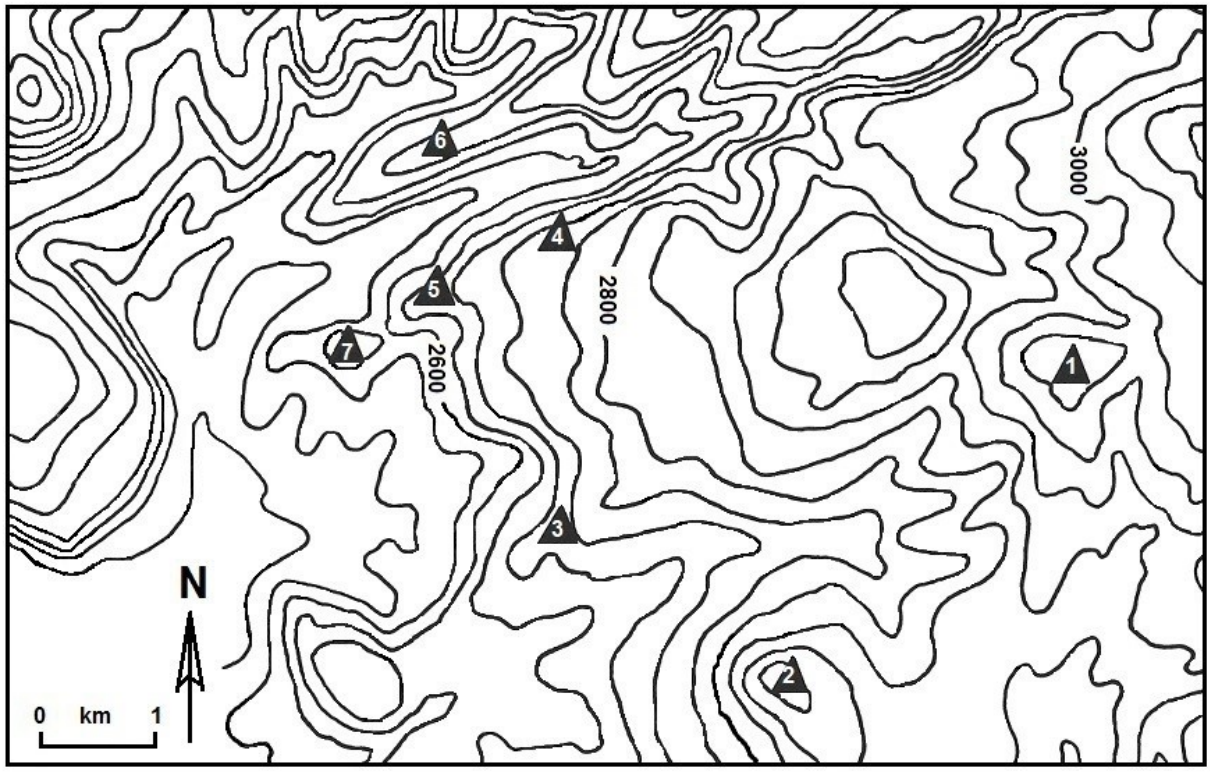

Figure 2: Location of Huarpa villages (1. Churukana, 2. Churo Orqo, 3. Vista Alegre, 4. Sullu Cruz, 5. West Huarpa Community, 6. Pacayqassa, 7. Huaqanmarka) in the area immediate to the site of Wari in the Ayacucho Valley (drawing by L. M. Valdez).

established in the area that was to become the periphery of the Huari urban centre.

Recent Archaeological Research at Huaqanmarka

Previous surface research of the area immediate to the great urban center of Huari demonstrated the presence of several small settlements (Figure 2) that, judging from surface ceramics, were occupied during the Early Intermediate period (Benavides 1976). These include the site of Churukana found on a hilltop east of Huari (Menzel 1964:5; Isbell 1997:190), Vista Alegre found about 4 km west of Churukana and south of the core area of Wari (Isbell 1997; Knobloch 2013), and Chupa Pata (also called West Huarpa community) located immediately to the west of the core area of Huari (Isbell 1997: Figure 6; Lumbreras 2010:22; Knobloch 2013). On the north edge of Huari, in the Sullu Cruz sector, Bennett (1953) excavated his pit 4 and uncovered Huarpa ceramics that indicate the presence of a pre -Middle Horizon occupation (Menzel 1964:7). In addition to these four Huarpa settlements, there were other sites that include the hilltop of Churo Orqo found south of Vista Alegre. Another Huarpa settlement also existed across the deep canyon to the north of the core area of Huari and east of the contemporary town of Pacaycasa.

One additional settlement found in the immediate periphery of Huari is Huaqanmarka located on a hilltop, only a short distance west of the core area of Huari and Chupa Pata (see Figure 2). Seen from its western side, the hilltop (Figure 3) is similar to Cerro Baúl, an important Wari center in the Moquegua Valley of southern Peru

Figure 3: The Huaqanmarka hilltop seen from its western side (Photo by L. M. Valdez).

(Williams 2001; Williams and Nash 2002; McEwan and Williams 2012). The Huaqanmarka hilltop is surrounded by cliff formations of vertical drop that make its plateau relatively inaccessible. At present, there is only a single narrow pathway reaching the top from its northern side. Considering that the place is of difficult access and without a reliable source of water, it is probable that its occupation implied overcoming significant challenges. Therefore, the possibility that the hilltop was selected for the purposes of security cannot be ruled out.

At present, the hilltop continues being exploited as agricultural land during the rainy season and as pasture land during the dry season. As a result of these activities, particularly of crop cultivation (and looting) that results in soil disturbance and the total or partial demolition of ancient walls, archaeological remains such as ceramics are found scattered all over the surface. Because soil deposition at the hilltop is shallow, the disturbances noted here have resulted in the mixture of the archaeological contexts.

Recently, research was carried out at the Huaqanmarka hilltop in order to elucidate the concerns outlined above; fieldwork consisted of a small scale archaeological excavation carried out at the south end of the hilltop. Information gathered with this first archaeological excavation indicates that prior to the Middle Horizon a sizable population existed at this location. The earliest occupation at the site is represented by a single relatively large sized and rectangular shape structure (Figure 4), with walls constructed of

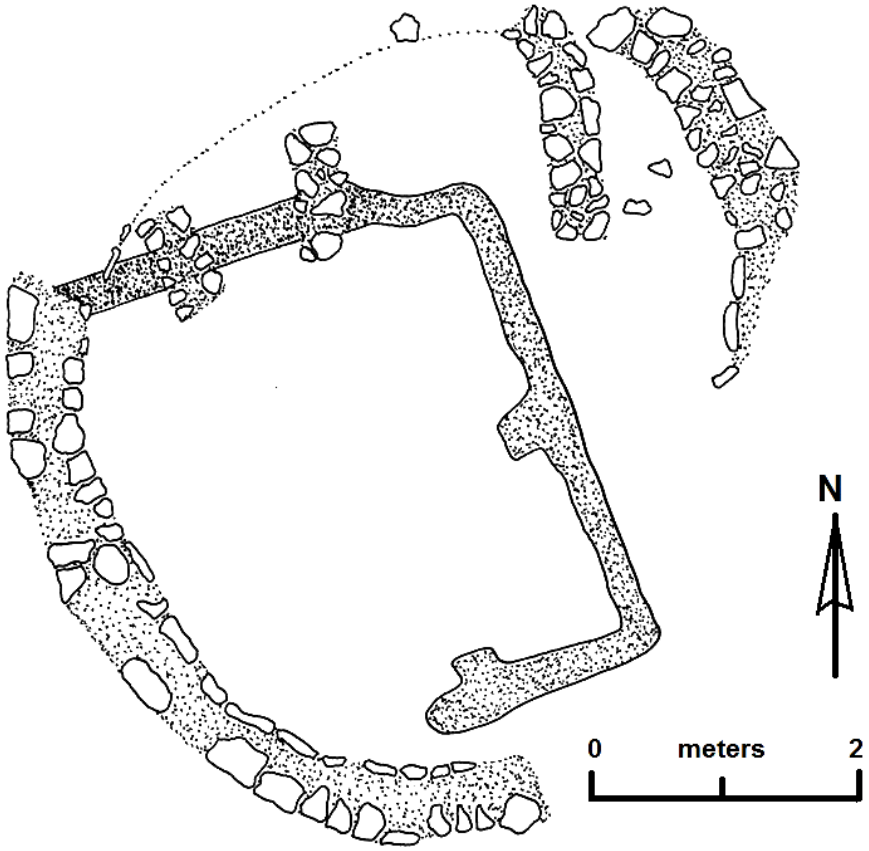

Figure 4: Earliest structure uncovered at Huaqanmarka (drawing by L. M. Valdez).

chunks of clay and stone, mortared with mud and established directly over a sterile formation. Later constructions were established immediately over the older building, unfortunately demolishing the structure as well as obscuring its cultural associations. On the basis of ceramics associated with the building, it appears that human occupation was heavy and there must have been several structures, which were destroyed as new buildings were erected.

Among the various archaeological remains present at the site, ceramic sherds are the most common artifacts. We must note that ceramics are very useful for the purposes of establishing the relative chronology of human occupation at the hilltop, particularly considering that no absolute dates exist yet. Sherds uncovered in association with the earliest structure consist of pieces that exhibit, on the one hand, rough, uneven surfaces with poorly prepared grey paste, where temper inclusions, such as white particles, are visible. Sherds of uneven surfaces mainly belong to large size vessels that include neck-less utilitarian *ollas* and narrow neck jars. On the other hand, there are very hard sherds of fine paste that exhibit better surface finishing, such as polish and paint. These sherds belong to dishes, such as plates, bowls and cups. A recurrent aspect of all the sherds is the abundant presence of small bright particles on their surfaces and white quartzite particles in the paste.

Vessel shapes, decorative motifs and the overall treatment of the sherds (Figure 5) indicate that they were produced about the mid and late Early Horizon (ca. 800 BCE). Stylistically, some of

Figure 5: Aya Orqo, Wichqana and Rancha ceramics found associated with the earliest structure (Photos by L. M. Valdez).

the sherds are identifiable, following Lumbreras' classification, as incised Aya Orqo (Lumbreras 1959: lámina VI R-T) and painted Aya Orqo (Lumbreras 1959: lámina VI N-O). In addition, other sherds are identifiable as Wichqana and Rancha (Lumbreras 1959:72-73; Pérez 2012). Their occurrence at the hilltop indicates that as early as mid Early Horizon this location was settled. The occurrence of a large volume of sherds of simple manufacture is noteworthy and indicative of the domestic orientation of the occupation. Further indicating the domestic nature of the early occupation, there are grinding equipment and spinning whorls. Most of these early vessel forms (Figure 6), in particular the jars, continued being made when new buildings were established later on.

Substantial human occupation at the hilltop occurred at the time new circular, stone walled buildings were established (Figure 7) thus replacing the previous structures. Unfortunately, contemporary farming activities have demolished most of the walls, in some instances even erasing their foundations. Despite these challenges, it was possible to determine three partially destroyed circular structures. The most recurrent ceramic styles found in association with the circular structures include the thick walled monochrome dark-red slip Kumun Senqa style and the thick walled with dense white unpolished surface named Huarpa Black on White style (Lumbreras 1974:136-137; Schreiber 1992:84) (Figure 8). These ceramic styles were manufactured during the Early Intermediate period (Menzel 1964; Lumbreras 1974, 1975; Valdez 1996, 1997).

Both of these ceramic styles noted here correspond to large sized, narrow neck, spherical body and conical base vessels (see Knobloch 2013). Due to their large size and their conical bases, it is possible that these vessels functioned to store grains. In both types, the surface of the vessels continues to be uneven, but smoothed, especially the exterior side, while the interior surface is smoothed only around the rim. Other small sized vessels, particularly the Huarpa Black on White, also occur. As noted, most of the domestic vessel forms associated with the early structure persist in association with the circular structures and continue showing little sophistication. In addition to ceramics, there are other artifacts, particularly grinding stones and spindle whorls that again indicate not only a

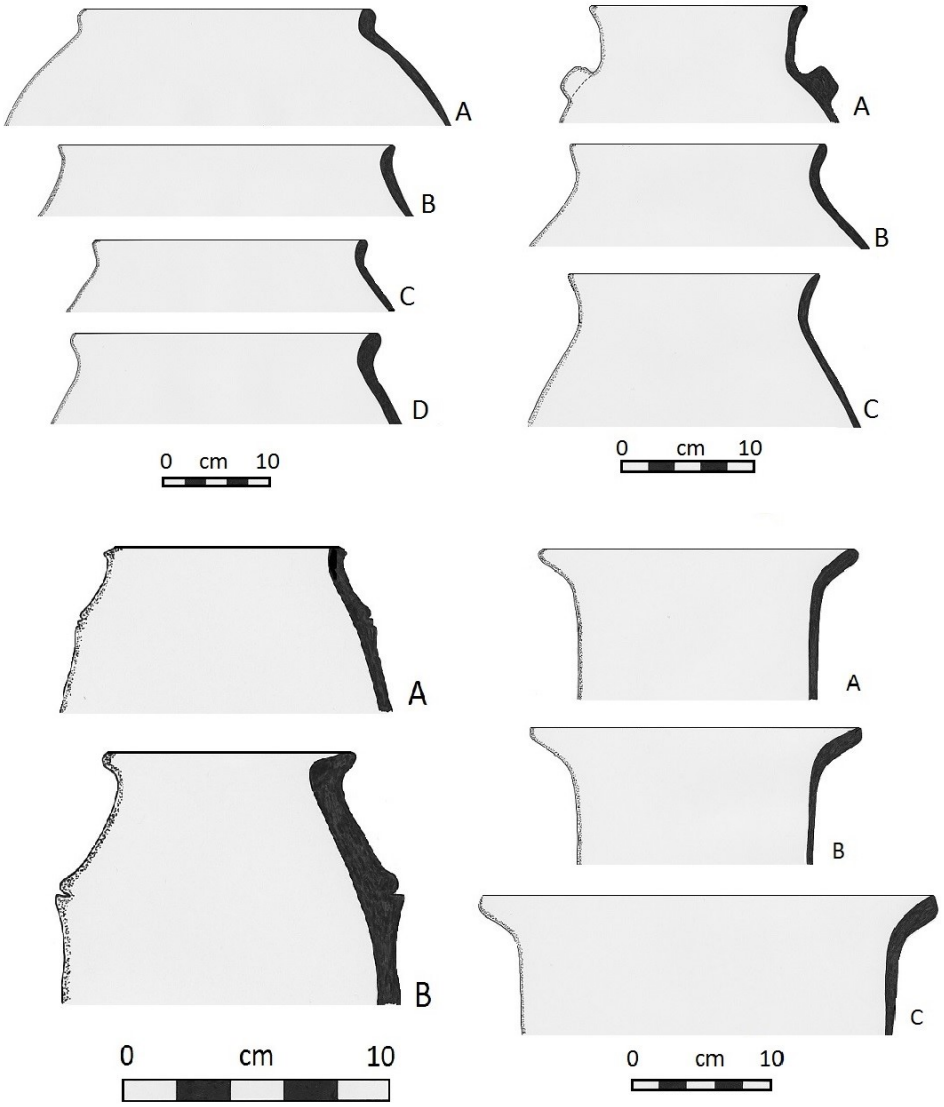

Figure 6: Vessel forms associated with the earliest structure found at Huaqanmarka (drawing by L. M. Valdez).

substantial human occupation, but also the domestic orientation of the human settlement at the hilltop.

Along with the above ceramic styles, there are other ceramic sherds also manufactured in the Huarpa Black on White style, but that exhibit a much more sophisticated surface treatment. The vessels are thin walled, with fine paste, and smooth surfaces that exhibit dense dark brown slip and white slip. These better finished vessels consist of tall drinking cups and deep bowls. The most interesting aspect of the vessels is that these are the first of the Ayacucho Valley ceramics to depict foreign design elements, in this case late Nasca designs (Figure 9). It must be noted that previously, some Nasca trade pieces had already arrived to the region and indicate that contact with the south coast had been established. The incorporation of south coast designs in the local ceramics of the Ayacucho Valley is indicative of a more intense interaction and acceptance of foreign concepts.

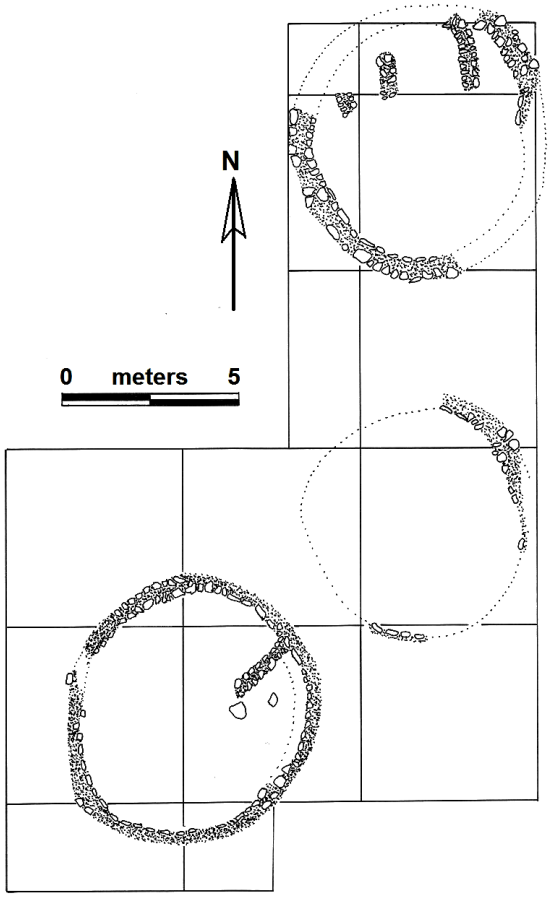

Figure 7: Vessel forms associated with the earliest structure found at Huaqanmarka (drawing by L. M. Valdez).

The late Nasca motifs depicted in the Ayacucho Valley include one that appears to be the stylized versions of Nasca bean pods (Proulx 2006:164), in addition to what Donald Proulx (2006:186) identifies as the 'flowering staff', also recognized as the "black line spirals attached to bars" (Menzel 1964:9; Bennett 1953:Plate 12; see also Knobloch 2012: Figure 93). Both of these decorative motifs appear on the south coast in Nasca phase 7 ceramics (Proulx 1994:95). In addition, the shape of these vessels (Figure 10) resembles late Nasca forms (Menzel 1964:7) and exhibit obvious technological sophistication (Lumbreras 1975:116; Knobloch 2012:125; Schreiber 2012:38), in some instances as if Nasca hands were involved in the manufacturing process. Future research may demonstrate that by late Huarpa and late Nasca times, peoples of these two regions had been moving, perhaps due to intermarriage. In such a context, the movement of knowledge as well as other cultural practices from one region to another would be expected.

Nasca pottery is widely recognized for its technological refinement, often used to argue that it must have been produced by full time specialists. However, Carmichael (1989) has shown the lack of conclusive archaeological evidence for the presence of full time Nasca potters, leaving open the possibility that the fine Nasca ceramics may have been produced at the household level and possibly by women. If this interpretation is correct, there is also the possibility that intermarriage between the inhabitants of the Ayacucho Valley and the south coast region allowed the spread of ceramic technology from the south coast to highland Ayacucho Valley. Hence, the technological sophistication of the Ayacucho Valley ceramics late during the Early Intermediate Period perhaps signals the presence of south coast women in the highlands, who carried their ceramic making knowledge to the Ayacucho Valley.

It is important to mention that most recent research on the valleys such as Palpa and Ingenio of the south coast of Peru indicate that late Nasca settlements decreased significantly in numbers and in size. It is suggested that these changes may be because a good number of the south coast population migrated elsewhere, perhaps to the Ayacucho Valley, in midst of a severe drought (Eitel and Mächtle 2009:27; Conlee 2014:245; Sossna 2014:184, 230-231). Interestingly, Lumbreras (1980:30) asserts that at the time the ceramics of the Ayacucho Valley gained technological sophistication, the population had also increased in the region. Was this as a result of immigration from the south coast? Thus, it is

Figure 8: Kumunsenqa and Huarpa Black on White ceramics associated with the circular buildings (Photos by L. M. Valdez).

Figure 9: Local ceramics from Huaqanmarka depicting late Nasca designs (Photos by L. M. Valdez).

tempting to argue that the changes observed in the Ayacucho Valley ceramics as well as the population increase perhaps were linked to south coast immigrants. By means of bioarchaeological and biochemical analysis, future researchers may be able to determine whether immigrants from the south coast had actually arrived to the Ayacucho Valley.

Another custom that appeared around this time in the Ayacucho Valley is the use of coca leaves. Recently, coca leaves have been found at the site of Convento, just north of the Ayacucho Valley (Valdez and Taboada 2013). The coca leaves, the first and earliest finding for the region, were uncovered in association with a ceramic vessel decorated in the Cruz Pata style that dates to the late Early Intermediate period and the early Middle Horizon. Coca leaves are unknown from early Nasca contexts (Piacenza 2002:9; Valdez 2009:264); however, it is noteworthy to mention that by late Nasca, Nasca artisans produced for the first time modeled effigy vessels with bulging cheeks (Silverman and Proulx 2002:55; Proulx 2006:174, Plate 37) that is indicative of coca chewing. Thus, it is possible that by late Nasca the inhabitants of the south coast already knew coca chewing, which following the interaction with the central highlands was introduced to the Ayacucho Valley.

Since there is not archaeological evidence for the use of coca leaves in the Ayacucho Valley prior to interaction with the south coast, the more likely scenario is that by late Nasca times coca leaves were already known on the south coast and subsequently were introduced to the highland valley of Ayacucho, perhaps by Nasca immigrants. The recently found coca leaves are morphologically thinner (lanceolate) and small, features that match the main characteristics of *E. novogranatense var. truxillense* (coca Trujillo), species adapted to the Pacific coast (Plowman 1979:113; Mortimer 1901:258; Towle 2007:60).

The archaeological excavation carried out at Huaqanmarka is still limited; nevertheless, it already provides needed information to discuss the developments that took in the region about the time Nasca influence occurred. This is particularly important considering that no other rural settlement from the immediate periphery of the Huari urban centre has been excavated. When comparative information becomes available, we will be in a better position to assess some of the observations put forward here. What has become apparent from this study is that the interaction with the south coast was not restricted to specific members (such as elites) of society; rather, available evidence indicates that residents of small settlements, such as Huaqanmarka, equally participated. Therefore, it appears that interaction resulted in the flow of ideas and knowledge in both directions and as part of that flow, late Nasca designs appeared in the Ayacucho Valley.

Settlement Relocation and the Emergence of Urban Life

At the time the interaction with the south coast appears to have been well established, the Huaqanmarka hilltop was abandoned. Corroborating this observation, the orange and white slipped Cruz Pata style as well as the distinctive orange slipped and fine Okros ceramic style (Lumbreras 1960:177; Knobloch 2012: Figure 94; Menzel 1964:17; Schreiber 1992:86), which according to Lumbreras (1974:138) are "closely related," are absent at the hilltop; such an absence indicates that human settlement at this location had come to an end.

Additional archaeological information coming from the area around the Wari urban centre indicates that other Huarpa settlements were also deserted about the same time. For instance, on the basis of surface ceramic collections from Churukana, Menzel (1964:5) observed an abundant occurrence of Huarpa

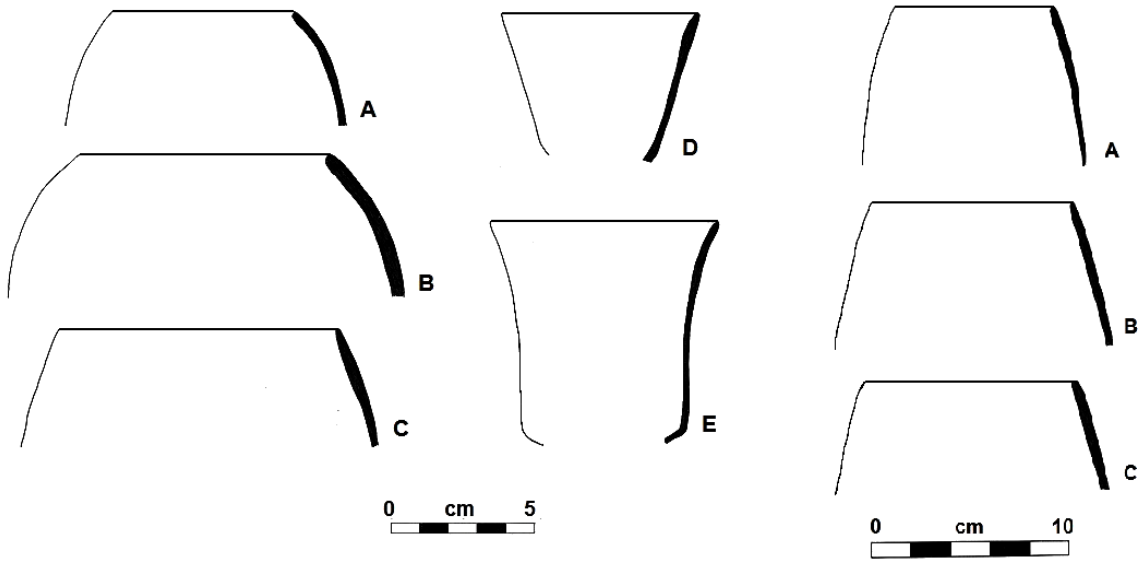

Figure 10: Vessel shapes from Huaqanmarka exhibiting late Nasca vessel forms (drawing by L. M. Valdez).

period ceramics and the rare presence of Middle Horizon ceramics, suggesting that the site was likely deserted. Test excavation conducted at the site further showed evidence for dense occupation during the Early Intermediate period (Isbell 1997:193). More recently, Lumbreras (2010:37) pointed out that the abandonment of Churukana intensified the occupation of Huari, implying that the site was left vacant.

Likewise, our recent inspection of Churo Orqo, a second Huarpa site found on the hilltop immediately south of Huari, reveals the presence of some Huarpa sherds, but no Middle Horizon pottery. In light of the information coming from Huaqanmarka, it is possible that Churo Orqo was also deserted around the same time as Churukana and Huaqanmarka. At Vista Alegre, a third Huarpa site found between the core area of Huari and Churu Orqo, there is an abundant surface occurrence of Huarpa ceramics (Isbell 1997:192; Knobloch 1991:248; Menzel 1964:5-7; Schreiber 2001:81), while Middle Horizon ceramics are less recurrent. Isbell (1997) suggests that Vista Alegre was depopulated, perhaps about the same time as the other Huarpa villages mentioned here. Therefore, current archaeological information strongly indicates that the growth of Huari is related to the desertion of several settlements from the area that became Wari's periphery.

In contrast to the apparent simultaneous abandonment of the above four Huarpa settlements, Chupa Pata never underwent a similar process. Instead, the settlement continued to grow; according to Isbell (1997:194), Huari developed over that foundation. Considering that Sullu Cruz and the West Huarpa community were only a short distance from each other, it is possible that the former also remained occupied and it is also possible that these Huarpa towns had joined, thus becoming a single settlement that gave origin to Huari.

The possible union of two previously separate Huarpa settlements probably created a power imbalance in the region; indeed, once joined, and perhaps under a single leadership, the new settlement probably was larger and likely more powerful than its neighbouring villages that in contrast remained small. Although tangible archaeological evidence to explain the conditions under which the local settlement pattern changed

is still fragmentary, it is already apparent that several Huarpa sites located in the area that was to become the city of Huari were abandoned about the same time. Parallel to such a drastic change in the local settlement patterns, Huari experienced rapid population growth, more than likely due to the arrival of new residents coming from the recently deserted towns, such as Huaqanmarka.

Therefore, available archaeological information suggests that settlements such as Huaqanmarka were abandoned when the residents of the previously separated villages clustered in a single location – the area where the urban centre of Huari is found. Whether settlement nucleation was done voluntarily or forcefully remains to be determined. Considering that several villages were left vacant about the same time, the possibility that relocation and subsequent nucleation in a single location was perhaps due to a threat coming from elsewhere in the valley cannot be ruled out.

Indeed, only about 25 km south from Huari, at Conchopata, seemingly a similar process to the one briefly discussed here also took place about the same time. Lumbreras (2010:37) asserts that several smaller Huarpa settlements that existed around Conchopata were abandoned as their inhabitants likely moved (or were relocated) towards Conchopata. Future research may provide similar evidence for other sections (north) of the Ayacucho Valley, but at present it is apparent that in two sections of the valley the residents aggregated themselves in two main centers about the same time, leaving deserted their former rural settings. Therefore, it appears that centers such as Huari and Conchopata emerged from such a nucleation and thereafter both played key roles in reshaping the settlement pattern of at least the southern half of the Ayacucho Valley early during the Middle Horizon.

Since nucleation into fewer but larger settlements took place late in the Early Intermediate period, it is also feasible that the competition between these two sections of the valley started before the Middle Horizon, but had become accentuated around the time the residents of the Ayacucho Valley began depicting late Nasca design elements. Although the necessary archaeological evidence is still lacking, it is plausible that the competition between these two sections of the valley resulted in fear and the imminent need for the establishment of defensive measures at both ends. One such defensive response appears to be the aggregation of the residents of the formerly small and dispersed Huarpa villages into fewer, but larger settlements such as Huari and Conchopata. In other words, these two settlements likely constitute the outcome of the possible tensions that existed between these two sections of the Ayacucho Valley. All the changes noted here occurred following the contact with the south coast.

Concluding Remarks

Recent research at Huaqanmarka revealed a dense and continuous human occupation at the hilltop, from about the middle Early Horizon until the end of the Early Intermediate Period. Judging from the material remains uncovered by the excavation, it is apparent that the human occupation at the hilltop was rural and domestic in nature, as the occurrence of a considerable number of plain ware vessels suggests.

During the Early Horizon, the inhabitants of the hilltop appear to have had little or no contact with peoples from other regions beyond the Ayacucho Valley. At present there is nothing that would indicate otherwise. This pattern continued during the Early Intermediate Period, when again a large number of vessels were plain wares. Ceramic technology had improved, since better finished vessels occur around this time. However,

it was not until the end of the period that the ceramic technology witnessed significant improvement. As previous researchers have pointed out, vessels were thin walled and exhibited better surface finishing. Furthermore, colours previously unknown in the region began to be used. Information coming from other Huarpa period settlements indicates that this occurred all over the Ayacucho Valley, suggesting that Ayacucho Valley settlements maintained close relationships.

From one Huarpa settlement to another ceramics occur homogeneously, indicating that Huarpa settlements co-existed in close contact and shared the basic skills of ceramic manufacturing. In the absence of specialized centers of pottery production, it appears that ceramics were produced at the household level and perhaps by women. As women married and moved to new households, more likely they carried their ceramic making knowledge, resulting in the establishment of stylistic homogeneity across the valley. Ethnographic research has shown that within small scale societies, ceramic production is in the hands of women (DeBoer 1990:90; Dietler and Herbich 1989:148; Stern 1989:450), and knowledge is passed from mother to daughter. Thus, as women married, they carried their ceramic making knowledge. If this assessment is correct, Huarpa may have been a patrilocal society.

In addition to the change in surface finishing and wall thickness just noted, late Early Intermediate Period ceramics from the Ayacucho Valley began depicting foreign design elements for the first time, in this case those from the south coast. As mentioned in the previous sections, this is recognized as the Nasca influence. At Huaqanmarka there are sherds exhibiting late Nasca designs and indicate that in the process of interaction with the south coast their inhabitants also participated. Whether the residents of Huaqanmarka walked all the way to the south coast and/or directly welcomed south coast residents to Huaqanmarka is difficult to determine. Nevertheless, the available evidence indicates that the residents of small settlements such as Huaqanmarka were at least aware about the contact established with peoples from distant lands and eventually produced or acquired vessels depicting foreign designs.

Interaction with distant lands, such as the south coast, likely brought new ideas to the Ayacucho Valley. One such concept appears to be conflict related and in particular the desire to obtain human body parts as trophies. Procuring human heads in particular has a long history on the south coast (Proulx 2001). For instance, Finucane (2008:82-83) interprets as trophies the body parts found at the site of Ñawimpukyo, a settlement found a short distance to the south of Conchopata. Likewise, Tung (2012:103) mentions the occurrence of skeletal trauma likely representing face-to-face combat at Conchopata that took place during the Huarpa period. If future archaeological research can demonstrate that violence in the Ayacucho Valley emerged following the interaction with the south coast, it can be argued that this was one of the concepts that the inhabitants of the Ayacucho Valley had learned from their south coast neighbors.

Perhaps, contact with distant lands enabled the emergence of individuals of prestige in the Ayacucho Valley, who in virtue of their links with other high rank leaders from elsewhere enhanced their status. It may be, as in the Burmese cases discussed by Leach (1990:222), that highland Ayacucho Valley high rank individuals raised their prestige by marrying lowland south coast elite women. Although archaeologically difficult to demonstrate, this may be the manner by which prestigious leaders emerged in the Ayacucho Valley, who likely competed to gain more followers, and thus

became rivals. Although archaeological information remains limited, it is becoming apparent that violence in the Ayacucho Valley during the late Early Intermediate Period was on the rise, which may be linked to the presence of high rank competing individuals.

What is evident from this discussion is that following the interaction with the south coast, the small rural Huarpa settlements, such as Huaqanmarka, were left deserted. As discussed in the previous sections, there is evidence indicating that a considerable number of Huarpa settlements were left vacant about the same time. As the small rural settlements were abandoned, a few other Huarpa towns not only continued being occupied, but also began to grow. One such settlement was Huari itself, the other being Conchopata. What appears to have occurred around this time in the Ayacucho Valley is site nucleation. Following Flannery and Marcus (2012:472), it can be argued that violence that emerged about the end of the Early Intermediate Period pushed the residents of the former rural small settlements out of their villages to move elsewhere, into places with larger populations and therefore more defensible political units. Thus, interaction brought profound change to the Ayacucho Valley. Ultimately, it appears that at the core of site nucleation and the eventual emergence of cities such as Huari itself, there was the need for security. In this process, existing leaders of the towns that welcomed the new arrivals likely increased their prestige, establishing their authority over the immigrants. Thus, the origins of state authority may also ultimately lie within this critical period of site nucleation that culminated in the emergence of cities.

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NOTE

[1] Huari (with **H**) refers to the ancient city and Wari (with **W**) refers to the pre-Inka Wari State. Likewise, we write Nasca (with **S**) to the ancient Early Intermediate period culture of the south coast; however, when citing we maintain the original spelling such as Nazca.

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Markets

Mayan Words for ‘Market’ and Related Concepts

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Recent discussion in archaeological circles has concerned evidence for markets in precolumbian Mayan communities and how markets might be detected in the archeological record. There is general agreement that in Mayan societies, markets are not associated with particular structures. Here, evidence is drawn from comparative studies of Mayan languages and their terms for 'market' and related concepts. Proto-Mayan lexical reconstructions attest cultural concepts from as early as 2200 B.C., including a term for 'market/plaza'. Branch-wise reconstructions represent later stages of development, and throughout, Mayan languages consistently merge terms for 'market' and 'plaza', supporting the notion of absence of market structures. Putative hieroglyphic naming of market structures cannot be confirmed. On the other hand, patterns of borrowing market terms within Mayan, into Mayan from Mixe-Zoquean languages, and from Mayan to Xinca, evidence precolumbian contact and intercultural influence in commercial activities.

In recent years, there has been some discussion in archaeological circles about the possibilities of identifying certain remains as evidence of market activity in early Mayan societies (e.g., Hirth and Pillsbury 2013). There is general agreement that in Mayan societies, among others, markets are not associated with particular structures. My purpose in this paper is to examine Mayan concepts of 'market' by looking at the terms for 'market' and related concepts in the linguistic data, leaning heavily on Kaufman's (2003) *Preliminary Etymological Mayan Dictionary*, the most extensive compilation of Mayan vocabulary accessible. I will review the words for 'market' and related concepts as they are reported from Mayan languages in general, and as they can be reconstructed to various stages of Mayan development (Figure 1, Table 1), as well as instances of borrowed words, and terms for 'market' as they might appear in Classic period hieroglyphic inscriptions. The linguistic data support the archaeological view that prehistoric

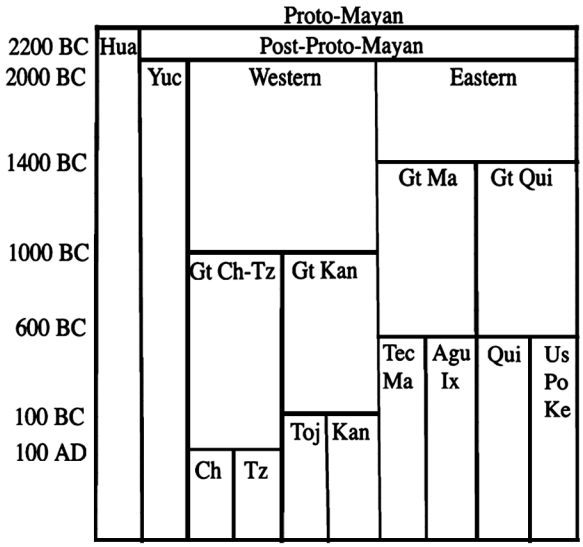

Figure 1: Major stages of diversification of the Mayan family of languages. Approximate dating from glottochronology (Kaufman 1978); chart adapted from Josserand (2011:Figure 6.3). Abbreviations: Hua, Huastecan; Yuc, Yucatecan; Gt Ch-Tz, Greater Cholan-Tzeltalan; Gt Kan, Greater Kanjobalan; Gt Ma, Greater Mamean; Gt Qui, Greater Quichean; Ch, Cholan; Tz, Tzeltalan; Toj, Tojolabalan (= Chujean); Kan, Kanjobalan; Tec, Tectiteco; Ma, Mam; Agu, Aguacatec; Ix, Ixil; Qui, Quiché; Us, Uspantec; Po, Poqom; Ke, Kekchí.

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The Mayan Family of Languages with Traditional and Revised Language Names

Yucatecan (Rama Yukateka)	
Maya	Yukateko
Lacandón	Lakandon (Lakantun)
Mopán	Mopan
Itzá	Itza' (Itzaj)

Huastecan (Rama Wasteka)	
Huastec	Wasteko (Teenek)
Chicomuceltec	Chikomuselteko, (Teko, Kabil)

Western Mayan (Maya Occidental)	
Greater Cholan-Tzeltalan (Rama Tzeltal Mayor)	
Cholan (Grupo Ch'ol)	
Chontal	Chontal (Yokot'an)
Chol	Ch'ol
Chortí	Ch'orti'
Tzeltalan (Grupo Tzeltal)	
Tzeltal	Tzeltal
Tzotzil	Tzotzil
Greater Kanjobalan (Rama Q'anjob'al Mayor)	
Tojolabalan (Grupo Chuj)	
Tojolabal	Tojolab'al
Chuj	Chuj
Kanjobalan (Grupo Q'anjob'al)	
Jacaltec	Jakalteko (Popti')
Acatec	Akateko
Kanjobal	Q'anjob'al
Tuzanteco	Mochu'
Motocintleco, Mochó	Mocho'

Eastern Mayan (Maya Oriental)	
Greater Mamean (Rama Mam)	
Tectitec-Mam (Grupo Mam)	
Tectitec	Tektiteko
Mam	Mam
Aguacatec-Ixil (Grupo Ixil)	
Aguacatec	Awakateko
Ixil	Ixil
Greater Quichean	
Quichean Proper (Rama K'iche' Mayor)	
Kekchí	Q'eqchi'
Uspantec	Uspanteko
(Grupo K'iche')	
Sipacapan	Sipakapense
Sacapultec	Sakapulteko
Achí	Achi
Quiché	K'iche'
Cakchiquel	Kaqchikel
Tzutujil	Tz'utujil
Poqom (Grupo Poqom)	
Poqomam	Poqomam
Poqomchí	Poqomchi'

Table 1: The Mayan Family of Languages with Traditional and Revised Language Names. Language grouping and revised language names from England and Elliott (1990:xv, xviii) and (right column, in parentheses) Kaufman (2003:38-43).

Reflexes of *man, *loq' 'buy' and *k'aay-i, *kon 'sell'.

	Western vs. Eastern Forms:	W buy	E buy	W sell	E sell
Huastecan					
Huastec	Wasteko (Teenek)	–	–	–	tx'a7
Chicomuceltec	Chikomuselteko (Teko)	–	–	–	k'ay-
Yucatecan					
Maya	Yukateko	man	–	kon	–
Mopán	Mopan	–	–	kon	–
Itzaj	Itza'	man	–	kon	–
Western Mayan					
Greater Cholan-Tzeltalan					
Chontal	Chontal	man	–	–	–
Chol	Ch'ol	man	–	chon	–
Chortí	Ch'orti'	man	–	chon	–
Tzeltal	Tzeltal	man	–	chon	–
Tzotzil	Tzotzil	man	–	chon	–
Greater Kanjobalan					
Tojolabal	Tojolab'al	man	–	chon	–
Chuj	Chuj	man	–	chonh	–
Jacaltec	Jakalteko (Popti')	–	loq'	txonh	–
Acatec	Akateko	man	–	xon	–
Kanjobal	Q'anjob'al	man	–	txon	–
Tuzantec	Tusanteko	man	–	chonh	–
Mochó	Mochu', Mocho'	man	–	chonh	–
Eastern Mayan					
Greater Mamean					
Tectitec	Tektiteko	–	loq'	–	k'aay-
Mam	Mam	–	loq'	–	k'aay-
Aguacatec	Awakateko	–	loq'	–	k'aay
Ixil	Ixil	–	loq'	–	k'ay-
Greater Quichean					
Kekchí	Q'eqchi'	–	loq'	–	k'ay-
Uspantec	Uspanteko	–	loq'	–	k'ay-
Sipacapan	Sipakapense	–	loq'	–	k'y-
Sacapultec	Sakapulteko	–	laq'	–	k'ay-
Quiché	K'iche'	–	loq'	–	k'aay-
Cakchiquel	Kaqchikel	–	loq'	–	k'ay-
Tzutujil	Tz'utujil	–	loq'	–	k'ay-
Poqomam	Poqomam	–	loq'	–	k'ay-
Poqomchí	Poqomchi'	–	loq'	–	–

*Table 2: Reflexes of *man, *loq' 'buy' and *k'aay-i, *kon 'sell'. Language data adapted from Kaufman (2003:792-3, 795, 797-8).*

market activity took place in open plazas and not in buildings.

Terms for 'Buy'

Many words for 'market' in Mayan languages are derived from the verbs 'to buy' and 'to sell', and mean simply 'buying place', or 'selling place'. In general, such terms are different in the Western Mayan languages (Cholan, Tzeltalan, and Kanjobalan)[1] and the Eastern languages (Mamean and Quichean). For instance, terms for 'to buy' (Table 2) generally contrast between these two major branches of Mayan. As in this case Yucatecan Mayan often patterns with Western Mayan, a grouping Kaufman refers to as "Western Mayan + Lowland," a product of the diffusion of culture and language in precolumbian times. The Eastern Mayan term *loq', which occurs in all branches of Eastern Mayan, has apparently been borrowed by Western Mayan Jacaltec (Jakalteko, Popti'), a language whose territory is adjacent to Eastern Mayan Mamean languages. From these distributions, the terms reconstruct with confidence only to post-proto-Mayan stages of Western and Eastern, respectively, ca. 2000 B.C.

Reflexes of Proto-Mayan *k'aay(i) 'buy, sell'

Huastec (Teenek, Wastek)	tx'a7-iy	'to buy (it)'
Yucatec Maya	k'aay	'sale'
Mam	ma t-k'aay-i	'he sold it'
Quiché (K'iche')	xu-k'aay-iij	'he sold it'
Cakchiquel (Kaqchikel)	xu-k'ay-ij	'he sold it'
Poqom	xu-k'ay-ij	'he sold it'
Kekchí (Q'eqchi')	x-k'ay-i	'he sold it'

*Table 3: Reflexes of Proto-Mayan *k'aay(i) 'buy, sell' (Kaufman 2003:792).*

Eastern Mayan Terms for 'Market, Plaza'

Mam	k'ay-b'il	'plaza'
	k'a7y-b'il	'plaza'
	k'a7-b'il	'market'
Quiché (K'iche')	k'ay-b'al	'plaza, market'
	k'ay-i-b'al	'plaza, market'
Cakchiquel (Kaqchikel)	k'ay-i-b'al	'plaza, market'
Poqom	k'aay-b'al	'plaza, market'
Kekchí (Q'eqchi')	k'ay-i-b'ahl	'plaza, market'

*Table 4: Eastern Mayan Terms for 'Market, Plaza' Derived From Proto-Mayan *k'aay(i) 'Buy, Sell' (Kaufman 2003:793-794).*

Yucatecan Mayan sometimes agrees with Eastern. When a term occurs in more than one branch of the family, it can usually be reconstructed to an early stage of the language family's development. If a term occurs in Huastecan as well as one of the other branches, it probably occurred in proto-Mayan, the ancestral language that began to diversify around 2200 B.C. Around that time the ancestors of the Huastecans became separated from the rest of the family, and soon thereafter, around 2000 B.C., the family further diversified into the Northern or Yucatecan branch, the Western branch, and the Eastern branch, the latter being languages of Highland Guatemala.

Terms for 'Sell'

One early Mayan term was *k'aay(i), which means 'to sell' in Maya of Yucatán (Yukateko) and Eastern Mayan, but 'buy' in Huastecan (Table 2). This suggests the term had a broader meaning in proto-Mayan, perhaps 'exchange' in general, regardless of the direction of the exchange. In Huastecan, Yucatecan and Eastern Mayan (Table 3), the similarity in terms is obvious. The roots of

Lowland and Western Mayan Reflexes of Proto-Mayan *konh 'to sell (something)'

Yucatec Maya	kon	'to sell (it)'
Cholan	chon	'to sell (it)'
Tzeltalan	chon	'to sell (it)'
Chuj	chonh	'to sell (it)'
Mochó (Mocho')	chonh	'sale'
Kanjobal	txon < Ch'olan	'to sell (it)'
Jacaltec (Popti')	txonh < Ch'olan	'to sell (it)'
Acatec (Akateko)	txon < Ch'olan	'he sold it'

*Table 5: Lowland and Western Mayan Reflexes of Proto-Mayan *konh 'to sell (something)' (Kaufman 2003:795-796).*

these words display regular correspondences throughout their forms, and a reconstruction to the stage of proto-Mayan is strongly supported.

In the Eastern Mayan languages (Table 4), the terms for 'market' are derived from this verb. Note that in most languages the derived terms mean both 'market' and 'plaza'. This pattern will be observed throughout Mayan.

In the Western Mayan languages and Yucatecan (Table 5), the corresponding term for 'sell' is a development of Proto-Mayan *konh. This term also reconstructs to an early stage of Mayan, perhaps slightly later than the stage of *k'aay(i), which is attested in Huastecan as well

Eastern Mayan Terms for 'Market, Plaza'

Itzá (Itzaj)	kon-ol	'market'
Mopán (Mopan)	kon-ol	'market'
Chuj	chonh-ab'	'town'
Kanjobal (Q'anjob'al)	kon-ob'	'town'
Jacaltec (Popti')	konh-ob'	'town'
Acatec (Akateko)	kon-ob'	'town'

*Table 6: Lowland and Western Mayan Nouns Derived from Proto-Mayan *konh 'to Sell (Something)' (Kaufman 2003:796).*

as Yucatecan and Eastern Mayan. As in Table 3, the regular correspondences between the words are obvious. Some of the languages of the Cuchumatán Mountains (Kanjobalan and Mamean) have borrowed this verb from Cholan. Such borrowing usually reflects significant cultural influence.

The verb *konh gives rise to several derivative forms (Table 6). One is 'market', another is 'town'. In the languages of the Cuchumatán Highlands of northwestern Guatemala, there is a second word derived from the same root, one that also means 'plaza' or 'market' (Table 7). In Chuj, one derivative of *konh provides the native name of San Mateo Ixtatán, *ko chonhab'*, literally 'our selling place/

Greater Kanjobalan Terms for 'Market' from Proto-Mayan *konh 'to sell (something)

Kanjobal (Q'anjob'al)	txonb'al < Ch'olan	'plaza, market'
Acatec (Akateko)	txonb'al < Ch'olan	'plaza, market'
Jacaltec (Popti')	txonhb'al < pre-Ch'olan	'plaza, market'
Mochó (Mocho')	chonhb'al < pre-Ch'olan	'market'
Tuzantec (Tuzanteko)	chonhb'al	'plaza, market'
Chuj	chonhlab'	'plaza, market'
Chortí (Ch'orti')	chojnib'	'plaza, market'

*Table 7: Greater Kanjobalan Terms for 'Market' from Proto-Mayan *konh 'to sell (something') (Kaufman 2003:796).*

Greater Quichean Terms for 'Commerce' and Their Apparent Origin in Mixe-Zoquean

	Greater Quichean *yak:	
Quiché (K'iche')	x-yak-anik	'comerció (bought/sold)'
Tzutujil (Tz'utujil)	x-yak-oni	'comerció (bought/sold)'
Poqomam	x-yak-ana	'comerció (bought/sold)'
Pokomchí (Poqomchi')	x-yak-wik	'comerció (bought/sold)'
	Proto-Mixe-Zoquean (Wichmann 1995:515): *yak 'to give'	

Table 8: Greater Quichean Terms for 'Commerce' and Their Apparent Origin in Mixe-Zoquean (Kaufman 2003:794).

our town', while another derivative, *chonhlab'*, is the term for 'market'. 'Market' and 'plaza' are the same in most languages. Note that Chortí, a Cholan language, also has such a derived term, and that many of the Kanjobalan terms have been borrowed from (pre-)Cholan (items beginning with *ch* or *tx* as opposed to native *k*).

A Loanword from Mixe-Zoquean

There is a term of limited distribution that is probably a loanword from Pacific coastal Mixe-Zoquean (Mije-Sokean) languages (Table 8). The term occurs only in languages that lie along the Mayan-Mixe-Zoquean border, now or in the past. The varying forms of the term are typical of borrowed words, although Kaufman (2003:794) does not note this. He reconstructs the term to Greater Quichean (K'iche'an). The term is common to all of Quichean, suggesting that the term was borrowed by at least 600 B.C., before Quichean diversified into independent languages. The term is absent from Mamean languages, suggesting that it was not present before 1400 B.C., when the language ancestral to both Mamean and Quichean had not yet diversified. This dating of 1400-600 B.C. is consistent with archaeological evidence of contact between coastal Mixe-Zoquean and adjacent highland Mayan (Josserand 2011). That the term was borrowed into Poqom (and appears in both branches) reinforces the hypothesis that the population of Kaminaljuyú included a component of early Poqom Mayan (Mora-Marín 2005).

A Unique Term for 'Market'

One important term for 'market' that is not derived from 'buy' or 'sell' has a limited distribution, but that distribution suggests the term was part of the early Mayan vocabulary (Table 9). It has not been attested in Huastecan, so it cannot be reconstructed to proto-Mayan itself with total confidence, but its occurrence in the other three branches suggests it might have been a proto-Mayan term. The term is *k'iwik, and like the other 'market' terms, it also means 'plaza'. This term was borrowed by non-Mayan Xinca as *k(')iiwi(k)*, with the sense of 'patio', i.e., an open space like a plaza (Kaufman 2001:7). This might suggest that the early Mayan meaning

Terms for 'Market' Derived from *k'iwik 'Market, Plaza'

Yucatec Maya	k'iwik	'market, plaza'
Tzotzil	ch'iwit	'market, plaza'
Tzeltal	ch'iwich	'market, plaza'
Mam	k'wik	'market, plaza'
Xinca	k(')iiwi(k)	'patio'

*Table 9: Terms for 'Market' Derived from *k'iwik 'Market, Plaza' (Kaufman 2003:799).*

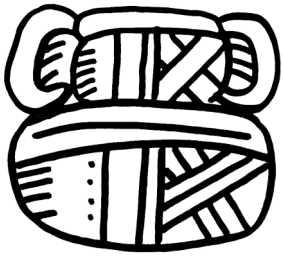

Figure 2: Martin's "mystery glyph" as it appears on Cancuén Panel 1. Redrawn from Martin 2012:Figure 46.

Figure 3: The hieroglyph from K633 that might be the title 'he of the market'. Redrawn from Tokovinine and Beliaev 2013:Figure 7.1, original drawing by Alexandre Tokovinine.

of the term was primarilly 'plaza', and that it acquired the meaning 'market' as plazas became the locus of economic exchange. In the central plaza of Mérida, Yucatán, there is a bilingual sign that identifies the location in English and Maya. The text in English refers to the "Main Square of Merida," the Plaza Central. The text in Maya labels the location "*u k'iiwikil u kaajil jo'*," or 'the *k'iwik* of the town of Mérida'. The downtown market of Mérida is several blocks away; here, the term clearly refers to the plaza.

The occurrence of reflexes of *k'iwik in three branches of Mayan, alongside the terms derived from 'buy' and 'sell', suggests that this was an early Mayan term that has generally been replaced by later innovations, and which survives only in scattered, peripheral, locations. The alternative explanation of a term common to these branches – diffusion – does not seem to be a likely explanation, given the great distances between the attesting languages.

Hieroglyphic Evidence

Recently, the claim has been made that the term for 'market' has been attested in the Chiik Nahb market murals of Calakmul. These magnificent murals depict people in market-related activities, and label many of the people depicted with their occupational titles, such as the "atole vendor." While the murals have not been published to any great degree, scholars with access to the data have deciphered many of these occupational titles. The major work so far is that of Simon Martin (2012). After discussing a number of terms, Martin ends by noting that what he calls a "mystery glyph" occurs in many contexts in the murals, on the inset moulding between the depictions of market activity. He speculates that this mystery glyph may be the name of a market structure, or as he refers to it, a market temple. The clearest example of this glyph X in the Calakmul murals occurs in the title of a female, "Lady X Nine-stone." Martin presents four other instances of the glyph, from sources as varied as the Dresden Codex and the inscriptions of Cancuén, Yaxchilán, and Piedras Negras (Figure 2, Table 10). Three of the instances are personal titles (a, d, and e). Two suggest the term refers to an object or location (b, c).

From these contexts, Martin concludes that the "mystery glyph" could refer to a structure, and he suggests a market temple. Examples (a) and (d) suggest X is something that could be "owned" in the Mayan sense of having some authority over a place or profession, i.e., "master of X" or "lord of X." Examples (b) and (c) suggest that X is something that can be made or brought to completion, and someplace that Chaak could sit (parallel sections of the Dresden refer to Chaak as sitting in a road, in a cave, or in a mountain).

Hieroglyphic Phrases Containing Martin's "Mystery Glyph," Perhaps 'Market Temple'

a. Calakmul Murals:	**ix X 9-tun**	'Lady X Nine-stone' (a personal name or title)
b. Dresden Codex:	**ta X**	'at X' (a place where the deity Chaak is sitting)
c. Cancuén Panel:	**patwan X**	'was completed X' (an architectural feature)
d. Yaxchilán Stela 19	**aj 1-X**	'Lord 1-X' (a personal name or title)
e. Piedras Negras Panel	**aj 1 X**	'Lord 1-X' (a personal name or title)

Table 10: Hieroglyphic Phrases Containing Martin's "Mystery Glyph," Perhaps 'Market Temple' (Martin 2012:Figure 46).

In a footnote, Martin (2012:80) notes that in a pre-publication review, Steve Houston suggested the mystery term might be one of the market terms, *ch'iwik, k'iwik, chojnib',* or *kojnib'*. Since there are absolutely no phonetic clues in the hieroglyphic collocation, Martin adds that the term may just as well be one of the other terms attested in Mayan languages, such as *konol, chonlab',* or *manb'al*.

A more phonetically rendered term that might mean 'market' is attested in a hieroglyphic inscription on an unprovenienced ceramic vessel (Kerr 633, see Reents-Budet 1994:fig. 2.31), written **a-k'i-wi/ni-ki**, putative *aj k'iwik*, a personal name or title like those cited in Chart 8 (Figure 3). However, Tokovinine and Beliaev (2013:171) argue that the glyph transcribed **wi/ni** is more likely **ni** than **wi**, given its similarity to other **ni** glyphs on the same vessel, and that the proper transcription of the phrase is *aj k'inik*.

Conclusions

There is no convincing evidence that epigraphers have found a term for 'market' in the hieroglyphic corpus. A conservative reading of the ceramic inscription does not include a term for 'market'; in any case this is an unprovenienced vessel and context is totally lacking. The Calakmul glyph may be the name of the specific location of the market scenes, but Mayan terms for 'market' never refer to a structure, always to an open plaza. Mayan "markets" are not structures, they are places where one buys and sells, and all that is required is a large open space. Evidence of market activity should be sought in open plazas, where it has in fact been found at some sites (Masson and Freidel 2013:210-212).

A second set of conclusions that can be drawn from the data concerns intergroup relations. Mixe-Zoquean languages were influential along the southern fringe of the Guatemalan Highlands in the Preclassic period, ca. 1400-600 B.C., and loaned terms for 'market' to adjacent Mayan languages. Cholan languages had a similar influence along the northern fringe of the Highlands, the Cuchumatán Mountains, beginning as early as the Proto-Classic period, ca. 100 B.C.-100 A.D.; (pre-)Cholan loaned terms for 'sell' and 'market' to other Mayan languages there. At some stage Mayan also loaned a term for 'market/plaza' to Xinca.

NOTE

[1] In 1987, the Guatemalan government, in consultation with the Academia de las Lenguas Mayas de Guatemala and other indigenous organizations, issued Acuerdo Gubernativo Número 1046-87, establishing new orthographic standards for the indigenous languages, including the spelling of their names, some of which are distinct from traditional usage. Mesoamerican scholars in general have extended these norms to other languages and their names. I have chosen to retain the traditional names, but give the

innovative names in parentheses. The new spellings are generally adopted from England and Elliott 1990:xv, except that later revisions have also been noted (e.g., for Huastec, Teenek in addition to their Wasteko; for Itzá, Itzaj in addition to their Itza', for Jacaltec, Popti' for their Jakalteko). For the native language of Yucatán, I use Maya (Yucatec Maya, Maya of Yucatán). Names and spellings in quoted material are retained as in the original. Language names used in the main text are as follows (innovations in parentheses): Acatec (Akateko), Cakchiquel (Kaqchikel), Chortí (Ch'orti'), Chuj, Huastec (Wasteko, Teenek), Itzá (Itza', Itzaj), Jacaltec (Jakalteko, Popti'), Kanjobal (Q'anjob'al), Kekchí (Q'eqchi'), Mam, Maya (Yukateko), Mochó (Mocho'), Mopán (Mopan), Poqomam, Poqomchí (Poqomchi'), Quiché (K'iche'), Tuzantec (Tuzanteko), Tzeltal, Tzotzil, Tzutujil (Tz'utujil), Xinca (Xinka). Proto-language and language group names also retain the traditional spellings: Cholan (Ch'olan), Huastecan (Wastekan), Mamean, Mixe-Zoquean (Mije-Sokean), Poqom (Poqomam and Poqomchí), Quichean (K'iche'an), Tzeltalan, Yucatecan (Yukatekan).

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The Distributional Approach and Imperfect Data Sets: An Examination of Market Exchange at Ugarit

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The distributional approach is a materially based framework for the analysis of object mobility and exchange through an examination of the distribution of objects throughout consumption units. The hypothesis of this approach is that independent provisioning will lead to a proportionate homogeneity of household assemblages across different social-economic stations, for—in a market context—individuals have access to goods independent of social ranking, and are restricted only by purchasing power. Under these assumptions, a decentralized market-based economic system at Ugarit would be reflected in the permeation of a variety of imported goods throughout all contexts of the site, a wider distribution pattern than expected by linear systems such as reciprocity or redistribution. This paper tests the efficacy of this methodology when applied to a site of lengthy excavation history and imperfect data—exploring whether this materially based framework can inform upon the nature of internal economic activity at Ugarit.

During the Late Bronze Age the Eastern Mediterranean was linked through an extensive trade network that enabled the movement of luxury goods and commodities between distant polities. This system incorporated large political centers, as well as strategically located smaller entities that subsisted and thrived through the management of exchange and the facilitation of the movement of goods. These smaller polities operated in the liminal space between larger states and empires, forcing them to navigate within the shifting political landscape in which they were economically engaged. In order to understand the way in which these locations engaged with the larger network, it is necessary to profile the social and economic modalities of these exchange communities and identify the active interest groups. In the case of the Late Bronze Age, of particular interest and debate is the potential involvement of extra-palatial agents in privatized production or non-centralized forums of exchange. Central to these issues is the question of whether open marketplaces were operating outside royal jurisdiction, providing independent access to imports and luxury goods. The paper explores the current methods and models employed in the analysis of distribution systems, particularly market exchange. The Late Bronze Age port kingdom of Ugarit will be employed as a test case, with the economic structure of the site profiled through an examination of small finds using a model known as the distributional approach. This analysis seeks to test the efficacy of the distributional approach method when applied to a site of lengthy excavation history—exploring whether this

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materially based framework can provide information about the nature of internal structures and economic activity at Ugarit.

Approaches to Studying Markets

Considerable time and literature has been devoted to the degree of centralization for power and authority in historic economic and political systems (Chase-Dunn and Hall 1991; D'Altroy and Earle 1985; Parkinson and Galaty 2010; Stein 1999; Wallerstein 1974; Weber 1978). Of this, a significant conversation has centered on the ability to discuss and characterize past institutions with contemporary concepts and terminology (Dalton 1968; Finley 1953, 1973; Granovetter 1985; North 1977, 1990; Polanyi 1944, 1957). In moving past this epistemological narrative, interest has focused on the systemic nature of object movement and the institutions which governed and facilitated distribution. Inquiries now seek to elucidate the mechanisms which moved goods across the macro landscapes and to identify the parties underwriting major ventures and the channels through which mobilized goods were dispersed. Interest has therefore increased in attempting to identify potential examples of marketing activity and marketplace exchange within the ancient world as a potential tool for the dispersal of subsistence or luxury goods (Dahlin et al. 2007; Garraty and Stark 2010; Hirth 1998, 2010; Hodges 1988; Minc 2006, 2009; Plattner 1985; Smith 2004).

Market activity or market exchange refers to economic transactions that reflect the powers of supply and demand, for which prices or values are established (Garraty and Feinman 2010:171). These transactions need not transpire within a physical marketplace to qualify as market exchange. Traditional archaeological approaches to studying market activity have generally focused on the marketplace itself. The first of which, the *configurational approach*, seeks to identify marketing activity by locating the spatial and architectural features associated with market exchange (Hirth 1998:453). Supplementing the analysis of physical structures and open plazas, a recent and promising avenue of study is the identification of marketplaces through the analysis of chemical signatures, particularly phosphate concentrations, in soil (Anderson et al. 2012; Dahlin 2009; Hutson et al. 2009). The value of this approach is clear for cultures with established marketing and permanent loci of exchange, such as a classical agora or a mesoamerican plaza. However, the focus on built environment is less fruitful when applied to smaller scale or less durably constructed periodic marketplaces, as not all marketing installations will leave strong archaeological signatures.

A second archaeological method to assess marketing activity is the *contextual approach*, which extrapolates the presence of marketplace exchange from the scale of urbanism, as well as the existence of cultural features that would require the provisioning and distributive utilities of a market to subside (Hirth 1998:453; Stanish 2010). There is a perceived threshold at which point communities exceed in size and complexity the redistributive capabilities of a centralized administration. Marketplaces are therefore imbedded institutionally within larger socio-political structures, and are frequently understood as a byproduct of urban growth (Hirth 1998:453). Although logical in its theoretical approach, the contextual method relies exclusively on circumstantial versus material evidence for marketplace identification.

A final traditional method for studying marketplaces is the *spatial approach*. This method deduces the existence of marketing mechanisms for circulating goods based on the distribution pattern of material across the

landscape—the assumption being that the efficiency of market systems will increase both the volume and distance that products travel relative to other organizational mechanisms (Hirth 1998:454). This type of 'fall-off analysis' is well known from Colin Renfrew's early application (Renfrew 1975), and it has gained extensive use by archaeologists who study trade—particularly long distance exchange. The hypothesized effect of market activity on distribution reach does not satisfactorily reduce the problem of equifinality, as the pattern of distribution fall-off for central-place redistribution and central-place marketing are very similar.[2] While each of these approaches can directly or indirectly infer upon the existence of marketplaces within a culture, most effectively when employed in combination (Dahlin et al. 2007; Garraty 2009; Minc 2006, 2009), the role of market exchange as a subsistence strategy on the micro-scale may be more effectively considered through an examination of its provisioning function. A promising methodology with these explicit aims is the *distributional approach*.

The *distributional approach* is an archaeologically based framework for the analysis of material distribution and marketplace exchange applied successfully by Kenneth Hirth to the site of Xochicalco in pre-Hispanic Mexico (Hirth 1998). This model supplements traditional study on the location, form and spatial configuration of the physical marketplace by instead examining the distribution of objects throughout consumption units (Hirth 1998:451). The primary unit of analysis is the household, which is understood to actively provision itself through both its own production and through the procurement of diversified products through the exchange of surplus. A spatial assumption on which this model is grounded is that more efficient forms of exchange, like that undertaken in a market, will result in a wider distribution than linear systems such as reciprocity or redistribution (similar to the aforementioned spatial approach [Hirth 1998:454]); this is due to the adherence of redistribution to social and political networks, by which they are unable to generate widespread distribution on the same scale as the marketplace. The economic activity of elite groups centers on the production of staple goods in large quantities, potentially maximizing on primitive economies of scale.

The predicted result of this approach is that the independent provisioning of households will lead to relative homogeneity of material assemblages across households of different social ranking (Hirth 1998:456). This differs from redistributive systems in which different social stations have differential access to luxury or imported materials. In a market context then, individuals are only restricted by purchasing power. While disposable income may be the greatest determining factor in determining access to imports, many scholars insist that exchange remains a socially imbedded activity with implicit access restrictions (Schloen 2001:64). While priority access may exist, scholars who have successfully applied Hirth's model suggest a modified form in which markets allow for a variety of commodities to be available to all kinds of people, but do not necessarily have a homogenizing effect on elite and non-elite inventories (Smith 1999:530). Instead object categories are mapped across domestic units to assess the presence of marketing mechanisms (Ossa 2013:418).

In the case of pre-Hispanic Mexico, Hirth's hypothesis was supported by his data, in which luxury and non-luxury products (specifically obsidian tools and domestic and imported pottery) were proportionally distributed throughout households, forming standardized components of the total material assemblage.

Subsequent studies by Payson Sheets (2000), Christopher Garraty (2009), and Jaime Aprile (2013) in Mexico and Greece have further demonstrated the possibilities offered by this approach. A derivative of the distributional approach used by Christopher Garraty (2009) to study the Middle Post Classic in the Mexican Gulf lowlands suggests that the incorporation of statistical diversity measures as analytical tools (in addition to uniformity as argued by Hirth) expands the operational utility of the distributional approach. Results may be further strengthened when mapped in conjunction with goods manufacturing data, including the locations of specialized production centers (Garraty and Stark 2010).

There are, however, important methodological considerations in extending the distributional approach's application to other sites—in particular, whether this framework is capable of analyzing sites of lengthy excavation history and variable data recording practices (Hirth 2010:240-241). The data control and resolution at Xochicalco far exceeds that of most archaeological projects—both in its consistency and robustness. This is due to the site's rapid abandonment and lack of reoccupation following its destruction, as well as the scrupulous work and consistent recording of the archaeologists. These conditions enabled the use of statistical calculations on the proportions of different components of the assemblage in order to demonstrate homogeneity across contexts. Since these conditions are atypical for archaeological sites (particularly early excavation projects), the goal here is to test whether enough can be said from the limited data available—particularly if operating under the assertion that the presence of a number of luxury and import goods in both elite and non-elite contexts can suggest market forces without necessitating homogeneous patterning across socio-economic divides.

Case Study

For this case study I have chosen the site of Ugarit on the eastern coast of the Mediterranean. As a large site with a lengthy and varied excavation history, Ugarit is an apposite example of the opportunities and limitations provided by data sets typical of large Mediterranean excavation projects. For instance, there are no published total ceramic counts against which arguments of homogeneous proportionality can be made (many of the early reports limit published finds to *materiel représentatif*).[3] Equally problematic, the recorded measurements of small artifacts from early excavation years include a margin of error in elevation of approximately 0.5 m, since levels were measured in relation to the excavation surface without accounting for topographical variation. Ugarit does however benefit from an abundant textual corpus against which conclusions on production and exchange activity can be compared.

Two primary hypotheses will be tested. The first hypothesis asserts that decentralized market activity will be reflected in the permeation of imported goods throughout all contexts of the site. Hypothesis two argues that independent provisioning will lead to similar material assemblages across households of different social status, with quantity and subtype variation as a function of purchasing power. This second hypothesis is the condition under particular focus, as it is the restrictiveness of the homogeneity condition that other proponents of the distributional approach have suggested should be relaxed.

The Kingdom of Ugarit on the Mediterranean coast of modern Syria formed a prominent node within the exchange network of the Late Bronze Age (Figure 1). The capital of Ugarit is located roughly one kilometer from the coast (and its port site of Minet el-Beida) at the modern site of Ras Shamra in the Northern Levant. The site was first

Figure 1: Map of the Eastern Mediterranean.

discovered in 1929 and has seen nearly continuous excavations since that time by French and Syrian teams (currently directed by Valérie Matoïan and Jamal Haydar). In addition to impressive archaeological remains, Ugarit has contributed a substantial corpus of documents including economic records, literary and religious texts, and personal and diplomatic letters.[4] These documents provide a highly significant compliment to the excavated material, and have formed the crux of many analyses of the site and its culture (Astour 1972; Heltzer 1978, 1982, 1999; McGeough 2007; Schloen 2001).

The site of Ugarit has been inhabited since the eighth millennium B.C.E., with the best known occupation being the final level, Level I, dating to the 14th to the 12th centuries B.C.E. This period began with Ugarit subject to Hurrian influence before the Hittite King Suppiluliuma defeated the Mitanni in 1350 B.C.E., at which time Ugarit was subsumed within the Hittite sphere of influence. The site was then destroyed and largely abandoned at the end of the Late Bronze Age, as part of the wave of destruction that occurred throughout the eastern Mediterranean. The tell is divided into four quadrants with the Palace and Royal Zone in the west, and an Acropolis dominated by a temple precinct in the northeast (Figure 2). These public areas were surrounded by urban residential blocks, within which domestic craft production facilities were interspersed.

Ugarit's intermediary role as a nexus of trade is attested archaeologically through the proliferation of imported goods. Previous studies of the Ugaritic economy differ as to the degree of centralization of production, the scale of extra-palatial participants' integration, and the existence of a marketplace operating outside royal jurisdiction, providing independent access to imports and luxury goods (Linder 1981; McGeough 2007; Rainey 1962, 1963; Sauvage 2006, 2012; Schloen 2001). Yet the practical constraints and logistical inefficiency of the state provisioning households with quotidian goods are substantial—and in the case of Ugarit, is a system that is not supported by the evidence. The large textual corpus yielded a dearth of administrative and economic documents (McGeough 2007:180), suggesting that the palace did not directly administer the organization of production. This absence of documented control similarly evinced by the archaeological record, as no large-scale storage or redistributive facilities have been identified (Minet el-Beida has been proposed as an alternative storage location [Sauvage 2006]). Instead the texts support the inclusion of extra-palatial producers who were active in the creation of tradable surplus goods (McGeough 2007:182). At Ugarit, this included wine, olives, oil and textiles, which were manufactured at the household and insula level.

While the textual material reflects private ownership and entrepreneurship in production, it is less clear what mechanisms facilitated household provisioning and the exchange of goods (there is no textual reference to a marketplace at Ugarit [McGeough 2007:218]). Imports at the site are plentiful and inclusive of essentially all traded goods from the Mediterranean in this period. By far the most common of these were Mycenaean and Cypriot ceramics, which were found in exceptional numbers (for example, nearly one quarter of all Mycenaean ceramics found in Syro-Palestine were at Ugarit).[5] Although no comprehensive ceramic counts are available, the excavators note the extensive distribution of Mycenaean and Cypriot ceramics through all contexts of the site (Van Wijngaarden 2002:43; Yon et al. 2000:68),[6] suggesting generalized access to this material throughout Ugarit (McGeough 2007:302). The extra-palatial accessibility of these imported goods is demonstrated by the high number of

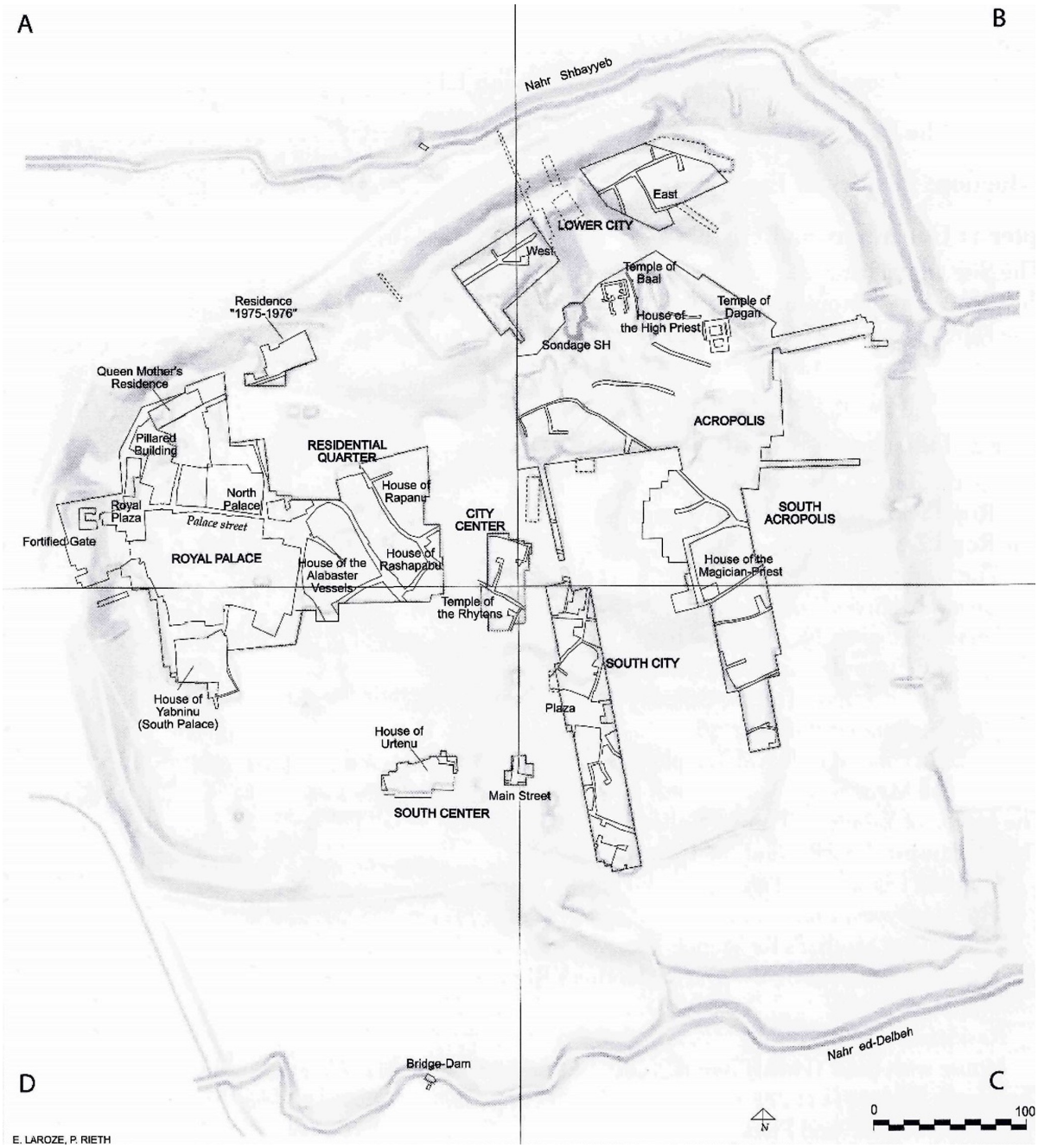

Figure 2: Plan of Ras Shamra-Ougarit (Mission archéologique syro-française de Ras Shamra - Ougarit). Reprinted with permission.

pieces recovered from outside of the royal palace (roughly three-quarters of the Mycenaean assemblage [Yon et al. 2000:68]).[7] There are, however, slight differences in the ceramic repertoire of elite or institutional inventories—namely the inclusion of painted kraters and a group of rhyta. Distribution patterns within domestic and institutional areas also differed, with tomb contexts

more common for non-elite goods. Based on the ceramic material, it appears that these imports were available to all socio-economic stations, while elite patrons were given privileged access to certain shapes.

The first category of material to be considered in this paper is ivory objects.[8] The finds from the site represent nearly the complete corpus of standard types traded throughout the Late Bronze Age Mediterranean. The artifacts recovered from the domestic quarters of the Ville Sud and Centre de la Ville were predominantly objects of personal ornamentation including buttons, hairpins, and combs. Spindle whorls and other utilitarian objects were also common and were often found in highly concentrated clusters (such as Houses E and F in the Centre de la Ville), suggesting potential loci of production activities. A number of higher value objects such as a pyxis, furniture plaques, and duck-shaped boxes were recovered from the Centre de la Ville, but were restricted to Fosse 1237 and the associated Sanctuary of Rhytons. As visible on the plan (Figure 3), these objects were distributed throughout the residential quadrants, and displayed little quantitative clustering.

Similar results were obtained in the analysis of the distribution of Egyptian stone vessels.[9] The patterning reflected on the area plans (Figure 4) is similar, although less intensive, than that produced by the ivory objects. Like Mycenaean ceramics, around one-quarter of those recovered from Ras Shamra itself were located in the palace and its immediate periphery (100 of 341 samples). In a pattern also recognized for Mycenaean ceramics, the Egyptian vessels from residential quarters were distributed roughly equally between domestic and funerary contexts (however, this may be the result of context corruption by which funerary goods were displaced into adjacent domestic contexts [McGeough 2007:301-302]). Finally, the stone vessels also exhibit variable distribution patterns within subtypes, as those incised with Egyptian hieroglyphs were found exclusively in the palace and the home of a central palace administrator. The clustering of higher value sub-types in elite contexts is a similar consumption pattern to that of both ivories and Mycenaean imports.

The third material group included in this examination is the large corpus of weights. More than 600 have been recovered from Ras Shamra and Minet el-Beida, which represent four main weight-value systems—that of the Hittites, Mesopotamia, Karkemish, and Ugarit; limited examples potentially based on Aegean measures were also found (Mederos and Lamberg-Karlovsky 2004: 203). In addition to the presence of different systems of measures, the weights also vary significantly in their style or shape and material of manufacture. Although there appears to be an absence of weights recorded in the publication of houses D, E, F, and G in the Centre de la Ville, this may be due to the limited reporting of small finds from these contexts (Schloen 2001:329). Weights were also discovered in buildings in the southern portion of this excavation area in the vicinity of the Sanctuary of Rhytons. The high quantity of weights uncovered in the Centre de la Ville and the Ville Sud supports the hypothesized integration of commercial domains and artisanal workshops throughout domestic districts (Callot 1994).[10] Again, the plans (Figure 5) depict a pattern consistent with those above for ivories and stone vessels. What does appear different is that there is little variation in the distribution of weights of different measurement systems, sizes, shapes, or materials. Their extensive dispersal, and the associated economic function of the weights themselves, are strongly indicative of marketing activity and the integration of extra-palatial residents within the Ugaritic economy.

For all three categories of objects examined

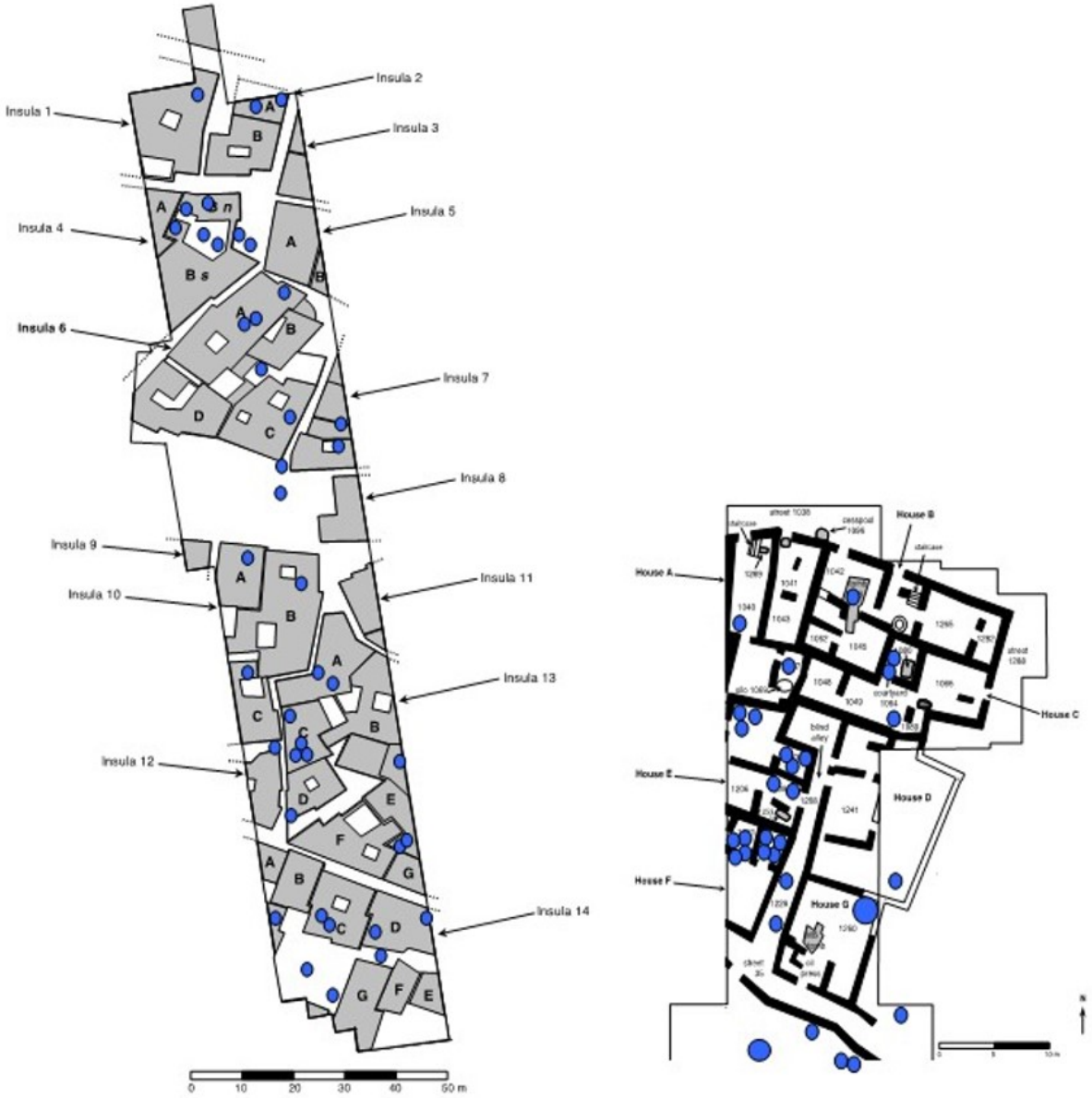

Figure 3: Distribution of ivory objects in the Ville Sud and Centre de la Ville (architectural plans adapted from Schloen 2001, Fig. 20 and 22).

above, similar patterns of wide-reaching artifact distribution were observed. Differences observed in the distributions may be a function of overall quantity present for each material category at the site. The broad dispersal patterns suggest that object type was openly accessible to the inhabitants of the different residential quarters. In the distributional approach as proposed by Hirth, household quantities should also vary in relation to their wealth or purchasing power. To assess the relationship between access and status here, a slight modification to the model has been adopted in order to facilitate comparative household analysis. In Hirth's study, elite and non-elite households were divided based on structure size, architectural features, and the totality of their assemblages (Hirth 1998:460). Since the Ugarit data as published impedes housing status

Figure 4: Distribution of stone vessels in the Ville Sud and Centre de la Ville (architectural plans adapted from Schloen 2001, Fig. 20 and 22).

classification based on complete assemblages, estimates are instead calculated based exclusively on housing size.[11] This in itself problematic, as not all domestic structures have been excavated in their entirety, nor is housing size alone an adequate indicator of wealth or status. Internal arrangements within the insula may also have shifted over time, creating confusion over housing divisions (Yon 1992:27). Published house sizes are also inconsistent in the literature, as superstructure reconstructions (and assigned second story square footage) varies. The houses sampled for this exercise were selected based on the comprehensiveness of their excavation and publication.

Three residences from the Centre de la Ville

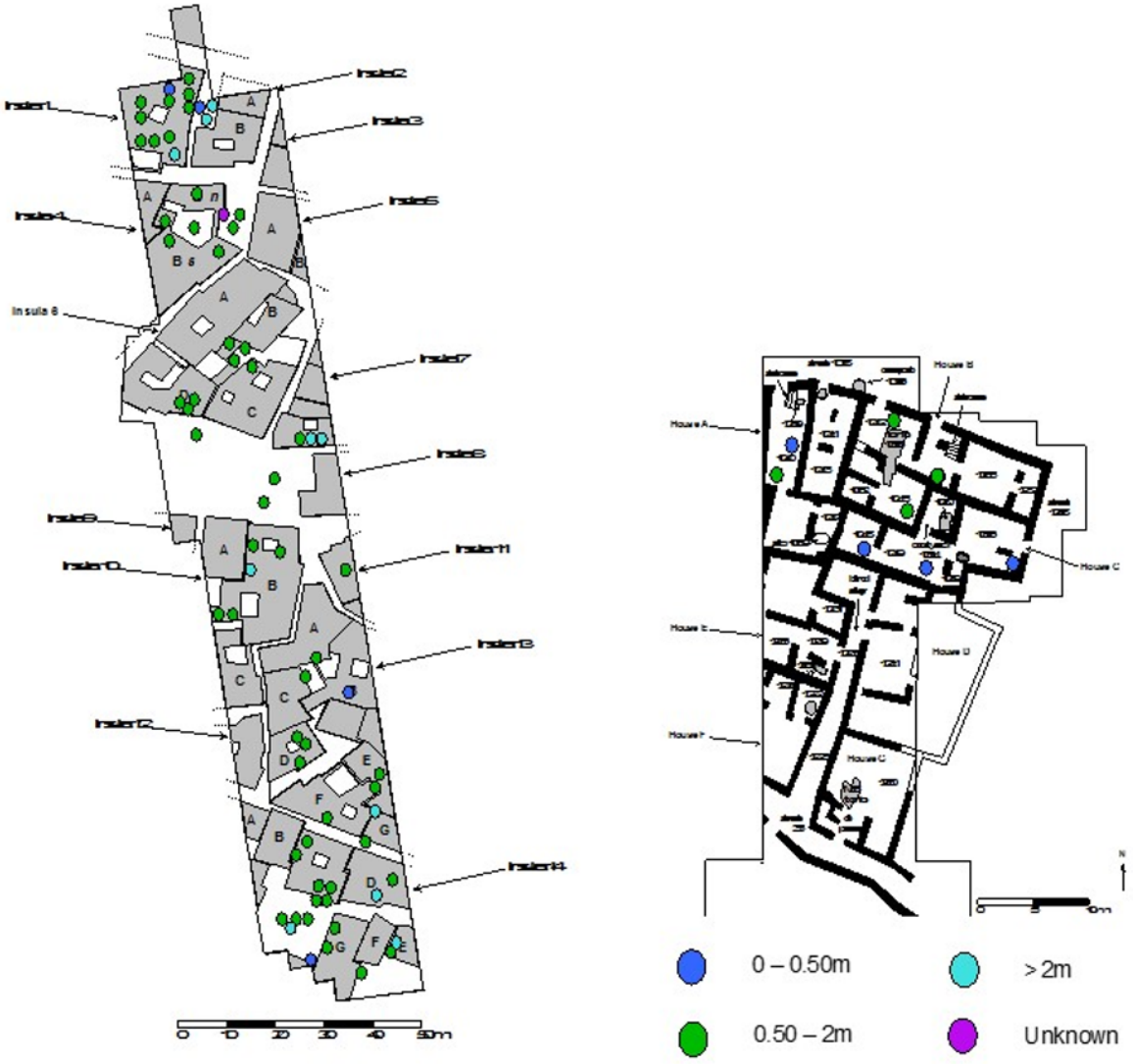

Figure 5: Distribution of weights in the Ville Sud and Centre de la Ville (architectural plans adapted from Schloen 2001, Fig. 20 and 22).

(Houses A, B, and E) and four from the Ville Sud (Houses X-A, X-B, XIV-C, XIV-D) were selected as a representative sample of the range of household resident wealth. Although there is not an exact correlation evident between house size and artifact quantity (as would be expected given the data resolution), the presence of each artifact type across housing 'class' is suggestive of marketing conditions and independent household provisioning (Figure 6). As more recent excavations have continued to focus on domestic quarters and publish small finds with their contexts, further and more precise analysis will be possible. Additional exploration of consumption differences between elite and non-elite contexts may seek to address the subtype variation recognized for the object types examined here, as well as the differing frequency of mortuary deposition across household class. Of the three object types analyzed here, the far-reaching distribution patterns are certainly in accordance with the pattern hypothesized for the

Figure 6: Distribution of objects across household sizes.

market circulation of goods.

Although brief, this exercise has sought to illustrate the potential value of the distributional approach in elucidating the nature of extra-palatial distribution mechanisms. By focusing on domestic assemblages and household activity, it should be possible to extend our understanding of trade and its active participants. The question posed here was whether the archaeological expectations of this approach could be adapted in order to incorporate imperfect data sets. Although further testing against sites with more robust data will certainly strengthen this conclusion, I believe this preliminary exercise has satisfactorily demonstrated the potential of this approach as a method for examining object mobility and provisioning strategies.

Acknowledgments. I thank Sarah Morris and Elizabeth Carter for reading and criticizing earlier drafts of this paper. All errors remain my own. I also thank the Social Sciences and Humanities Council of Canada, the Cotsen Institute of Archaeology, and the University of California, Los Angeles for their generous support. Fig. 2 is reproduced here with the kind permission of V. Matoïan.

NOTES

[1] The premise of this approach is that the quantity of traded material decreases with the distance from the source, with the gradient of this decline often indicative of the method of transport (i.e. water transport versus land transport).

[2] The use of central place theory is related to the concept of hexagonal lattices used in landscape geography (Christaller 1966), and has been used to study the relationship between retail market centers (Hodder and Orton 1976).

[3] Although a significant component of the published ceramics are imports, it is argued that they actually represent less than 1% of the attested corpus (McGeough 2007:283; Yon 2006:145).

[4] Ugarit texts are published in the series Palais Royal d'Ougarit (PRU).

[5] Of the 2200 sherds and whole vessels from Syro-

Palestine, around 496 come from Ugarit (Yon et al. 2000:67; Van Wijngaarden [2002:39] gives a total of 443 vessels from Ras Shamra, and another 168 vessels from Minet el-Beida). It is important to note that the 496 total includes both imported LH II-III ceramics from the Argolid and locally produce Mycenaean imitation wares (for further discussion of the sourcing of Mycenaean corpus, see Yon et al. (2000:64-65); Monchambert (1983:27-29). McGeough (2007:302) further observes that this may be in part a function of the lengthy occupation of the site, as well as the particular interest in Mycenaean ceramics of the early excavators.

[6] For a discussion of context contamination and potential contextual confusion between funerary and domestic findspots, see Yon et al. 2000:6-7, 68.

[7] Only 118 of the 496 samples are confidently attributed to palace contexts.

[8] A catalogue of the majority of the ivory objects included in this study can be found in RS VI (Caubet 1991; also Yon 1987).

[9] A catalogue of the majority of the stone vessels included in this study can be found in RS XVI (Gachet -Bizollon 2007; also Yon 1987).

[10] The identification of domestic production facilities within the Ville Sud is further supported by the widespread discovery of cylinder seals and tool molds. The distribution patterns of these objects correspond to that of the all of the material classes discussed here (for plans see Callot 1994).

[11] A more comprehensive (although subjective) tripartite housing classification has also been suggested for the Ville Sud based on house size, construction quality, and object assemblage (Callot 1994:199). In this system, House X-B falls into group 1 (the highest class), while Houses X-A, XIV-C, and XIV-D fall into group 2 (comprised of semi-detached houses).

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Trade and Resource Movement

Coca Leaves in the Context of the Central Andean Wari State

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Coca, of the genus Erythroxylum (family Erythroxylacea) is a stimulant and painkiller that at the time of the Spanish conquest was widely used in the Central Andean region. Despite its undisputed position within the Andean society in general, archaeologically coca remains little investigated, particularly in the Peruvian central highland region. Consequently, it is uncertain, for instance, when coca leaves began being used in this region. This uncertainty is largely due to the difficulties of finding coca leaves at highland archaeological sites. New evidence coming from the northern part of Ayacucho Valley in the Peruvian central highlands which consists of several coca leaves represents the first direct proof for the presence of coca leaves in an archaeological context that, based on ceramic stylistic grounds, dates sometime between the end of the Early Intermediate Period (ca. 1 – 550 CE) and the beginning of the Middle Horizon Period (ca. 550 – 1100 CE). This unprecedented finding demonstrates that as early as the Middle Horizon, therefore several centuries before the rise of the Inka State, coca leaves were already used in the Peruvian central highlands. This paper presents the new evidence and discusses its immediate implications.

Introduction

The central Andean Middle Horizon (ca. 550 – 1100 CE) was a period during which the Wari State emerged in the Peruvian central highland valley of Ayacucho and established political and economic control over most of current Peru. Throughout this large territory, the Wari State built a series of provincial administrative centres, potentially to better manage the newly incorporated territories. Moreover, the inhabitants of the recently conquered territories often were relocated near more productive ecological zones, likely to better access local resources (Rowe 1956; Lumbreras 1974; Menzel 1964; McEwan 2005; Schreiber 1992, 2001). These changes strongly indicate that Wari's expansion beyond its heartland was to maximize access over the resources of other regions.

Ever since the finding of some Wari settlements in the tropical rain forest valley of Apurimac, east of the Ayacucho Valley and the Wari capital, it has been suggested that the colonization of the tropical valley may have been in order to establish access to coca leaves (Raymond 1973, 1988, 1992). In addition, Raymond observed that all Wari settlements found in the Apurimac Valley – identified as Wari outposts – were located at elevations

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suitable for coca cultivation. This suggestion directly implies that coca leaves were already consumed in the central highlands of Peru as early as the Middle Horizon. As discussed further below, several centuries later the Inka State had coca plantations in the tropical rain forest region.

This paper reports evidence of the presence of coca leaves in an early Wari context. The information comes from the site of Convento in the Peruvian central highlands region, about 90 km north of the ancient Huari capital. Considering that no similar finding has been reported from elsewhere the Peruvian central highlands, this is the first tangible evidence of coca leaves in an early Wari context; as such, this finding is unique and provides an unparalleled opportunity for elucidating the role of coca leaves within the Wari State. To contextualize our discussion, first a brief consideration of *Erythorxyum* is in order. This is followed by an overview of the role of coca leaves within the Inka State and a brief assessment of the use of coca leaves by contemporary inhabitants of the Peruvian central highlands.

Coca (*Erythroxylum*)

The plant commonly named coca belongs to the genus *Erythroxylum* (family Erythroxylacea) (Plowman 1979:103-104; Mortimer 1901:227; Towle 2007:58). Researcher argue that *Erythroxylum* contains between 230 and 250 species of tropical trees and shrubs, most of which are indigenous to the American tropics (Plowman 1979:104; Plowman and Hensold 2004:1). Most of the wild species are found mainly below 1000 m of elevation, but cultivated species can be found as high as 2000 m a.s.l.; above this elevation the plant does not grow because it does not tolerate frost (Plowman 1979:104; Allen 1988:221; Raymond 1992:23; Gade 1999:139). In South America members of the genus *Erythroxylum* are found scattered all over the continent, although the majority of them are found in present day Brazil (Plowman and Hensold 2004). Some of the species also grow on the eastern slopes of the Andes and along the Pacific coast. The latter location indicates that some coca species tolerate drought.

Plowman (1979:104) asserts that many of the species of *Erythroxylum* are difficult to distinguish, due to several reasons, including a lack of well-defined taxonomic characters and the enormous variety of the species that discourages botanists. When this is the case among plant specialists, the issue if even more complicated among archaeologists, who often work with small specimens or only with chewed coca quid. As a result, often the reference provided by the archaeologists is only the broad name (coca), without specifying the species.

Nevertheless, "cultivated cocas belong to two closely related species of *Erythroxylum."* 1) *Erythroxylum coca* var. *coca* Lam (*E. c.* var. *coca*) and its variety *Erythroxylum coca* var. *ipadu* Plowman (*E. c.* var. *ipadu*) (Plowman and Hensold 2004:56), and 2) *Erythroxylum novogranatense* var. *novogranatense* (Morris) Hieron (*E. n.* var. *novogranatense*) (Plowman 1979:104) and its variety *Erythroxylum novogranatense* var. *truxillense* [Rusby] Machado (*E. n.* var. *truxillense*) (Plowman 1979:111; Plowman and Hensold 2004:56; see also Johnson et al. 2005:601). Except for the *E. ipadu* variety that reproduces asexually, all the others propagate sexually (from seeds). Plowman (1979) asserts that the ancestral form of *E. coca* occurs wild on the eastern slopes of the Andes; therefore, initial cultivation of this plant must have occurred somewhere in that region. When this domesticated species was moved to the western side of the Andes and eventually to the Pacific coast, it developed into a distinct variety that is better adapted to drier conditions, the *E. novogranatense var. truxillense*. Finally,

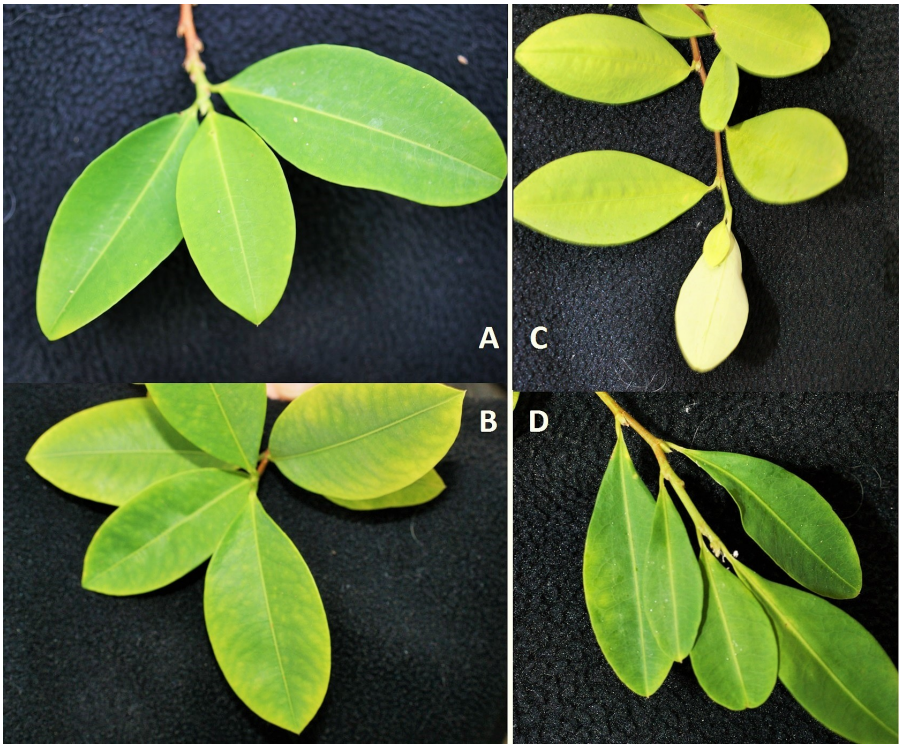

Figure 1: The four varieties of domesticated coca leaves: A, E. coca; B, E. ipadu; C, E. novogranatense; D, E. novogranatense var. truxillense (Photo courtesy of Lyndel W. Meinhardt).

northward spread of *E. novogranatense var. truxillense* resulted in *E. novogranatense*. More recent studies by Johnson et al. (2005:604-605, 607, Fig. 2; Emche et al. 2011:126; Johnson et al. 2003) show that genetically these two coca species are indeed very similar and that the "rationale of recognizing *E. n.* var. *truxillense* as a different variety is questionable."

Geographically, *E. coca* Lam. (also known as coca Huánuco or Bolivia) is native to the eastern slopes of the Andes (Peru and Bolivia) and grows in wet conditions between 500 and 1500 m of elevation (Mortimer 1901:228; Plowman 1979:114). Outside of South America this species is not cultivated. *C. ipadu* (also known as coca Amazonas) grows only in the Amazon region. Meanwhile, *E. novogranatense* (also known as coca Colombia) is mainly found in the northern section of South America, but since the end of the nineteenth century has been widely cultivated beyond South America (Plowman 1979:109-110). *E. novogranatense var. truxillense* (also known as coca Trujillo) is the one that grows along the Pacific coast and as such is adapted to drier environments.

Despite the difficulties in distinguishing one species from another, the shape of their leaves is relatively different (Figure 1). First, the leaves of *E. coca* (Figure 1A) are "characteristically large and thick, broadly elliptic in shape, more or less pointed at the apex and dark green in color" (Plowman 1979:106; see also Mortimer 1901:258) and this species is the main source of cocaine (Plowman 1979:105; Johnson and Emche 1994:645). Second, the leaves of *E. ipadu* (Figure 1B) are "apically rounded" (Plowman 1979:108). Third, the leaves of *E. novogranatense* (Figure 1C) tend to be "smaller, thinner, bright yellowish-green" usually rounded at the apex (Plowman 1979:110). As this species is not deciduous,

physically the plants are bushier than *E. coca*. In contrast to *E. coca* which grows in wet environments, *E. novogranatense* is more drought resistant and can also grow in cooler climates. Finally, *E. novogranatense var. truxillense* (Figure 1D) is similar to *E. novogranatense,* but its leaves are smaller, narrower although slightly thicker and once mature they turn green (Plowman 1979:113); reportedly this is the variety with better flavor than *E. coca* (Mortimer 1901:258; Moore 2014:145). In comparison to *E. novogranatense, E. novogranatense var. truxillense* is more drought resistant and that explains its successful cultivation in a desert environment such as the Peruvian coast. However, to grow successfully, the plant requires irrigation and human assistance (Plowman 1979:114; Davis 1996:442).

Coca Leaves in the context of the Inka State and contemporary Andean Society

Coca grows in the tropical lowlands and on the Pacific coast, but cannot be cultivated in a highland valley, such as the Wari heartland (Allen 1988:221; Raymond 1992:23; Gade 1999:139). Despite being non-native to the highlands, coca leaves are second to none because of their multi-purpose uses (Mayer 2002). For example, within the Inka State coca leaves had different uses (Rowe 1946:311; D'Altroy and Earle 1992:58; Malpass 2009:99-100; McEwan 2006:150) and during public festivities coca was "the single most important vegetable offering" (Rowe 1946:307; see also Cobo 1990:116). Furthermore, important landmarks within the empire also received offerings of the "precious herb called coca" (Sarmiento de Gamboa 1999:130).

Pedro Cieza de León provides one of the most valuable accounts about the use of coca leaves within the Inka Empire. Cieza de León pointed out that "throughout Peru the Indians carry this coca in their mouths; from morning until they lie down to sleep they never take it out. When I asked, some of these Indians why they carried these leaves in their mouths, which they do not eat, but merely hold between their teeth, they replied that it prevents them from feeling hungry, and gives them great vigor and strength" (cited by Mortimer 1974:151; see also Cieza de León 1973:221).

In addition to the living, who sustained themselves chewing the precious herb, even the dead carried coca leaves in their mouths (Guaman Poma de Ayala 1980:267; Murúa 1946:267; Ramos Gavilán 1976:26), emphasizing again the high value of this tropical product. Reinhard and Ceruti (2010:123, 156; Reinhard 2005) have reported the finding of coca leaves near the mouth of the *capacocha* sacrificial victims, thus confirming the account of the Spaniards. Coca leaves were of such importance that the Inka State established coca fields, east and north of Cuzco, the Inka capital, in order to cultivate their own coca supply (Bowman 1916:73, 77; Le Moine and Raymond 1987; Gade 1999:139; Hanna 1974:291; Murra 2002:262; Niles 2004:50). Likewise, coca was extensively cultivated in the Pacific coastal valleys, at least in late pre-Hispanic times (Rostworowski de Diez Canseco 1973, 2002; Murra 1986; Julien 1998; Marcus and Silva 1988).

Rostworowski de Diez Canseco (1973) mentions that at the height of the Inka Empire two varieties of coca were known in the region: one was named *mamacoca* and was brought from the eastern slopes of the Andes and characterized by its bigger dark leaves; the other was named *tupa* and came from the *llanos*, the Pacific coastal valleys and was highly valued because it was full of flavor. Plowman (1979) asserts that *mamacoca* was *E. coca*, while *tupa* coca was *E. novogranatense var. truxillense.* Furthermore, before, during and after the Inka, there were coca

Figure 2: Coca leaves used to barter products in the Huanta market, Ayacucho Valley (Photo L. M. Valdez).

plantations in coastal valleys such as Chillón, Rímac, Lurín and Cañete (Murra 2002:368; Murphy and Boza 2012:171). As noted by Rostworowski de Diez Canseco (1973), coastal coca plantations declined thereafter as a consequence of efforts to eradicate the plant and curb coca chewing practices among the Indigenous Peoples (see Mortimer 1901:148; Kubler 1946:394; Davis 1996:417, 425).

In more recent times, coca leaves continue to be used throughout the central Peruvian highlands, in most cases in the same way they were used in Inka times. Indeed, over the years several researchers have shown consistently that coca leaves play a central role in contemporary central highland communities (Hanna 1974:283; Bastien 1978:112; Allen 1988:21-22; Valderrama and Escalante 1996:156; Bolin 1998:15, 222). For instance, the sacred mountains (*Wamanis*) and other significant spots in the landscape still receive coca leaf offerings (Arnold 1993:67; Hyslop 1984:312). Furthermore, rituals, such as *herranza* (Isbell 1978:155; Hastorf 1993:53), divination (Allen 1988:133; Bastien 1978:14-15), birth, marriage (Isbell 1978:155), funerals (Bastien 1978:153), and sharing and socializing (Allen 1988:17), to name some, all require the use of coca. Therefore, in the Peruvian central highland region, life itself, from birth to death (Allen 1988:57), is deeply immersed in the use of coca leaves (Davis 1996:421-423).

Since coca acts as a stimulant and a painkiller (Steward and Faron 1959: 142; Hadingham 1987:171; Allen 1988:221; Bolin 1998:15; Kendall 1973:92; Mitchell 2006:14-15; Burchard 1974, 1992), anyone engaged in labor and travel, for instance, chews coca leaves. Consequently, at high altitudes in particular the use of coca leaves is nearly universal (Hanna 1974:283). Labor itself is exchanged for coca (Arnold 1993:117; Valdez 2012:77), and during work projects, the toiling parties must be provided with coca leaves because labor and coca chewing are non-separable.

Furthermore, coca is a highly valued commodity that is used in the exchange (barter) of goods (Hanna 1974:292; Stern 1982:36; Arnold 1993:132; Valdez 1997:68; Mayer 2002:176). Currently, coca leaves are still used to barter for products in the Sunday market in Huanta (Figure 2) and other neighbouring communities in the Ayacucho Valley, in central Peru (Valdez 1997). The few examples highlighted here demonstrate that coca leaves maintain a privileged position within Central Andean culture and cannot be matched and/or replaced by anything else (Mayer 2002).

Use of Coca Leaves before the Inka State

The Peruvian central highlands receive rain

for about 4 and 5 months every year; as a result, organic remains such as coca leaves seldom survive in archaeological contexts (Hastorf 1987:297). Due to the poor preservation of organic remains, it is uncertain when exactly coca leaves were first used in the region. Not surprisingly, the earliest archaeological evidence for coca chewing in the central Andes comes from the arid Pacific coast. Archaeological research in the region has uncovered evidence indicative of coca chewing from pre-ceramic and early ceramic contexts (Engel 1957, 1963; Cohen 1978; Dillehay et al. 2010; Hadingham 1987:171; Lanning 1967:79). According to Plowman (1979:112; Pearsall 2006:196) all coca samples coming from coastal archaeological contexts from northern Peru to northern Chile belong to the coca species adapted to the dry region: coca Trujillo.

For the central highland region, direct botanical evidence for the presence of coca leaves in archaeological contexts is almost unknown. Even for the case of the Inka State there is little archaeological evidence. Therefore, without the written records left by Spaniards such as Cieza de León (1973), Cobo (1990), Murúa (1946), Ramos Gavilán (1976) and Sarmiento de Gamboa (1999), to name some, it would have been very difficult to appreciate the extent of coca use within *Tawantinsuyo*.

Despite the absence of tangible evidence, researchers have long suggested that coca was likely already in use by the time the Wari State flourished several centuries before the rise of the Inka State (see Bergh and Jennings 2012:7). The idea that not only was coca chewing practiced during the time the Wari State flourished, but also that the Wari administration cultivated their own coca supply is largely supported by the finding of Wari settlements in the tropical forest valley of Apurimac, east of the Ayacucho Valley. In 1968 and 1970 Scott Raymond carried out an archaeological survey of the lower Apurimac Valley, locating several archaeological sites, some of which were identified as highland Wari outposts (Raymond 1973, 1988). On the basis of those findings, Raymond (1985:42, 1992:30) has suggested that Wari colonization of the Apurimac Valley likely was in order to secure coca leaves.

Figure 3: Wari coca bag found at Pacheco in the Nazca Valley of the south coast of Peru (Photo courtesy of Susan Bergh).

An additional observation made by Raymond (1992) was that all known Wari settlements in the Apurimac Valley were found at elevations suitable for coca cultivation. That is, at elevations ranging between 550 and 650 metres above sea level, which is below the cloud forest area. As a

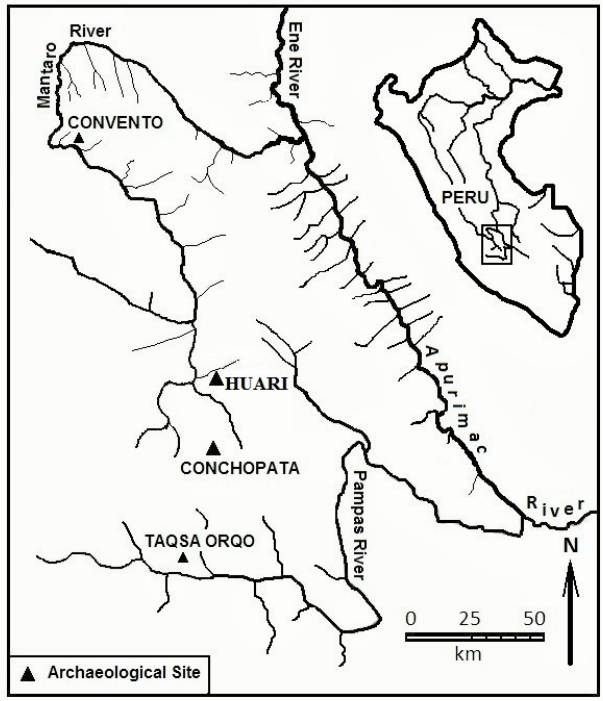

Figure 4: Location of the archaeological site of Convento in relationship to the Huari urban center in the Ayacucho Valley (Drawing by L. M. Valdez).

Figure 5: Cruz Pata ceramic vessel found at Convento (Photo L. M. Valdez).

tropical forest plant coca needs moisture and plenty of sunshine. Moreover, coca develops better on the slopes, in areas where rainwater drains quickly. Otherwise, on flat terrain without natural drainage, the roots of coca plants develop fungus and the plants die.

Indirect evidence supports the idea that coca leaves were already used by the time the Wari State flourished. For example, an offering pit excavated at the Wari provincial center of Pikillaqta in the Cuzco region (Arriola Tuni 2008:34-36) reveals the careful placement of a series of artifacts that include several miniature Wari warriors (Arriola Tuni 2008:34-36; Arriola Tuni and Tesar 2011: Figures 16 & 19; Bergh 2012: Figure 226a). An interesting aspect of the miniature warriors and relevant for the purposes of this discussion is their bulging cheeks that is even more pronounced than the bulged cheeks of the Inka gold and silver male statues that Reinhard and Ceruti (2010:139, Fig. 7.9; see also Gibaja Oviedo et al. 2014: Figure 47) interpret as indicative of coca chewing.

As pointed out by Cieza de León (1973:221) and largely substantiated by ethnographic studies, it is well known that coca chewers held the coca leaves between the mouth and gums, resulting in bulging cheeks (Allen 1988; Isbell 1978; Plowman 1979:103). Therefore, it is more than likely that the bulging cheek of the Pikillaqta miniature warriors represent coca chewing and that as early as the Middle Horizon – if not earlier – the chewing of coca leaves already was known in the Peruvian central highlands.

Additional evidence of the use of coca leaves during the height of the Wari State is represented by a Wari coca bag (Figure 3) housed at the Cleveland Museum of Art (Bergh and Jennings 2012: Figure 18) that was reportedly found by the late Junius Bird at the site of Pacheco in the

Nasca Valley. Susan Bergh (personal communication, November 2014) notes that the bag from Pacheco contained coca leaves, further demonstrating that coca indeed was known by this time period.

Coca Leaves in an Early Wari Context

Recently, at the site of Convento, in the locality of Puerto San Antonio at an elevation of 3450 metres above sea level (in Tayacaja, Huancavelica) and about 90 km north of the ancient Huari capital (Figure 4), workers building a school unearthed archaeological remains associated with stone walled burial cists. As the workers opened trenches in order to establish the foundation of the new school building, several burial cists and their contents were smashed, while others were removed and taken away by the work party.

One burial cist was exposed shortly before the arrival of the junior author, who upon realizing the importance of the archaeological finding decided to intervene. The burial was already open and some of its offerings also broken; among the broken ceramic vessels there were fragments of what appeared to be pieces of an anthropomorphic vessel. Human skeletal remains, all poorly preserved, had also been crushed. However, a ceramic vessel was recovered intact and consists of a small bottle decorated in the distinctive Cruz Pata style (Figure 5) that dates to the end of the Early Intermediate period and the beginning of the Middle Horizon (Lumbreras 1974:137; Knobloch 1991:248).

We must emphasize that Cruz Pata is a ceramic style indigenous to the Ayacucho Valley. It first emerged sometime late during the Early Intermediate period following the interaction established between the Huarpa culture of the Ayacucho Valley and the Nasca culture of the Peruvian south coast (Lumbreras 1959, 1960; Menzel 1964:7; Knobloch 1991:248). The style not only continued being manufactured during the early phases of the Middle Horizon, but also was the source of Middle Horizon Wari ceramics (Knobloch 1991:248). Therefore, Cruz Pata is a transitional ceramic style between the late Early Intermediate period and the beginning of the Middle Horizon period (Lumbreras 1974:137).

In association with the Cruz Pata bottle, and as part of the burial offering, were also two copper *tupu* pins (Figure 6), one placed over the other. Copper *tupus* pins already existed in Wari times (Lechtman 1997:157) and have been found associated with the remains of female individuals (Tung and Cook 2006:79). In Inka times, *tupus* had a strong gender association as they were used to fasten women's clothing (Kendall 1973:36-37, 170; Malpass 2009:78). Thus, the artifacts noted here likely represent the grave goods of a female individual. The most important findings, however, had been placed between the two *tupu* pins and consist of coca leaves. This fortuitous finding is extraordinary and provides the first ever direct evidence of coca use in the central highland region in early Wari context.

The archaeological evidence coming from the site of Convento shows clearly that as early as the time the Cruz Pata ceramic style was produced, the inhabitants of the Ayacucho Valley were already familiar with coca leaves. However, future research and future similar findings in the region more likely will modify this observation because there is the potential that the coca leaves were used in the region even earlier. Considering that coca findings from the Pacific coast are coming from much earlier contexts (see Dillehay et al. 2010) and that coastal and highland populations were in contact from very early times (Topic 2013), the practice of using coca leaves likely was practiced in both regions.

An important issue that deserves some clarification is the origin of the coca leaves found

Figure 6: Tupu pins found in association with the Cruz Pata ceramic vessel of Figure 5 (Photo L. M. Valdez).

at Convento. Or rather which coca variety is the one found at Convento? Without further analysis of the coca leaf samples, such as DNA (Emche et al. 2011), it is difficult to determine the coca species with certainty. However, relying solely on the leaf shape that enable botanists to differentiate morphologically the cultivated coca species (Plowman 1979), here we make a cautious identification, with the hope that further analysis will clarify this issue.

Considering that the samples are coming from a highland archaeological site, the state of preservation of the coca leaves found at Convento is surprisingly good. This enables us to readily distinguish it from *E. coca* Lam. (Huánuco or Bolivian coca), characterized by its much larger leaf and "broadly elliptic in shape, more or less pointed at the apex" (Plowman 1979:106). As noted, *E. coca* Lam. comes from the eastern slopes of the Andes. The leaves from Convento are not elliptic; instead, they are more lanceolate (or narrow abovate) and more or less rounded at the apex, with two well pronounced lines parallel to the midrib. These are some of the salient characteristics of *E. novogranatense var. truxillense* (Trujillo coca) (Plowman 1979:113; Mortimer 1901:258).

Although the leaves of *E. novogranatense var. truxillense* and *E. novogranatense* are "morphologically similar" (Plowman 1979:113), it is important to consider the geographic distribution of *E. novogranatense*, which is found mainly (or only) in present day Colombia and Venezuela (Plowman 1979:109). This observation leaves *E. novogranatense var. truxillense* (coca Trujillo), the species adapted to the drier Pacific coast, as the only potential candidate for the coca leaves used at Convento.

Previously no archaeological coca of the species *E. novogranatense var. truxillense* had ever been reported in the highlands. In contrast, the single coca leaf fragment found by Hastorf (1987:197) has been positively identified as *E. coca* (Huánuco or Bolivian coca) brought from the eastern lowlands.

Given that Convento is only two-days walking distance from the tropical rain forest valley of Apurimac, it is surprising that the coca leaves at the site have no link to the eastern lowland region. As noted, the presence of Wari settlements in the tropical valley of Apurimac (Raymond 1992) opened the possibility that highland colonization of the region was to access tropical rain forest resources, including coca leaves. As noted above, at least based on leaf shape, the coca leaves found at Convento appear to have no connection with the eastern lowlands.

Of course, the presence of coastal coca leaves in the highlands does not necessarily imply that *E. coca* from the eastern lowlands was not available to highland inhabitants, including those of the Ayacucho Valley. The Wari outposts in the Apurimac Valley perhaps were part of the vertical archipelago system (see Murra 1985:17-19) that enabled highland populations accessing locally non-available resources, coca leaves being one of them. As demonstrated by the findings from Hatunmarka in the Mantaro Valley, by the Late Intermediate Period coca leaves from the eastern lowlands were certainly consumed by highland inhabitants (Hastorf 1987). When exactly did such an exploitation of the eastern tropical lowlands begin is an interesting issue that only future research will clarify.

Although *E. novogranatense var. truxillense* is cultivated at relatively higher elevations, at this point it remains uncertain whether the plant was actually cultivated anywhere in the Peruvian central highlands. In the state of our current knowledge, the more likely scenario is that the coca leaves were introduced to the Peruvian central highlands from the Pacific coast perhaps following the cultural interaction established between the highland Huarpa culture and the south coast Nasca culture. As already mentioned, by the late Early Intermediate Period the inhabitants of these two regions were in contact (Rowe et al. 1950:128; Lumbreras 1960:156; Menzel 1964:7). Following this interaction, the ceramic making technology of the Ayacucho Valley witnessed significant change that included better finishing, the incorporation of new vessel shapes that resemble late Nasca vessels, the use of more colours, and the addition of late Nasca designs (Lumbreras 1980:30; Schreiber 2012:38). Cruz Pata is precisely one such ceramic style that at times appears to have been manufactured by Nasca hands. Thus, Cruz Pata vessels stand apart from the ceramics produced in the region prior to the interaction with the south coast.

Strongly suggesting that the peoples of the south coast had access to coca leaves about the time the Nasca began interacting with the central highlands, Nasca artisans produced for the first time modeled effigy vessels with bulging cheeks and holding coca bags (Silverman and Proulx 2002:55; Proulx 2006:174, Plate 37). As in the case of the Pikillaqta miniature warrior figurines, the bulging cheeks of the Nasca effigy vessels (Figure 7) suggest coca chewing. Prior to late Nasca, coca leaves are absent on the south coast (Piacenza 2002:9; Valdez 2009:264); the earliest known evidence of coca leaves in the region comes from Middle Horizon contexts, from the lower Ica Valley (Beresford-Jones 2011:97-99). In light of the late Nasca effigy vessels with bulging cheeks, it can be argued that coca leaves and therefore the concept of coca chewing were already present by late Nasca times. It is of interest that once the Wari State began to expand from the Ayacucho Valley, the south coast was one of the first regions incorporated into the Wari

Figure 7: Late Nasca effigy vessel depicting a coca chewer (Collection Museo Nacional de Arqueología, Antropología e Historia del Perú, Lima, photo courtesy of Donald Proulx).

domain. Hence, there is the possibility that the main reason that motivated the early Wari expansion toward the south coast was to gain direct access to coca leaves.

What is evident at present is that by the time Cruz Pata ceramics were manufactured in the Ayacucho Valley, coca leaves were accessible to highland populations. The burial offering from Convento also shows that by then highlanders already had a preference towards the plant, probably because they were familiar with its unique properties. Considering that there were countless other plant types available, yet none seemingly were included as part of the offering strongly signals that coca may have been already regarded as a special plant. Such a familiarity with coca's properties would have emerged only from a long term human – plant relationship. Therefore, there is the possibility that highland populations had been utilizing coca leaves since much earlier times, but poor preservation of plant remains at highland sites prevents a full appreciation of its uses in the ancient past.

Finally, a word must be said about the association of the Convento coca leaves with what appears to be a female individual. It is certainly difficult to make any conclusive statement based on one sample; as a result, the finding from Convento raises some questions. For instance, it would be interesting to know if other female burials also had coca leaf offerings. Likewise, it would be important to know if male burials and those of children also carried similar offerings.

Concluding Comments

The coca leaves found at the Convento site provide the first direct evidence of the use of this product in a context that is associated with the Cruz Pata ceramic, a style that corresponds to the transitional phase between the Early Intermediate Period and the Middle Horizon. The mortuary context in which the coca leaves were found also strongly indicate that the leaves were already highly valued. To the best of our knowledge, it is unknown if coca leaves were treated in this manner before the Middle Horizon. If so, it may be that this practiced was started by Wari and carried on by later cultures, more notably by the Inka.

It is interesting that the source of the coca leaves found at Convento seemingly was the Pacific coast. This is in sharp contrast to previous expectations that coca leaves likely came the tropical rain forest valley of Apurimac (Raymond 1988, 1992). As noted, this idea was put forward following the discovery of Wari outposts in the Apurimac Valley. The initial identification of the coca leaves from Convento as coca Trujillo coming from the Pacific coast does not exclude

totally Wari's use of coca from the eastern slopes of the Andes (coca Huánuco). Instead, there is the possibility that the Wari – perhaps – had access to two different coca types, just like the Inka State did centuries later.

At present, the more likely scenario is that coca perhaps was introduced to the central highlands by the Nasca following the interaction established between the peoples from the south coast and the central highlands. As discussed in the preceding sections, there are also suggestions that peoples from the south coast migrated to the Ayacucho Valley and carried to the highlands their cultural practices that included coca chewing. Again, due to the presence of Wari settlements in the Apurimac Valley, it is also possible that the inhabitants of the Ayacucho Valley were already familiar with coca leaves. If so, the Nasca may have just introduced a different variety of coca leaves.

To sum up, the evidence coming from Convento in unprecedented and demonstrates that the use of coca leaves in the Peruvian central highlands goes back at least to the beginning of the Middle Horizon. Future research may demonstrate that the relationship between the coca leaves and the inhabitants of the central highlands goes back to much earlier times, perhaps to pre-ceramic times as in the coastal region. Future research will have much to say in this regard. Until then, it is clear that as early as the end of the Early Intermediate Period and early Middle Horizon coca was already available to the peoples of the Peruvian central highlands.

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Extraction, Exchange, and Intra-regional Interaction at the Zaragoza-Oyameles Obsidian Source, Puebla, Mexico

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Obsidian is a naturally occurring volcanic glass that was commonly used as tools, jewelry, weapons and ritual paraphernalia in prehispanic western Mesoamerica for several millennia preceding the arrival of the Spanish in the Sixteenth Century. In the last few decades, investigations of the procurement, production, distribution and consumption of obsidian have become an important part of studies into ancient economic systems. For a number of reasons obsidian is a particularly salient artifact class for economic studies. First, fractured obsidian produces an extremely sharp, albeit fragile, naturally occurring edge. Second, the fracturing, or knapping, of this material can be controlled by an experienced artisan and a variety of tools can be produced from it. Third, the production of obsidian tools is a reductive process, meaning that waste debris is removed from core material in order to form the desired tool. As such, the morphology and quantity of the waste can be studied by the archaeologist to identify the types of commodities produced. Fourth, obsidian is found only in two general volcanic regions of Mesoamerica, one spanning the width of central Mexico and the other along the southern spine of Guatemala. Since each obsidian source contains unique chemical compositions, it can be measured through a variety of techniques, allowing for artifacts and sources to be matched, greatly increasing our understanding of the movement of obsidian across space.

One such obsidian source is Zaragoza-Oyameles in eastern Puebla, Mexico (Figure 1). Zaragoza-Oyameles obsidian artifacts have been recovered in archaeological assemblages throughout western Mesoamerica dating from the Early Formative through Late Classic periods (ca 1200 B.C. - A.D. 1000). However, beginning in the Protoclassic period (ca. A.D. 200) Zaragoza-Oyameles becomes the most common obsidian identified at a variety of sites in the southern Gulf Lowlands of Veracruz, Mexico like Tres Zapotes and Palo Errado (Knight and Glascock 2009; Pool et al. 2014). By the Early Classic period (ca. A.D. 200-600) it constitutes over 80% of the obsidian in these same assemblages, as well as those in the Sierra de los Tuxtlas (Santley et al. 2001), and in the neighboring Mixtequilla zone of central-south Veracruz (Stark et al. 1992). It also constitutes a substantial proportion of the Late Formative through Middle Classic assemblages at several sites in the Tehuacan Valley (Drennan et al. 1990:188-189), the Lower Rio Verde Valley of Oaxaca (Joyce et al. 1995) and in the Isthmus of Tehuantepec (Zeitlin 1982). The infusion of Zaragoza-Oyameles obsidian into western Mesoamerican exchange networks beginning in the Protoclassic period corresponds with the rise of Cantona, one of the largest cities in Mesoamerica during its existence.

Located 10 km south of the Zaragoza-

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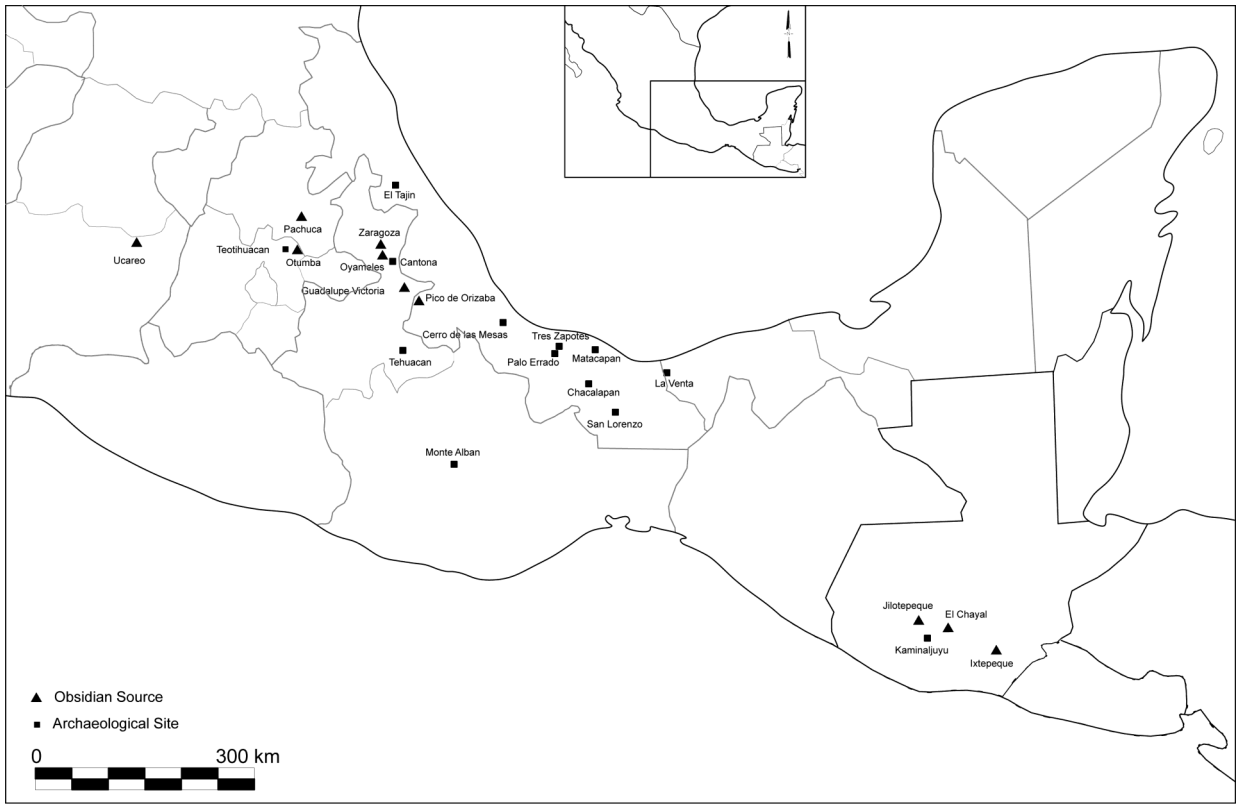

Figure 1: Map showing the location of the Zaragoza-Oyameles source area in relation to several other obsidian sources and archaeological sites in Mexico.

Oyameles source area, the site of Cantona covers 1,430 ha (3,534 acres) (García Cook 2003:315) (Figure 2). The distribution of extant surface features delineating the city, such as stone-lined avenues, house lots, platforms, plazas, and ball courts, represents the maximum extent during its apogee in the Late Classic period, dating to around A.D. 800. Although it was originally settled in the Middle Formative period (ca. 600 B.C.) it did not become a regional center until its first fluorescence in the Protoclassic and Early Classic periods (ca. 50 B.C. – A.D. 600). The city is believed to have controlled the Zaragoza-Oyameles source area, with 353 obsidian workshops identified in a 19 ha zone adjacent to the civic-ceremonial core of the city (García Cook et al. 2010:219). The proximity of these workshops to the civic-ceremonial core and their physical location below the line-of-sight from the civic-ceremonial core has resulted in their interpretation as "state workshops" (García Cook 2003:337). The excavations of four of these state workshops indicate that prismatic cores and blades were primarily produced for export and elite consumption (García Cook et al. 2010:219). It is believed that Cantona's involvement in the production and distribution of this obsidian throughout western Mesoamerica was the economic basis for its development and maintenance for almost 1500 years.

In this paper, I investigate the nature of the long distance exchange in obsidian commodities attributed to the city of Cantona through a comparison of data from the recently completed Zaragoza-Oyameles Regional Obsidian Survey with that from several consumer sites in the southern Gulf Lowlands, Veracruz, Mexico. After a review of the data, I propose several scenarios

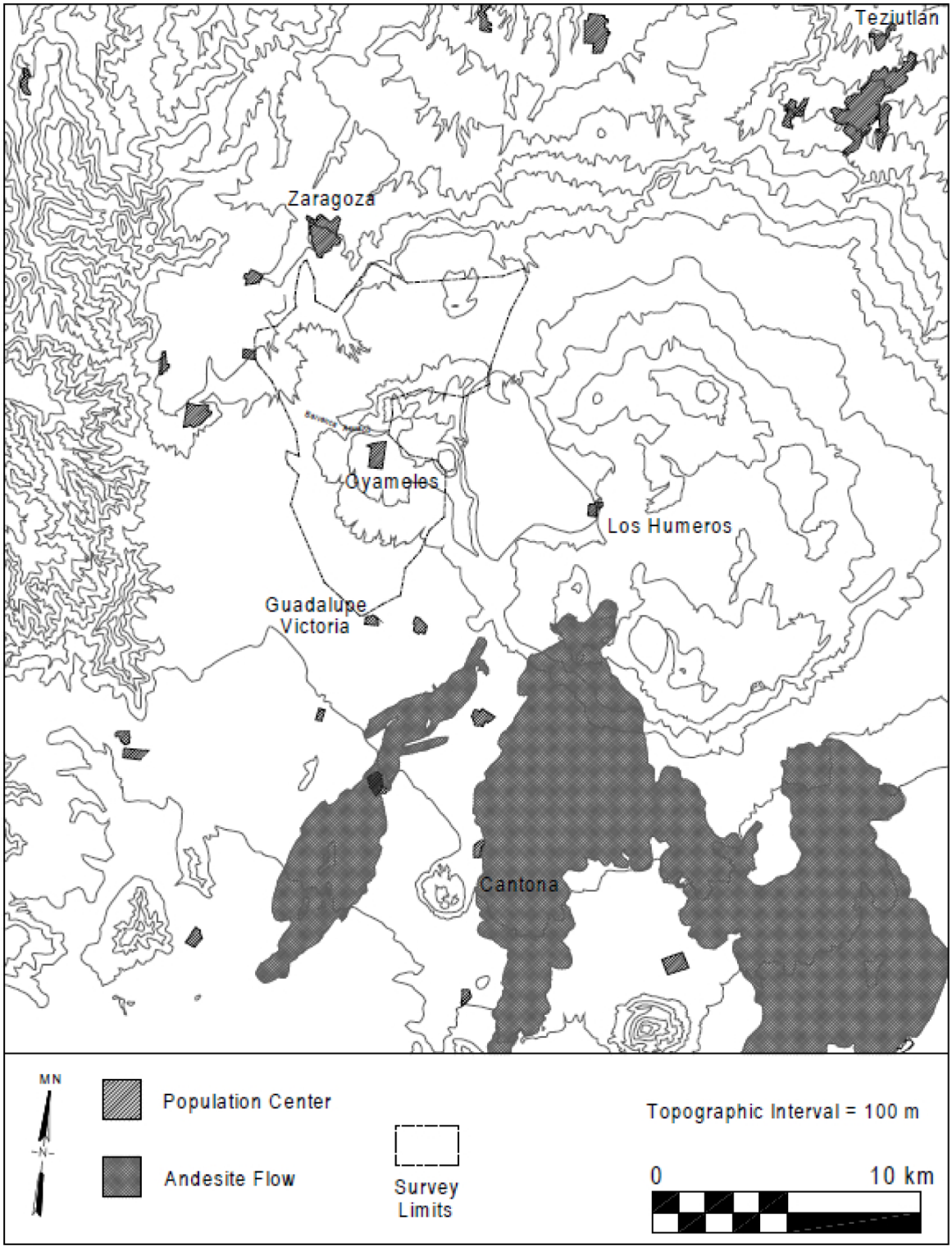

Figure 2: Map showing the topography of the Zaragoza-Oyameles source area and nearby sites and towns.

for the degree and type of interaction Cantona had with populations adjacent to the source area.

Background

The Zaragoza-Oyameles obsidian source area is located in the Cuenca Oriental of northeastern Puebla, along the eastern edge of the 1000 km long Mexican Volcanic Belt (Siebert and Carrasco-Nunez 2002). Obsidian flows associated with the Xaltipan ignimbrite were emplaced approximately 460,000 years ago, when the Los Humeros caldera was formed (Ferriz and Manhood 1984; Ferriz 1985). Since that time the region remained volcanically actively producing a series of rhyolitic domes, ignimbrites, tuff layers and basaltic and andesitic lavas that have covered the source area. The final series of andesitic lavas formed from 40,000-60,000 years ago and became the foundation for the prehispanic city of Cantona, which was built on top of the youngest lava, utilizing the volcanic Tezontle rock as construction material (Ferriz 1985:364). Millennia of erosion of the Oyameles rhyolitic dome, and associated volcanic features exposed the Xaltipan obsidian bands, which were then exploited by prehispanic populations like those that founded Cantona.

Topographically, the Zaragoza-Oyameles source area is marked by the steep slopes, level uplands and deeply incised drainages of the Oyameles dome, the Caltonac flow and the rhyolites of the Ocotepec group. The Oyameles dome and the Caltonac flow are located to the southwest and directly west of the Los Potreros caldera. The town of Oyameles de Hidalgo sits atop of these deposits and along their northern boundary, immediately south of the deeply incised Barranca Acuaco (Figure 2). This barranca is approximately 80 m deep and 50 to 400 m in width, thus exhibiting some of the most severe topographic relief in the immediate area. It also exhibits some of the largest and most extensive exposures of obsidian banding in the project area and, as a result, is the area with the most intensive and extensive evidence for prehispanic quarrying. To the north of the Barranca Acuaco are the emplaced hypersthene rhyolites of the Ocotepec group (Ferriz and Manhood 1984:1815), which have been deeply incised by several major drainages, including the Toluca and El Duraznillo. The town of Zaragoza is located on the northern toe-of-slope of one of these hypersthene rhyolitic domes. To the south, just beyond the southern limits of the Oyameles dome and Caltonac flow is the town of Guadalupe Victoria, which sits atop the northern edge of the Tepeyahualco lava flow. Thus Zaragoza and Guadalupe Victoria mark the northern and southern limits, respectively, of the survey area, while the town of Oyameles lies in its center.

In the southern Gulf Lowlands Zaragoza-Oyameles obsidian, dating to the Protoclassic and Classic periods, has been recovered in the form of percussion macroflakes and blades (i.e. >2.5 cm in width [see Tolstoy 1971:275]), large eraillure flakes, and large blocky chunks with dorsal angles of 90 degrees. It has been recovered from sites adjacent to the Sierra de los Tuxtlas, like Tres Zapotes (Knight 2003), Palo Errado (Knight n.d.; Knight and Glascock 2009), and sites in the Chacalapan region (Santley and Barrett 2002). This indicates that Zaragoza-Oyameles obsidian was imported as macrocores and/or large polyhedral cores at that time. At Matacapan (Santley 1989) and elsewhere in the Sierra de los Tuxtlas, it was imported primarily as more refined macrocores (Santley and Barrett 2002; Santley et al. 2001). In contrast, no evidence for macrocore reduction was recovered from the Mixtequilla area, where Zaragoza-Oyameles obsidian was imported as polyhedral and prismatic cores (Heller 2001:165-169). Further afield, Zaragoza-Oyameles obsidian constituted

Flakes

	State Workshop #1		State Workshop #2	
	n		***n***	
Large (>15.5 cm^2)	592	0.3%	unknown	
Medium (15.5>5.5 cm^2)	5,501	2.7%	127,379	7.7%
Small (5.5<1.5 cm^2)	41,221	20.5%	309,921	18.7%
Microflake (<1.5 cm^2)	149,442	74.2%	1,218,117	73.6%
Other	4,618	2.3%		
Total	**201,374**		**1,655,417**	

Table 1: Excavated flake quantities and sizes from State Workshops #1 and #2 at Cantona.

34% of the Protoclassic period sample from the Isthmus of Tehuantepec and 78% of its Early Classic period sample (Zeitlin 1982:268), although no mention is made of the form (i.e. blade, flake or core, etc.) it was in when entering the region. At several sites in the Tehuacan Valley, Drennan and his colleagues (1990:188-189) found that Zaragoza-Oyameles obsidian constituted a large proportion of the Late to Terminal Formative period assemblages, while dominating the subsequent Early Classic to Middle Classic assemblages. There, it was imported as cores, but whether as polyhedral or finished prismatic cores is not known (Drennan et al. 1990:188-189). While far from exhaustive, what these few examples from the Formative and Classic periods in western Mesoamerica indicate is that a variety of products were being exchanged, from larger commodities like macrocores and large polyhedral cores to smaller polyhedral cores and possibly prismatic cores.

Considering the evidence for the forms of obsidian entering the consuming markets of the southern Gulf Lowlands, we should expect to find evidence for the production of macrocores, large and small polyhedral cores at the Zaragoza-Oyameles source area. How the production of cores for export at the source area and the role of Cantona in this exchange were related may be illuminated by a study of the obsidian tools and debitage recovered from the city. Currently, obsidian data from Cantona comes from two sources; surface and excavation data from areas within and beyond the civic-ceremonial core of the city from the Licenciatura thesis of Juan Martín Rojas Chavez (2001), and unpublished data on excavations of state workshops in the civic-ceremonial core of the city generously provided by Dr. Ángel García Cook. Tables 1 and 2 summarize the assemblage metrics for flakes and blades recovered from the excavations of State Workshops #1 & #2 at Cantona (García Cook n.d.). As indicated in Workshop #1, large macroflakes (> 15.5 cm^2) comprise an average of 0.3% of the excavated flake assemblage and medium-sized percussion flakes (15.5 cm^2 – 5.5 cm^2) comprised 2.7% of the excavated assemblage (García Cook n.d.). Core reduction errors such as crested blades and blade overshoots also were recovered. The proportions of these flakes and error debitage support a scenario of some macrocore reduction occurring, but principally emphasize a program of polyhedral core reduction into prismatic cores and blades at the state workshops. The evidence from the more extensive surface survey and excavations conducted in the civic-ceremonial core indicates that macrocores entered the city and where being reduced in non-state workshop contexts, as indicated by the recovery of 1021

Blades

	State Workshop #1		State Workshop #2	
	n		***n***	
>20 mm (width)	657	2.0%		
20-10 mm (width)	14,706	44.4%		
10-5 mm (width)	7,845	23.7%		
<5 mm (width)	2,002	6.1%		
Total Prismatic Blades	25,210	76.2%	105,633	95.8%
Crested Blades	1,643	5.0%	4,614	4.2%
All Blades	**33,086**		**110,247**	

Table 2. Excavated blade quantities and sizes from State Workshops #1 and #2 at Cantona.

decortication flakes, 74 macrocores, 794 polyhedral cores, 292 crested blades and 3708 macroblades found in these contexts (Rojas Chavez 2001:169-194). All evidence indicates that the cores reduced at Cantona were single faceted.

Evidence for biface production also was recovered at Cantona. Rojas Chavez (2001:284-298) recovered 439 bifacial reduction flakes, 82 biface cores, and at least 40 bifaces in the process of being shaped from both elite and nonelite contexts across the city, but not from the state workshops. No mention is given on whether bifacial reduction occurred at these state workshops. Bifaces of Zaragoza-Oyameles obsidian are known to have been used in ritual human sacrifice and dismemberment in the city (Informador 3 May 2012), but where such bifaces were produced is unknown.

Zaragoza-Oyameles Source Area

In the winters of 2012-2014, I conducted an intensive surface survey with collections of the Zaragoza-Oyameles source area. The survey consisted of seven archaeologists walking along parallel transects spaced 5 m apart in plowed and unplowed fields. The locations of all surface tools, such as projectile points, cores, bifaces, and scrapers, as well as all ground stone and ceramics were marked with a hand-held GPS and then collected. Once identified, sites were either 100% surface collected or with a proportional random sample of 5-x-5 m surface units, depending on site size. In total, 1,534 ha (3,790 acres) were surveyed in this manner, resulting in the identification of 50 reduction sites, 3 habitation sites, 117 obsidian exposures, 77 surface extraction pits, and 1 extraction trench.

A total of nine Principal Obsidian Extraction Complexes were delineated from surface materials and features in order to conceptualize obsidian procurement activities (Figure 3). Principal Obsidian Extraction Complexes were defined by the geographical clustering of any combination of open, donut-style extraction pits, obsidian band exposures and associated primary and secondary reduction sites. Of the nine complexes delineated, I will focus on three that offer a broad view of the types of extraction and reduction activities carried out at the source.

Principal Obsidian Extraction Complex #1 is located along the upper lip of the southern edge of the Barranca Acuaco, immediately north of the town of Oyameles (Figure 4). There, some of the

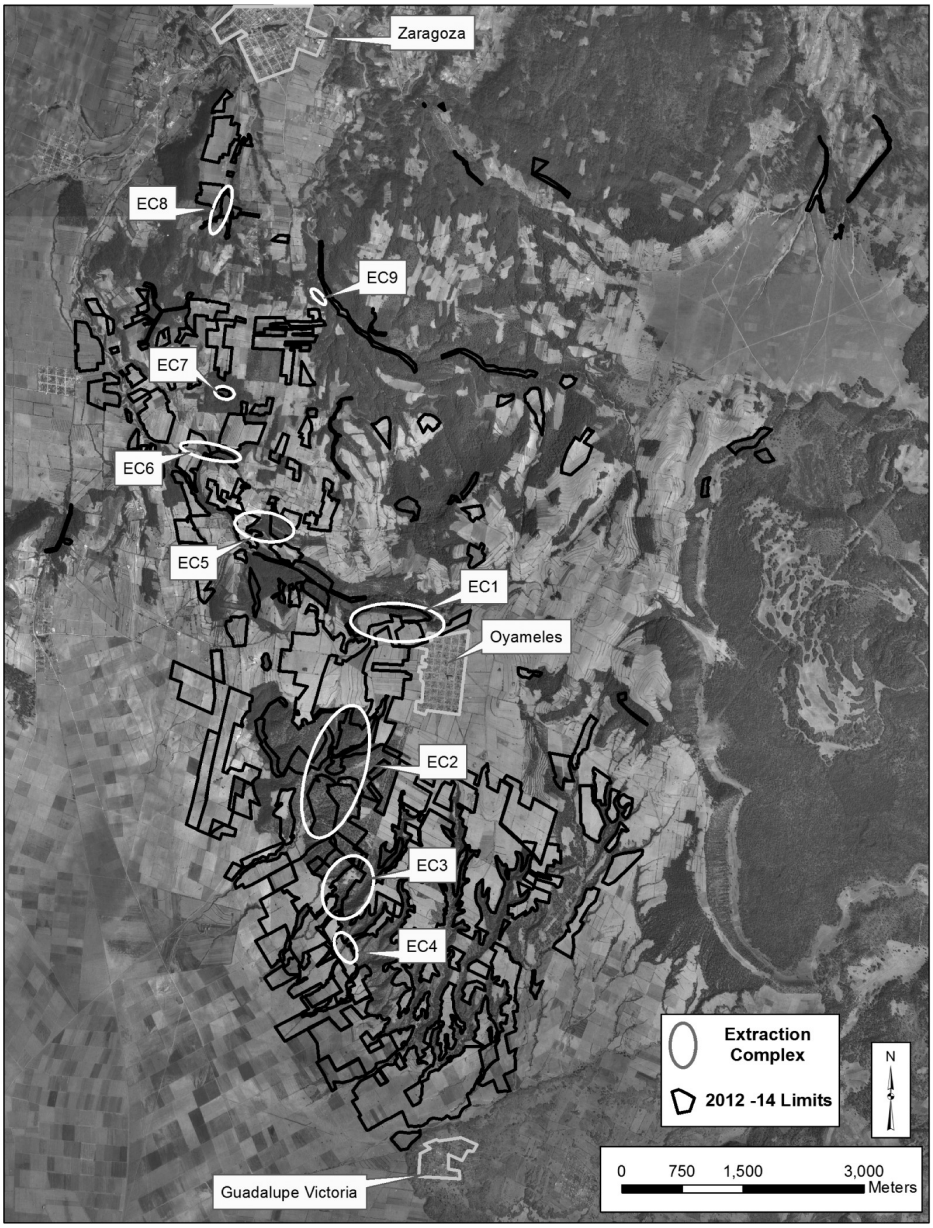

Figure 3: Map showing survey limits and the location of the nine Principal Obsidian Extraction Complexes.

most intensive obsidian extraction activities occurred, manifest in the identification of 9 workshops, 30 donut-style quarry pits and one large extraction trench. Surface data indicates that small, tabular polyhedral cores were produced there, many being rejuvenated as indicated by their multifaceted platforms and subsequent blade removal attempts. However, the cores recovered from the surface likely represent rejects rather than representative examples of the cores exported, and thus may not accurately reflect the reduction activities occurring in this extraction complex. An analysis of the reduction debitage however, better represents the reduction activities. While the bulk of the debitage analysis remains to be carried out, debitage observed and

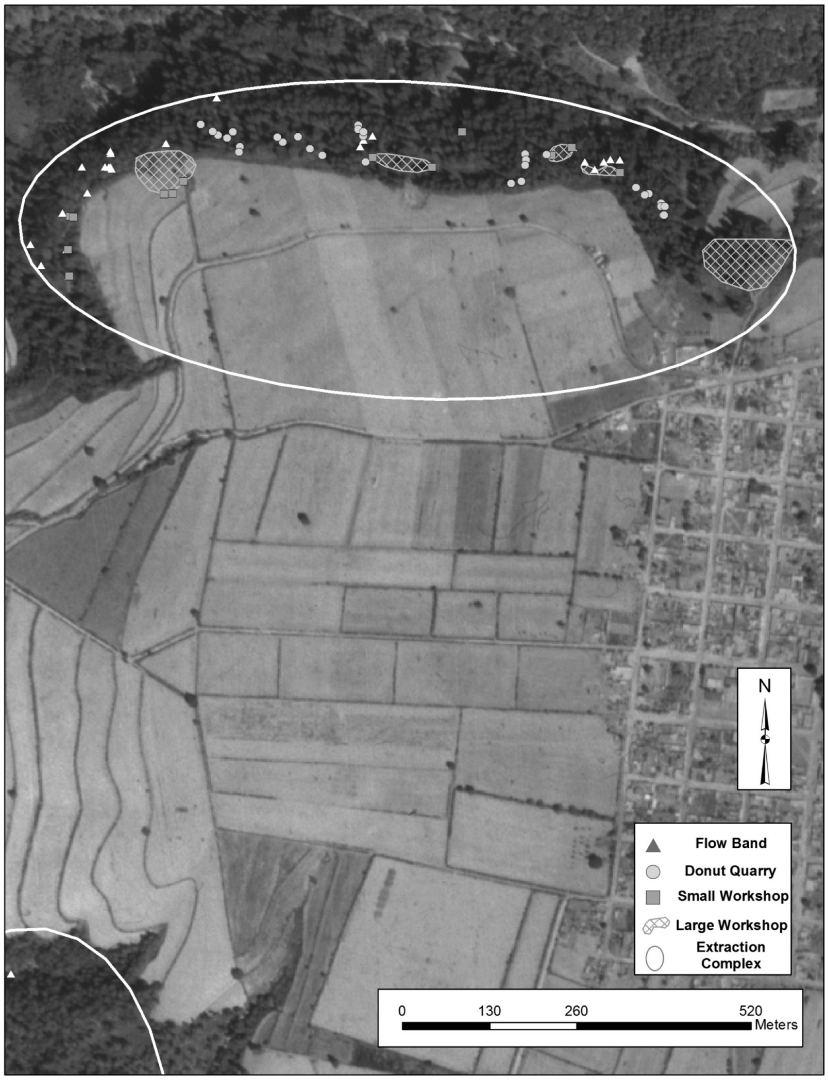

Figure 4: Location of Principal Obsidian Extraction Complex #1 and associated features.

collected adjacent to these quarries indicates that medium-sized macrocores were reduced into small polyhedral cores. Sites of core-blade reduction were concentrated in a band stretching the width of the quarries and extending up to 50 m south of them. Beyond the band of core-blade reduction sites, a concentration of bifaces and bifacial debitage was identified 250 m south of the quarries and core production loci. No off-quarry reduction sites or habitation sites associated with this extraction complex have been identified.

Approximately 4 km southwest of the Barranca Acuaco is Principal Obsidian Extraction Complex #3 (Figure 5), located along the western flanks of the Oyameles dome and centered on a narrow, yet steeply incised unnamed barranca. This extraction complex is the second most intensively exploited area identified during the survey. This extraction complex stood out for the unusually large polyhedral percussion macroblades (e.g. 24-30 cm in length) that were recovered from the surface of reduction sites within the complex (Figure 6). Numerous bifaces

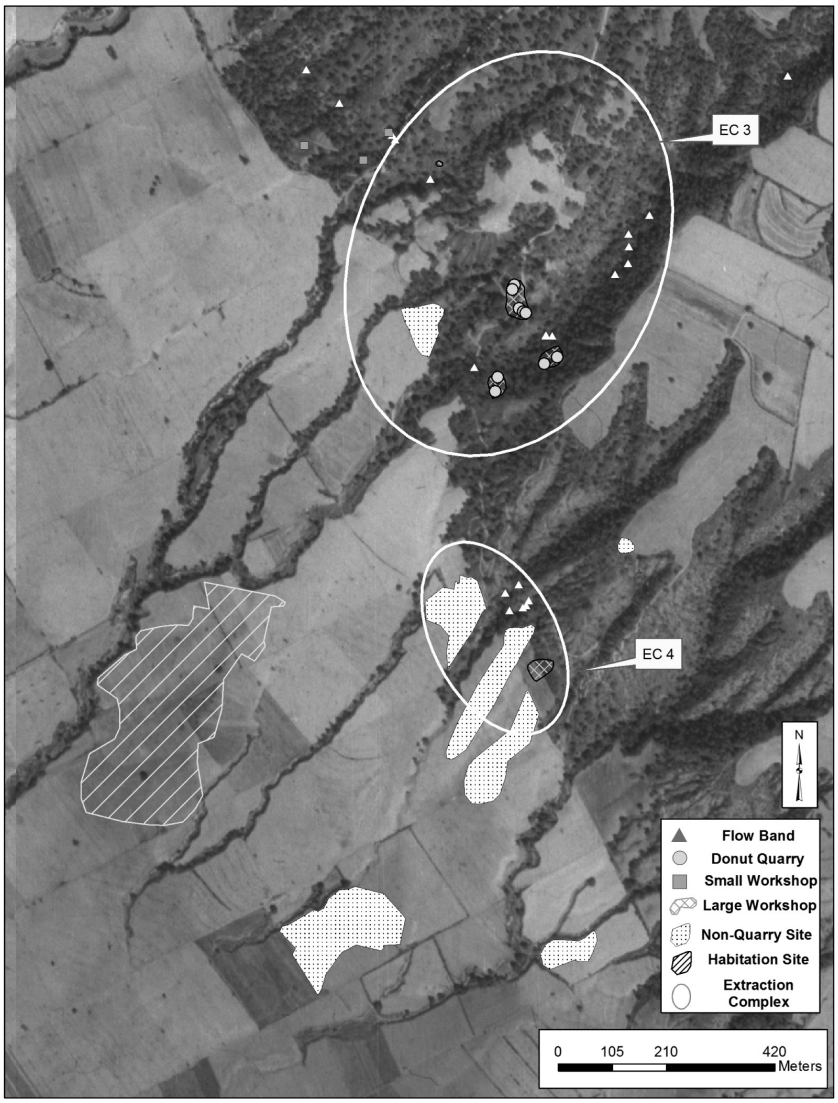

Figure 5: Location of Principal Obsidian Extraction Complex #3 and associated features.

made from these blades also were recovered, indicating that the production of large percussion blades was part of the general reduction sequence from raw material to exportable polyhedral core. This is an example of "linked-sequence" reduction, when more than one commodity, such as blades and bifaces, are produced within a single reduction sequence (Andrews 2002; Hirth and Andrews 2002:10). Several large biface reduction sites also were identified and mapped 300-450 m west, southwest and south of this extraction complex, while core reduction sites have been identified immediately adjacent to the complex, both below and above it.

Related to Principal Obsidian Extraction Complex #3 is Habitation Site #1, identified in 2013. This habitation site is located 600 m west and below the quarries, and covers 17 ha (42 acres) with a high density of surface artifacts, including large cobbles of raw obsidian material, obsidian primary and secondary reduction debitage, polyhedral cores, hammerstones and a variety of domestic refuse such as grinding stones, ceramics and foundation stones. The size

Figure 6: Three macroblades from the surface of Principal Obsidian Extraction Complex #3.

of the site and the types and quantities of artifacts identified there indicate that it was permanently or semi-permanently occupied by specialists in the production of polyhedral cores, and their families. A few biface fragments also were recovered from the surface of the site, but whether they were produced there or used there has yet to be determined.

Finally, Principal Obsidian Extraction Area #6 (Figure 7), is a small, well defined complex 3 km northwest of the Barranca Acuaco centered on a series of 7 open quarry pits referred to as Workshop 34. This extraction complex is located in an area of drastic topographic relief and dense pine and oyamel cloud forest. The initial reduction of quarried material at Workshop 34 produced macroblades 40-49 cm in length, reflecting the large size of the obsidian blocks extracted. This large size is also seen in the polyhedral cores that were being produced there, as those recovered from the surface of reduction Site 36, located on the level plain below and 450 m west of Workshop 34. Site 36 covers .34 ha (.84 acres) and 22 polyhedral cores, as well as hammerstones, a scraper and ceramic sherds were recovered from its surface, yet not a single biface or biface fragment. This contrasts with the surface assemblages adjacent to the other two extraction complexes under discussion and indicates that linked-sequencing of polyhedral cores and biface blanks was not part of the reduction strategy in Principal Obsidian Extraction Complex #6.

Discussion

Although this discussion on the production of cores is based on a preliminary analysis, the overall impression from the Zaragoza-Oyameles source area is that polyhedral cores were the principal core type produced and exported. Some specialized macrocores, it appears, were being reduced at the source for their large macroblades before being transported from the source area as polyhedral cores. Therefore, while it is certainly possible that macrocores were produced and removed from the source area, the debitage recovered and thus far analyzed suggests that far fewer macrocores were being produced and removed than polyhedral cores.

Macroblades and macroflakes were identified at all extraction complexes, yet evidence for the production of macroblades as biface blanks in linked-sequence reduction was only evident at one, or possibly two, of them. Even though extremely large macroblades were produced at Principal Obsidian Extraction Complex #6, the fact that they were not being used as biface blanks suggests that linking biface blank production to the general core-blade reduction sequence was not solely dependent on practical considerations, such as the size of available obsidian cobbles, the ability to produce large

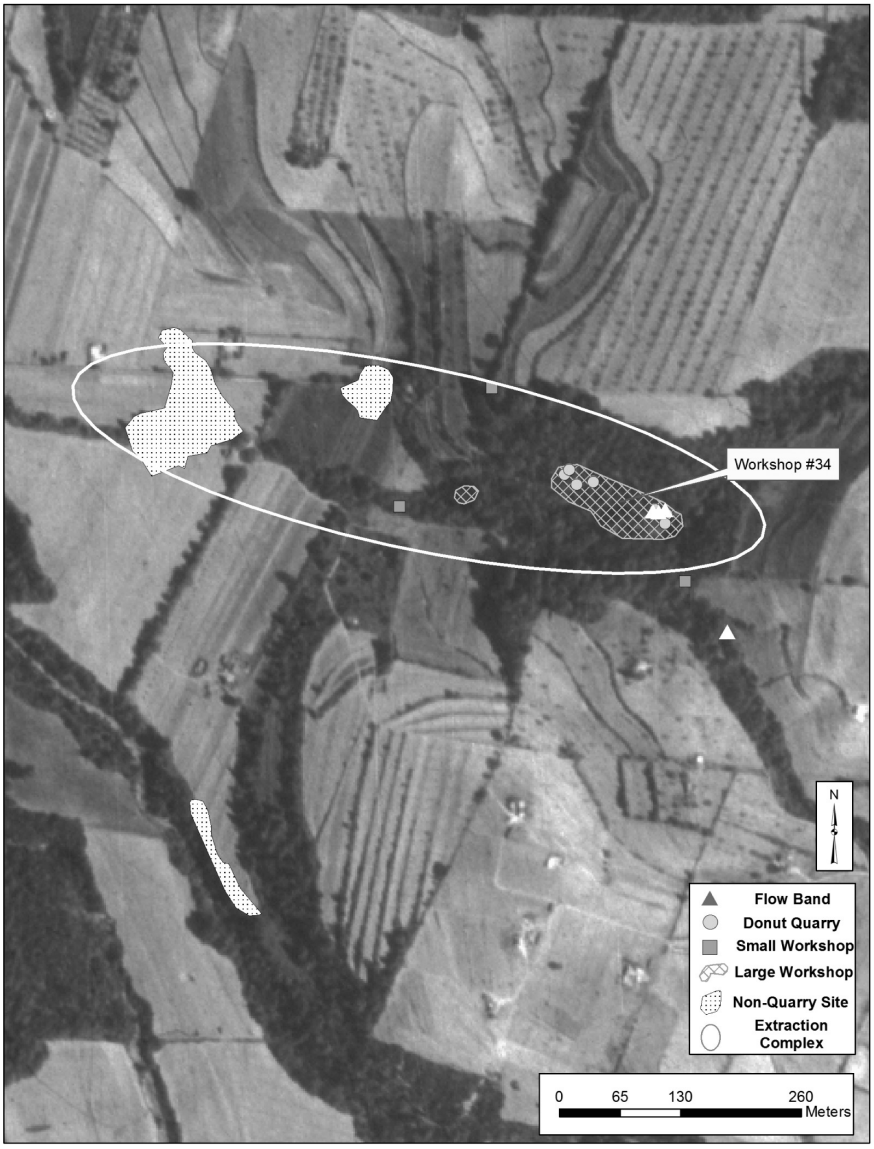

Figure 7: Location of Principal Obsidian Extraction Complex #6 and associated features.

macroblades from them, or efficiency maximizing behavior. Rather it may reflect the relationship between this relatively distant, topographically varied and relatively small workshop and the consumers of such blades and/ or biface blanks, like Cantona.

At Cantona, macrocore reduction and biface production is apparent from elite and non-elite areas of the city. At State Workshops #1 and #2, the preliminary evidence suggests that while macrocores were being reduced there, it was essentially large polyhedral cores (i.e. "núcleos o protonúcleos" [García Cook n.d.]) that were being reduced into prismatic blades. There is no mention of bifacial production at these state workshops. Therefore, the principal obsidian product of the two state workshops discussed in detail appears to have been prismatic blades, and possibly prismatic cores. Some evidence from Workshop #1 suggests that some of the prismatic blades were used locally for autosacrifice, however the majority of them are believed to

have been made for export (García Cook n.d.). What then, do we make of the fact that Zaragoza-Oyameles obsidian was entering the southern Gulf Coast as macrocores and polyhedral cores?

We know that the transport of finished prismatic blades over long distances is risky business, due to the higher possibility of damage to the finished blade edges compared to the movement of some type of core and then the reduction of blades at the consuming site. However, whole-blade has been documented at several Formative period sites in the Valley of Oaxaca and the Basin of Mexico (De León et al. 2009:120-123). Could it be that the prismatic blades produced in the state workshops were to be consumed elsewhere in the city or in the city's immediate hinterland? Evidence for obsidian working appears to be wide-spread across the city (Rojas Chavez 2001) and therefore blade production in the state workshops for local consumption seems unlikely. Considering the evidence from the southern Gulf Coast, the fragility of prismatic blades and the reduction activities known to occur in the city, it is most likely that these blades, if exported, were not transported over great distances. It is possible that many, if not most, of the other 350+ obsidian workshops identified at Cantona were producing cores for export. The surface and excavation evidence presented by Rojas Chavez (2001) strongly suggests macrocore and polyhedral core production. However, until there is a more detailed study of these obsidian assemblages, it is not possible to say for certain how the products of these workshops were being used. Nonetheless, a city the size of Cantona, with a population believed to have been around 10,000 by 300 B.C., 50,000 by 400 A.D. and 90,000 at its apogee around 750 A.D. (García Cook 2003:339) most certainly would have consumed a large amount of finished obsidian tools like blades, scrapers and bifaces for its daily utilitarian and non-utilitarian tasks.

That the obsidian working the city appears to replicate the obsidian reduction activities occurring in the source area is of great interest too. The lack of clear-cut breaks in the stages of obsidian core reduction between source area and within the city (e.g. initial reduction found both at the source and in Cantona workshops) complicates interpretations of the nature of the relationship between Cantona and the source area. For instance, what does Habitation Site #1 and Principal Obsidian Extraction Area #3 suggest about Cantona-source area interaction? The area of the state workshops at Cantona is located 16 km to the southeast of Principal Obsidian Extraction Area #3, while the northern suburbs of the city, where core production evidence was recovered from the surface (Rojas Chavez 2001), are located only 7 km from the extraction area. Either way, inhabitants of the city were close enough to the source quarries for daily or multi-day trips, making permanent habitation at the source unnecessary. However, permanent habitation at the source area specifically to produce polyhedral cores did exist. Therefore, if the inhabitants of Cantona were receiving all their obsidian commodities from these source-based workshops, then we would not expect to find any, let alone the quantity of, macrocore and large polyhedral reduction debitage like that found in the surface survey and excavations in the city. The same can be said about biface blank production, which occurred at specific loci of the source area, as well as in the city. Obviously something more complicated and nuanced than a simple situation that inhabitants of the source area were producing obsidian commodities for the inhabitants of Cantona to consume and export took place. The archaeological investigation of Cantona is on-going and the analysis of the collected material from the source area is not yet complete. Perhaps macrocores and polyhedral

cores produced in the source area did not pass through the city of Cantona before entering regional exchange systems. While it is also a possibility that Cantona was only producing commodities for export and commodities at the source were being produced for consumption by the inhabitants of Cantona, I feel that the evidence for prismatic blade production at Cantona and the absolute lack of such production in the source area, makes such a scenario less likely.

Conclusions

The Zaragoza-Oyameles Regional Obsidian Survey has thus far illustrated the complexity of the production and distribution system between the city of Cantona and its adjacent obsidian source area. Obsidian reduction in the city appears to have produced a greater variety of obsidian commodities than at the source area, although much of those reduction activities overlapped. As such, either location, or both, could have been producing the commodities which ended up at consumer sites in areas like the southern Gulf Lowlands. Several intensively quarried areas of the Zaragoza-Oyameles source area, as well as one permanently inhabited reduction workshop, located within an easy day's walk of Cantona, are interpreted as representing intensive production of commodities for export, while the inhabitants of Cantona appear to have been producing a number of commodities that they themselves may have consumed. However, variation in the size and form of the commodities being production, and raw material accessibility in the source area, including distance to each Principal Obsidian Extraction Complex, may correlate to variation in the nature of the relationship between different zones of the source area and Cantona, and in turn the mechanics behind the distribution of Zaragoza-Oyameles obsidian throughout western Mesoamerica.

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Maya Coastal Adaptations in Classic and Postclassic Times on Ambergris Caye, Belize

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Introduction

The sea has always been integral to Maya thought. Its powerful associations with life, death, rebirth and what we describe as the 'supernatural' world could be said to be most strongly apparent to those who lived on the east coast of Yucatan, where the sun rose and the earth was renewed each day (Miller 1973; Taube 2010:204). The sea was also a source of abundance. It provided important commodities such as salt, fish, shellfish, as well as shells, stingray spines and a variety of other marine resources. The sea was integral in other ways to Maya cultural development. Coastal canoe trade in all manner of goods bound mainland and island communities from at least Late Preclassic times (Andrews 1990; McKillop 1989:4). Maya seascapes, however, remain relatively understudied in comparison with Maya landscapes and mainland dynamics (Finamore and Houston 2010:15). The results of archaeological research on the island of Ambergris Caye, Belize, indicate that the Precolumbian Maya groups who lived on the island were quite well integrated into what has been termed the "Mesoamerican World System" (Smith and Berdan 2003). These coastal Maya specialized in the production and exchange of key commodities and luxury goods, and they participated in a well-developed circum-peninsular trade network with links extending deep into the interior of Yucatan.

In this paper we explore Maya coastal activity during Classic and Postclassic times using information from the site of Marco Gonzalez, Ambergris Caye, Belize (Figure 1). First, we describe the locale and the archaeological work spearheaded on the caye by Tom Guderjan, Jim Garber, and Herman Smith (Guderjan and Garber 1995). We then summarize the excavation history of Marco Gonzalez; we present what we know about local chronology and discuss information acquired to date on the site's role in trade and exchange.

Settlement and Brief Research History of Ambergris Caye and its Sites

Ambergris Caye is located on the east coast of the Yucatan Peninsula. It is aligned, more or less, along the rim of Belize's coastal shelf and is the northernmost of a string of islands or cayes that dot the rim of the shelf and extend southward to the Bay of Honduras (Wallace 1997:73). The caye is 39 km long and no wider than 4 km at any point; the reef lies only about 150-160 meters to

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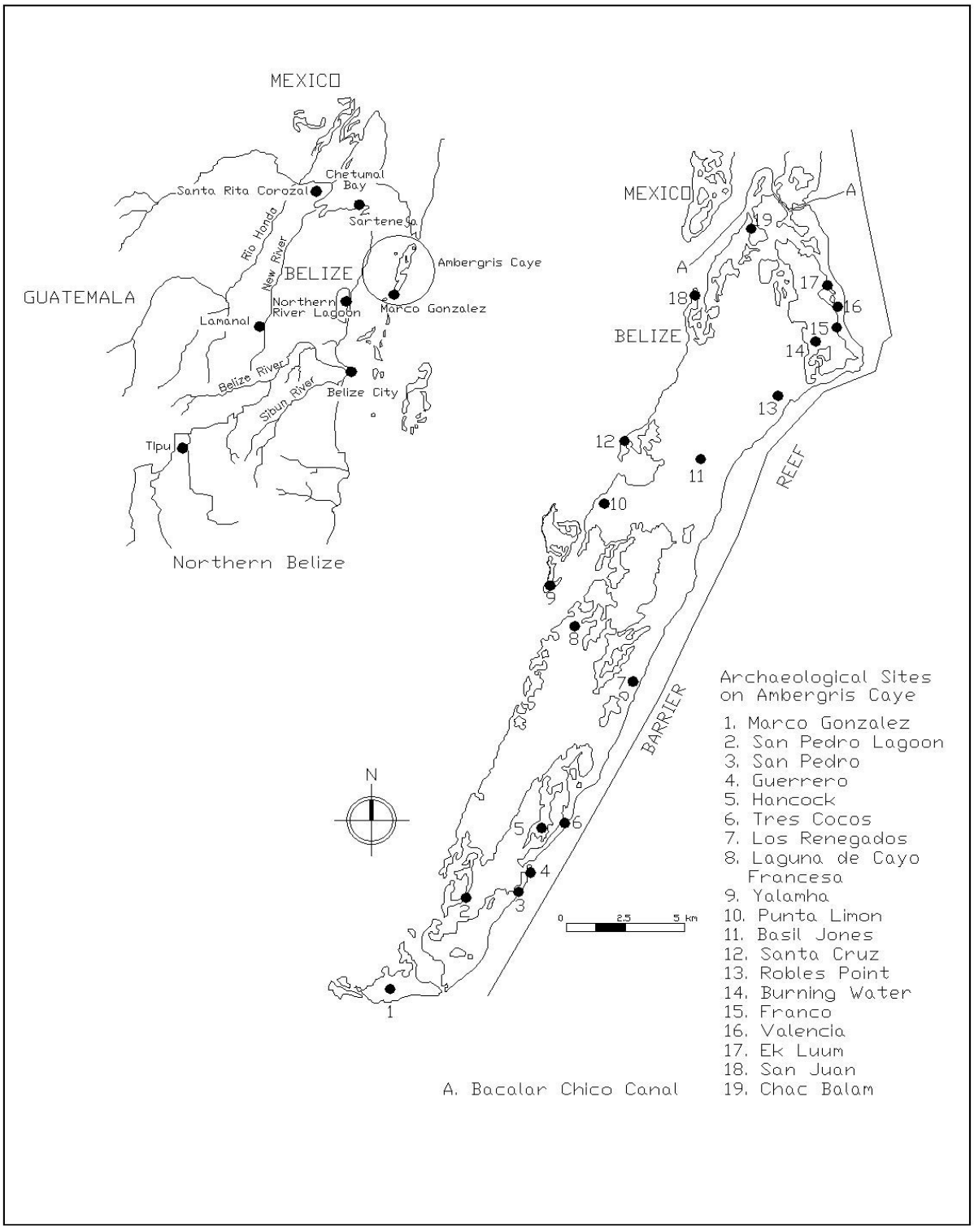

Figure 1: Location of Marco Gonzalez and other Ambergris Caye archaeological sites. Drawing by Jon Begue.

the east. Waters within the reef, owing to the shallow depth of the coastal shelf, are significantly calmer than outside the reef, but we know that the Maya plied the waters outside the reef as well as inside because evidence of Maya activity has been found at two of the atolls (MacKie 1963; Graham 1989). The reef and the coastal shelf it borders afforded protection from storms and large waves and also provided an ample supply of marine foods.

Although Thomas Gann was the first to survey Ambergris Caye nearly a century ago (Gann 1926), Tom Guderjan and the other members of the Ambergris Caye Archaeological Project (ACAP) conducted the first comprehensive archaeological survey of the island between 1983 and 1990 (Guderjan and Garber 1995). They identified 22 separate sites and 2 canal complexes, and excavated portions of several of these, including San Juan, Chac Balam, and Ek Luum (Guderjan 1995; Guderjan et al. 1989), three of the northernmost sites on the island (Figure 1). Information from these sites is compared here with information from our work at Marco Gonzalez as a way to gain a more comprehensive picture of changing Maya lifeways on Belize's largest barrier island.

In terms of settlement dichotomy, all but one of the sites on the leeward side of the island are classified as large in size (large at least for the island), whereas all of the sites on the windward side are either small or medium in size. All leeward sites also have harbor features of some kind, formal architecture, and quantities of exotic materials such as obsidian, jade and ceramics obtained through coastal trade (Guderjan 1995:29). It appears that the larger sites with access to the leeward side of the caye, including Marco Gonzalez, were active participants in coastal trade, while the smaller sites on the windward side of the island focused primarily on marine resource acquisition (Guderjan et al. 1989).

A prominent feature of Ambergris Caye is the Bacalar Chico Canal (Figure 1), a tidal passage that now separates Mexico's Xcalac Peninsula from Ambergris Caye. Use of the canal would have been advantageous to Maya traders in at least two key ways: it would have allowed them to avoid the perils of going outside the protection of the barrier reef at the aptly named Rocky Point, where the coral reef converges with the shore of the island for around 1 kilometer; and it would have greatly shortened the distance traders coming from the north would need to travel to reach the calmer waters of Chetumal Bay and inland rivers beyond.

The work of the ACAP has shown that most sites on the island were occupied during Late and Terminal Classic times. Marco Gonzalez, however, has earlier Late Preclassic and Early Classic components, although the deposits dating to these periods are now largely below present sea level (Graham and Simmons 2012a). Marco Gonzalez was intensively occupied until the 13th century or so, after which time mangrove encroachment and coastal sedimentation impeded access to the sea (Dunn and Mazzullo 1993). After this time, some activity continued, if intermittently, until the early historic period, although the main center of activity on the island from the Middle to Late Postclassic period was San Pedro, the modern town that lies about 8 km north of Marco Gonzalez (Graham and Pendergast 1987, 1989, 1994; Pendergast and Graham 1987, 1990).

Marco Gonzalez, Ambergris Caye, Belize

Marco Gonzalez, the largest site on the caye, is located near the southern tip of the island (Figure 2). It is now a relatively small area of elevated terrain measuring approximately 355 m x 185 m, or about 6.6 hectares in size (Graham and Pendergast 1989). It is surrounded largely by

Figure 2: Air photo of southern tip of Ambergris Caye. The Marco Gonzalez site can be seen as the oblong-shaped stand of trees in the left-center of the image. View southeast.

mangrove vegetation that is seasonally inundated (*Rhizophora mangle, Avicennia germinans, Conocarpus erectus*). In contrast, vegetation on the site itself is characterized by species such as gumbolimbo (*Bursera simaruba*), strangler fig (*Ficus sp.*) saltwater palmettos (*Thrinax* sp.), white poisonwood or *chechem* (*Cameraria belizensis*) and coconut palms (*Cocos nucifera*).

Geomorphological research has revealed that over the last two millennia, sea levels have risen about 60 cm on Ambergris Caye (Dunn and Mazzullo 1993) and there has also been accretion of sediments, which, as noted above, ultimately encouraged the growth of mangrove around the site. In the Late Preclassic period, however, and through most of its history as an active settlement, Marco Gonzalez seems to have been open to sea breezes with access to the sea on both windward and leeward sides (Dunn and Mazzullo 1993; Graham 1989).

Differences in plant communities on the site are believed to be attributable to the nature of the anthrosols and their parent materials, and although we cannot say much at present, a recent botanical survey will yield information on the details of plant biodiversity. The soils are mined locally for gardens on the island, and indications are that anthropogenic components of the archaeological sediments—fish and animal bones, human bones, other food refuse, pyrogenic carbon that resulted from Late Classic salt processing activity, and thousands of shells from Precolumbian middens—may have played a role in the formation of the surface soil characteristics (Graham 2006).

Brief Excavation History of Marco Gonzalez

The information we have on Marco Gonzalez

comes from a number of small-scale excavations (Graham 1989; Graham and Pendergast 1989; Graham and Simmons 2012b; Pendergast and Graham 1987, 1990). After being taken to the site by a young San Pedrano named Marco Gonzalez, Pendergast and Graham began test excavations at the site in 1986 (Graham and Pendergast 1989). More intensive excavations were carried out in 1990, with more limited work in 1992 and 1993. These investigations revealed that the site had been both a busy and prosperous trading port in the Terminal Classic and Early Postclassic periods. Similarities of pre-Terminal Classic deposits to strata encountered at the Colson Point sites in Stann Creek (Graham 1994)—as well as to other sites on the caye and the mainland—led Graham to consider that the site was also a locus of salt production.

After a 17-year hiatus, work directed by the co-authors began in 2010 and continues today (Graham and Simmons 2012a, 2012b; Simmons and Graham 2014). To date 49 separate structures have been identified and mapped at Marco Gonzalez (Figure 3). All are fairly low platforms ranging in height from 30 cm to 4.2 m. Six different plaza groups have been identified and these are spread throughout the area of the site. A number of isolated structures also are present, including several in the northwestern area of the site, Structures 26, 27 and 28, that are made up of no less than 50,000 conch, mainly Queen Conch (*Strombus gigas*), West Indian chank (*Turbinella angulata*) and helmet shells (*Cassis tuberosa*). Shells also litter the surface of the site and spread out into the mangrove swamp. All reflect ancient midden deposition as well as "swamp filler." The shells and other midden debris, such as discarded potsherds, comprise what remains of core material used, probably in the Early Postclassic, in the construction of platforms, which originally were terraced and faced with reefstone. The facing stones were likely quarried from Pleistocene limestone deposits—generally called reefstone—located in the shallow waters of the leeward-side lagoon. This limestone material, formed on the coastal shelf and made up of dead coral, compressed shell and sand, was used in the construction of low platforms beginning at least as early as the Early Classic (Graham and Simmons 2012b). Other structures in the site's center, such as Structures 12, 14 and 19, used the vast deposits of salt processing debris as core material, but platform terrace faces were constructed of reefstone.

Local Chronology, Trade and Exchange

Although a number of structures have been tested throughout the site area, excavations have focused mainly on two adjacent large residential structures at the south end of the central plaza, Structures 12 and 14 (Figure 3). Evidence so far indicates that these structures were first built at the end of the Classic period, perhaps in the latter half of the 8th century, with occupation continuing through the 9th and part of the 10th century. Modifications seem to have taken place, including the addition of giant riser stairs on Structure 12, probably in the late 10th or 11th century, with occupation continuing into the Early Postclassic. The origins and kinds of grave goods accompanying many of the 44 sub-floor burials indicate that the residents of both structures enjoyed some level of elevated social standing in the community. Ceramics from the graves date from the end of the Late Classic period through Terminal Classic times. Polychromes, generally simple in design, are present but give way to monochrome wares such as Fine Orange, plumbate, Augustine Red, and possibly Teabo Red.

During at least the Late Classic and possibly earlier the Maya of Ambergris Caye were clearly engaged in the production of shell objects. Artisans at Marco Gonzalez, San Juan, Ek Luum

Figure 3: Marco Gonzalez Site Plan.

and Chac Balam were fashioning ornamental shell objects as well as more utilitarian forms, including 'cups' or possibly eating utensils made from cut shells (Garber 1995:125-135)(Figure 4). No formal studies have been completed on shell production as an aspect of economic life at Marco Gonzalez, although one is underway by Petra Cunningham. Numerous cut shell pieces, along with shell "blanks" and finished objects, have been observed during excavations and on the ground surface. Many of the pieces of manufacturing debris as well as worked conch and olive shell objects are nearly identical to those reported at other lowland sites (Alonso

Figure 4: Shell jewelry from Marco Gonzalez. Note the quadripartite and quincunx designs. The quincunx shaped conch piece was recovered with a group of grave goods found at the left elbow of Burial 14/35.

2013; Emery and Aoyama 2007; Hohmann 2002; Isaza 2004). Olive shells, many of which have had their spires removed, were notched, drilled, incised or otherwise worked. Such shells were often sewn together on garments as tinklers used in extravagant performances by Classic Period rulers (Finamore and Houston 2010:35, 103, 104; Miller and Taube 1993:153) and have a wide distribution throughout the Preclassic and Classic periods in the lowlands (Kidder et al. 1946). In addition to tinklers, finely made shell pieces including adornos, ear pendants and other ear ornaments very similar to those found at Marco Gonzalez have been recovered from the northern Ambergris Caye sites of Chac Balam and San Juan (Garber 1995:128).

Shell jewelry and other grave goods recovered in association with burials excavated at Marco Gonzalez, and at northern caye sites, reveal the strength of trade and exchange connections enjoyed by the island's elites from the closing years of the Late Classic, through the Terminal Classic to about A.D. 1200. At Marco Gonzalez a number of burials in Structure 14 included goods obtained from distant locations as

Figure 5: Burial 14/35 from Structure 14. Note the grave goods at left elbow.

well as finely crafted objects from local sources. For instance, excavation of Burial 14/35 revealed a group of objects that had been placed on the left elbow of the individual (Figure 5)(Graham and Simmons 2012a). Two exhausted obsidian cores from El Chayal, a bone spatulate object, and two worked shell ornaments, including a finely crafted quincunx style piece (Figure 4) were found. Other Structure 14 burials included distinctive polychromes, including one with the

Figure 6: Polychrome vessel with sectioned conch shell design from Str. 14 (l). Illustration by Louise Belanger (r).

image of a sectioned conch shell with spiral designs (Figure 6).

A number of the burials at the Ambergris Caye sites were found in either flexed or supine positions, with a great many at Marco Gonzalez lying either face down or less frequently on their backs with knees bent and lower legs crossed (Figure 5). Some of the burials encountered at Chac Balam and San Juan were in these same positions. Further connections among the islands' sites can be seen in the ceramics they shared. Tohil Plumbate and Augustine Red vessels were found accompanying burials at both San Juan and Marco Gonzalez (Valdez et al 1995; Simmons and Graham 2014). For example, San Juan Burial 5 in Structure 3 and Marco Gonzalez Burial 32 in Structure 14 each had an almost identical pedestal -based Augustine Red tulip-shaped vase (Figure 7). These various lines of evidence lead us to speculate about the nature of the relationships that existed among the Maya living in these island communities. Their locations, similar occupation histories, and the regularity of coastal canoe travel suggest that the Maya of San Juan and Marco Gonzalez were almost certainly in communication, perhaps regularly.

With regard to post-Terminal Classic occupation at Marco Gonzalez, Early Postclassic (Zakpah Orange-red and Zalal Gouge-incised) pottery appears in quantity but largely as sherds on the surface and in immediate sub-surface deposits, and seems to be associated with activity in which the Terminal Classic structures were modified ("giant riser stairs") and used until about the beginning of the 13th century. After this point any intensive activity at the site decreases. Research carried out by Dunn and Mazzullo (1993) suggests that this decrease in activity occurred sometime around A.D. 1200, owing to the increasingly dense mangrove vegetation that

Figure 7: Nearly identical pedestal based Augustine Red tulip-shaped vases found at San Juan (l) and Marco Gonzalez (r).

ultimately cut off the site from the sea and the lagoon. Beyond the 13th century A.D. there is evidence of only occasional activity, such as the deposition of a cache in the early Colonial period, we think 16th century, in which vessels with applied effigy heads were buried in the giant riser stairs of Structure 12 (Graham and Pendergast 1989).

At the other end of the continuum, Chicanel pottery occurs but is out of context and mixed with later deposits. Its presence tells us that the site was occupied during the Late Preclassic—to be conservative around 100 B.C., but very possibly earlier. Late Preclassic and a portion of the Early Classic deposits lie below the modern water table and are therefore very difficult to investigate. Early Classic and specifically Tzakol 1 deposits, however, have recently been delineated in test pits excavated in 2013. Two Tzakol 1 basal flange polychromes were discovered in the process of removing a soil micromorphology monolith from a section wall of Op 13-1, Str. 14. Both were heavily fragmented but seem to have been deposited one inverted atop the other. Whether they were part of a cache or were burial accompaniments was not possible to determine.

The Early Classic deposits are reasonably substantial. Str. 14 overlies an Early Classic reefstone platform of some kind, and an Early Classic floor showed up in a looter's pit, which was cleared in 1986. Early Classic and Terminal Preclassic levels have produced thousands of fish bones and shells that were apparently food refuse, as well as a great deal of debris from chert knapping. Some of this chert knapping may be related to the production of shell tools and ornaments at the site (Simmons and Graham 2014). Overall the information we have on the Early Classic suggests that a substantial community resided at the tip of the caye. They were heavily involved in marine resource extraction but were also involved in trade, with a main item being polychrome pottery. The

indication is that polychrome vessels were being transported up and down the coast and then to inland trade networks (Graham 1994).

By the beginning of the Late Classic—ca. A.D. 550/600, we see a remarkable change at the site. Large quantities of crude, unslipped, orange-paste sherds from quartz-tempered bowls are found layered with spreads of ash and charcoal. Called originally Coconut Walk unslipped ware by Graham (1994:153-156), the pottery comprises poorly fired ceramic bowls, which initially were thought to have functioned as moulds for salt cakes. They are generally above 30 cm in diameter, however, which could be too large for a cake. The bowls seem to have been used to contain the brine as the water was driven off by heating (McKillop 2007; Reina and Monaghan 1981). No bowl bases have yet been recovered; all of the sherds are from the sides and rims. This suggests strongly that the bowls were set directly on or over fires or hearths and that the bases disintegrated in the heating process. In any case the bowls seem to have been discarded once the water from the salt had evaporated and the salt was removed. Coconut Walk sherds have been recovered in abundance from San Juan, Chac Balam, Ek Luum and San Pedro Town (Graham and Pendergast 1994; Guderjan and Garber 1995; Valdez et al. 1995).

All indications are that salt processing was not a subsistence activity but instead was a major export industry in Late Classic times, and compelling archaeological evidence exists for the production of substantial quantities of salt all along the Belize coast at this time (Andrews and Mock 2002; Graham and Pendergast 1989; McKillop 2002, 2005, 2007; McKinnon and Kepecs 1989; Mock 1994). Processing activity at Marco Gonzalez seems to diminish at the end of the Late Classic, probably sometime in the late 8th century AD. The timing entangles the cessation of salt supply with the mainland political collapse, but in what ways we do not yet know.

Following the cessation of the Belize salt industry in the late 8th century, or perhaps as early as A.D. 750, the saltworks along the coast of Yucatan leap to prominence (Andrews 1983; Andrews and Mock 2002; Kepecs 2003; McKillop 2002). Nonetheless the prosperity of the Terminal Classic town built over the remains of the salt industry at Marco Gonzalez seems to have been undiminished, although its wealth and power must have been derived from a source other than salt export. Capitalizing on coastal trade and exchange as a "service" may have become a prominent part of economic life on the caye once more (Graham 1989).

Evidence for a range of other activities is abundant at the site but cannot be correlated to restricted periods, and it is likely that these activities may well have been indicative of many periods. For example, Maya merchants on Ambergris Caye brokered trade and exchange in ceramics, lithics (both chert and obsidian), shell and presumably other items such as salted fish and other marine resources. Jade artifacts have surfaced on the island—the occasional bead or even ear flare brought up by the land crabs, and a jade celt was discarded, presumably by accident, by looters (Graham and Pendergast 1989), but the quantity recovered is minimal enough to suggest that the jade may have been the property of individuals living on the caye rather than a trade item. Curiously, no copper artifacts have been found as yet at the Ambergris Caye sites, although copper objects were circulating around the Yucatan Peninsula by Early Postclassic times, if not earlier (Simmons and Shugar 2013). This seems likely the result of sampling bias, at least at Marco Gonzalez, as much of the work conducted there to date has focused on Terminal Classic and earlier deposits. It is clear, however, that the efforts of these coastal merchants and their families resulted in the economic integration of

communities on the caye into larger commercial networks that operated throughout the highlands and lowlands over time.

For example, recently completed X-Ray fluorescence analysis of 110 pieces of obsidian from various contexts at Marco Gonzalez indicates that the volcanic stone was obtained from eight different highland sources. Just over 80% of the assemblage comes from El Chayal and Ixtepeque, whereas lesser amounts of central Mexican obsidian from Pachuca and Ucareo are present. Provenience analyses of obsidian from San Juan (Guderjan et al. 1989) revealed five different source locations, with nearly three quarters of the sample originating from El Chayal. By comparison, excavations at Isla Cerritos, the probable trading port for Chichén Itzá, produced obsidian from seven different sources, with Pachuca obsidian comprising almost half (48%) of the assemblage (Andrews 1990; Andrews et al. 1988:204). Although it appears that the Ambergris Caye sites probably functioned more as coastal transshipment points rather than specialized ports of trade for large inland polities, the range of sources from which obsidian came to the Ambergris Caye sites and Isla Cerritos is comparable. Unfortunately, solidly datable contexts are lacking for much of the sample from Marco Gonzalez, so it is not yet possible to examine trends in obsidian procurement over time.

Interaction, migration, exchange

We have described above how our data bear on knowledge of the kinds of objects and materials exchanged and when these exchanges occurred, but what can be said about interaction and migration? Although all periods involve interaction with both the mainland and other coastal communities, there do seem to be periods when Marco Gonzalez is more focused on delivery to the nearby mainland communities and other times when energies are directed towards keeping circum-peninsular traffic and commodities moving. For example, we hazard on the basis of present information that the Late Classic salt trade was directed towards nearby lowland mainland communities; Terminal Classic energies were taken up in circum-peninsular movement of commodities; Early Postclassic activity again focused on the mainland, and particularly Lamanai and other communities producing Zakpah Orange-red and Zalal Gouged-incised pottery (Howie 2012; Ting 2013). Then in the later Postclassic, as indicated by work at the San Pedro site, circum-peninsular currents picked up again with intensity.

Migration is often more difficult to discern from the archaeological record. Nonetheless, the appearance of the face-down, bent-leg burial position in the Terminal Classic seems to represent a significant change in worldview (Graham et al. 2013). The face-down position, from its first appearance at Marco Gonzalez, San Juan and Chac Balam in the Terminal Classic, seems to dominate on the caye through the Postclassic, as evidenced at San Pedro up until contact (Glassman 1995:74-75; Pendergast and Graham 1990:4). Are we seeing new people on the caye in the Terminal Classic? Or have locals simply adopted a new religious or cultural orientation? These questions cannot be answered at this juncture, although isotope and other analyses may one day shed light on this issue. What we can propose, however, is that coastal communities were probably always mixed, and exposed to international trends and currents on a frequent basis as the result of trading activities. Combined with information from mainland communities that can be dated to specific periods, it may be possible to track movements of people or ideas across landscapes as well as seascapes. In any case it is clear that seascapes cannot be excluded in addressing major questions of

regional or inter-regional interaction among the ancient Maya.

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NOTE

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Costa Rica and the Maya: Prestige Goods and International Relations

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Introduction

The presence of Mesoamerican jadeite artifacts, especially Early Classic Maya jade belt plaques, in Costa Rica has been interpreted as a typical example of the core-periphery model of exchange (Lange 1986). That is, the less socially complex Costa Rican societies acquired these items to be displayed as prestige markers whose local value was based on their association with the "foreign" and the "distant" (e.g. Helms 1979). However, research also has identified a surprisingly large number of Costa Rican objects found in Mesoamerica, especially the Maya region, prompting a reevaluation of their implications for ancient interaction (Mora-Marín 2002, 2005a, 2005b, 2008). Our investigation of the exchange in prestige objects between Mesoamerica and Costa Rica reveals a far more complex scenario of interaction that calls into question the conventional core-periphery model, with the focus of this paper being the imported jades in both regions.

The majority of Mesoamerican objects found in Costa Rica comprise Classic Maya jadeite belt plaques (Stone 1964; Fields and Reents-Budet 1992). These royal objects were seminal parts of regal garb of Maya rulers, their value and symbolic significance being such that they descended from ruler-to-ruler as heirlooms signifying royal lineage and authority. Many are incised with imagery that, in essence, transforms them into miniature stelae. One side features a portrait of the ruler as the Maize god and the *axis mundi*, the fundamental ideology of Classic Maya royal authority which was first articulated in Formative times by the Olmec of southern Mexico (Reilly 1990). The basic principle of this Mesoamerican ideology is that through ritual performance (especially bloodletting, dance, and vision quests), the ruler rejuvenates, even re-creates, the cosmos as did the Maize god when the universe was created. The jadeite plaques also pertain to the broader Mesoamerican ideology of maize in the stone's green color and their celt-like form, the celt being the primary milpa-clearing tool. The belt plaques also are incised with hieroglyphic texts that feature crucial royal historical events including the ruler-to-be's first bloodletting and accession to power. Given the highly precious and royal significance of these key pieces of imperial adornment, the question remains as to why so many have been found in Costa Rica.

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Jadeite Source and Mayan Artifacts in Costa Rica

Considered within the corpus of Mesoamerican jades (artifacts crafted from jadeite and jadeite-like minerals) found in Costa Rica, a pattern emerges that allows for a more nuanced understanding of interaction networks between Mesoamerica and Southern Central America. Of first importance is establishing the probable dates of interaction. The Mesoamerican-Costa Rica corpus includes Middle Formative Olmec, Late Preclassic Epi-Olmec, and Late Preclassic and Early Classic Maya objects: a range of nearly 1,000 years (Reents-Budet and Fields 1991). To date, no Late Classic examples have been identified. The scant archaeological evidence from Costa Rica suggests deposition close to the date of manufacture in the Maya region, based on artistic style (e.g., the El Tres mirrorback slate disk, and the La Fortuna mirrorback slate disk, both with paleographic datings of late 4th to early 5th century) and epigraphic data (e.g. jade belt plaque fragment with a date of 322/384 CE and alluding to the same place name on the Leiden Plaque, *Chak Chan Wa...*, dated to 320 CE).[1]

All evidence points to the Costa Ricans' interest in Mesoamerican jadeites, and the Maya plaques in particular, based on the material (raw jadeite), their high local value based on scarcity and perhaps foreign associations, and the plaques' shape (Reents-Budet and Fields 1991; Fields and Reents-Budet 1992; Mora-Marín 2002, 2005a, 2005b, 2008). The jades were reworked by Costa Ricans to fashion local types of adornment, specifically re-drilling for horizontal suspension consistent with the Costa Rican winged pendant tradition or modified with the double-bird head motif. The reworking of Mesoamerican jades, including the splitting of the Maya plaques into small pieces may or may not have taken place in Costa Rica. There is ample evidence for Costa Rican artisans reworking and splitting local jades (e.g. at Las Huacas) as well as similar behavior in Mesoamerica, including *in situ* finds at La Venta (e.g. several of the Offering 4 jade plaques are partial plaques, i.e. parts of originally larger pieces), Calakmul (Folan et al. 1995), Hatzcap Ceel (Thompson 1931), Chiapa de Corzo (Lee 1969:139-140, Figure 98), and Lake Güija (Houston and Amaroli 1988), not to mention the possible Mezcala-style reworking of at least one Maya belt plaque in the Dumbarton Oaks collection (Coggins 1985:116).

Second, all evidence points to the Mesoamerican artifacts being incorporated into the local suite of preciosities typically found in the burials of high-status individuals, including elaborately carved stone metates, finely made ceramics, greenstone mace heads, and jade pendants. The few archaeologically documented cases include a Maya jade from Las Huacas (Hartman 1907:89, Pl. XLV, Fig. 10; Heckenberger and Watters 1993; Hoopes 2005a), the Olmec-style clamshell pectoral, likely recarved with Late Preclassic or Early Classic (possibly Mayan) imagery, from Talamanca de Tibás (Snarksis 1979), and Late Preclassic Maya ceramics excavated and from El Pilar, Pacific Northwest, and cited by John Hoopes in specific reference to Sierra group of Paso Caballo Waxy Ware [...]" (Hoopes 1985). And last, a carefully documented yet uncontrolled excavation at El Trés (Stone and Balser 1964) yielded a Veracruz-style slate mirror back and a Maya-style one with a carved inscription. The corpus of looted Mesoamerican artifacts from Costa Rica include a variety of Olmec, Epi-Olmec, and Early Classic Maya jadeite objects as well as a small number of Teotihuacan-style objects.

Third, it has been assumed that jade was available locally given the early and focused interest in jadeite as a prestige material in Costa Rica. Further, the Olmec-style jades found in Costa Rica prompted the suggestion that Costa Rica was the source of the famous and rare "Olmec blue jade" (Balser 1974). Also, the relatively small number of Maya and other Mesoamerican jade objects in Costa Rica in comparison to the large numbers of Costa Rica-style jade artifacts has led to the conclusion that only a sporadic relationship was present with the occasional acquisition of Mesoamerican jades (Lange 1986). Therefore, several scholars have concluded that Costa Rican jade artisans placed little value on the Maya (and Mesoamerican) imagery, which led to their reworking of the pieces, and that the interaction between the two societies was one of "culture contact" rather than "culture impact" (Lange 1986).[2]

However, more recent discoveries have shed new light on the question of jade sources and the amount of trade in the material–in both its raw and worked states. First, a primary source of jade has been known in the Motagua River Valley of southern Guatemala since the late 1950s (Foshag 1957). Second, field and laboratory investigations by geologists and trace elemental analysis by Ronald Bishop and Frederick Lange have failed to find or identify a Costa Rican jade source (Lange and Bishop 1993:31, 58). The hundreds of chemically sampled Costa Rican and Mesoamerican jades by Bishop and Lange identified the Motagua as the source for many of these pieces. Their work also has shown a strong likelihood for a common source for the bluish (blue-green) jades found in Belize and Costa Rica. In fact, Harlow (1993) had already argued that the range of compositional variation of Motagua Valley jadeite could account for the jades from the various artistic traditions in Middle America. And recently, Seitz et al. (2001), Gendron et al. (2002) and Taube et al. (2004) have reported on the discovery of a blue-green jade source in the Motagua River Valley, which could be the source of both the Olmec and Costa Rican blue jades.

These data indicate that Costa Ricans looked to the Motagua River Valley as their primary source of raw jadeite. The excavation of raw jadeite cobbles from Las Huacas and Finca Linares prompted David Mora-Marín to support a single-source hypothesis (Mora-Marín 2002, 2005a, 2005b, 2008). Notably at Finca Linares, the jadeite cobbles were associated with a burial of what may be a jade/gold artisan given the presence of jade-working tools and a gold figurine (Herrera Villalobos 1998). Considered together, the archaeological and artifactual record supports a model of long-term procurement of jadeite from the Motagua River Valley in the southern Maya region by the Costa Ricans.

Fourth, these jade-focused activities were not unilateral. All evidence indicates that the tradition of jade heirlooms, the reworking of these treasured artifacts, and the trade of elite artifacts have a long history in Mesoamerica, too, which is especially prevalent in the Maya region. Examples in Mexico include jades from Cerro de las Mesas in Veracruz, while those from the Maya region come from Chaksinkin and the Sacred Cenote in Yucatán, Olmec-style jade heirlooms excavated at a variety of Maya sites (e.g. the figurines at Waká-El Peru and Dzibilchaltún), a Mezcala-style object from Xcambó, Yucatán, and a relatively large number of Olmec-style artifacts reworked by the ancient Mayans (e.g. Dumbarton Oaks quartzite pectoral, the Brooklyn Museum jadeite mask). The most well-documented is the link between Teotihuacan and the Early Classic Maya at such sites as Kaminaljuyú, Tikal and Copán, with an array of finely-crafted, high-status artworks found in elite contexts at all four sites.

The patterns of artifact origin, use, and provenience during the Early Classic period implicate the Maya as the likely contacts for the Costa Ricans if we follow a least-moves approach. One of the Cerro de las Mesas jades illustrates this position quite well: a Maya-style jade belt plaque fragment was found in in a jade cache at the site. Yet it had been reworked with the doubled-bird head motif typical of the Costa Rican lapidary tradition (Mora-Marin 2008). Clearly this artifact has a complicated social history, first as a royal Maya jewel, traded to Costa Rica, reworked with a local symbol of elite power, and traded north to the Veracruz people of Mexico's Gulf Coast. From Maya to Costa Rica to Veracruz, archaeological patterns of interaction (see below) and the least-moves approach imply the Maya region as this artifact's corridor of travel.

Costa Rican Jades in Mesoamerica

There are many instances of Costa Rican-style objects found in Mesoamerica beginning in the Middle to Late Formative periods. Easby (1963) described a piece from the cave of Tzajalob in Chiapas, near San Cristóbal de las Casas, that she suggested was a Maya copy of a Costa Rican-style anthropomorphic axe-god pendant, and further identified a number of jade pieces from sites in the Maya highlands and lowlands, as well as elsewhere in Mesoamerica (Cerro de las Mesas, Veracruz) and its periphery (Playa de los Muertos, Honduras), that could have been imported from Costa Rica.[3] The majority come from sites in the Maya region, the inventory including jade pendants, ceramics, and carved metates. Most late Middle Preclassic and Late Preclassic evidence comes from

the Pacific Coast and Piedmont regions of southern Mesoamerica and El Salvador, for example, Tak'alik Ab'aj, Kaminaljuyú, and Chalchuapa. It should be mentioned that we disagree with Christa Scheiber de Lavarreda's recent identification of a pendant she excavated from an elite burial at Tak'alik Ab'aj as Preclassic Maya and dating to ca. 700 BCE. In spite of her insistence that the architectural levels support such an early date and the object is stylistically related to the *hunal-ajaw* headband jewel of Maya kingship, this artifact clearly is a Costa Rican avian axe-god pendant similar to, but stylistically later than the earliest-known pendant excavated in Costa Rica at the site of La Regla, and certainly dated to ca. 500 BCE.

The end of the Late Preclassic and the Early Classic periods bring a shift in cultural patterns indicated by the lack of Costa Rican jade artifacts from sites along the Pacific Coast and Piedmont, although some type of exchange continued given the sporadic presence of Costa Rican-style ceramic vessels and carved metates, and the few but later tumbaga objects found in the Pacific Coastal region. However, the region's lack of Costa Rican jade artifacts is notable if we look elsewhere among the Maya. Beginning at the end of the Late Preclassic period and becoming prevalent during Early Classic times, Costa Rican jades are found at sites located in a south-north arc along the Caribbean side of the Maya region (Mora-Marín 2002). These sites include an equally notable amount of Olmec heirlooms, including ones reworked by the Maya. Especially prominent are the Belizean sites of Altun Ha, Pomona, Kendal, La Milpa, and Río Frio Cave (Mora-Marín 2002, 2005a, 2005b, 2008). The list also includes sites further inland which likely had connections to Belize, including Cival-Holmul and Nakum. Costa Rican-produced artifacts from the Belizean contexts include a gold-copper claw at Altun Ha, several avian axe-god or anthropomorphic axe-god pendants from elite or royal necklaces found at Pomona and Altun Ha, and a beaked-bird pendant from a royal necklace at La Milpa. Sadly the Costa Rican artifacts from Río Frio Cave E were lost in Hurricane Hattie in 1961, although A. H. Anderson's detailed notes and one photograph survived to document this important find.

Among the earliest Costa Rican-style artifacts from the Maya lowlands is an example from the famous dedication cache at Cival/Holmul. This cruciform cache of jade celts and water jars, dated somewhere from 400 BCE-100 CE, includes a necklace of beads with an avian axe-god pendant in its center, which is misidentified by Francisco Estrada Belli as a Maya rain god (Estrada-Belli 2008:5).

Another shift occurs during Late Classic times and becomes especially pronounced during the 8th century. The Belizean sites exhibit lesser amounts of jadeite artifacts and a near absence of Costa Rican objects. At the same time, there is a florescence in Honduras of both jadeite artifacts and Costa Rican-produced objects found at a variety of sites (e.g. Santa Ana, Peor es Nada), but especially Copán (Mora-Marín 2002, 2005a, 2005b, 2008). The site also housed foreigners in the elite complex known as Las Sepulturas, identified predominantly as having Lencan affiliation (Gerstle 1988). Nevertheless, artifacts found there include two Costa Rican-style metates as well as other objects indicating consistent interaction with the Ulúa and Sula Valleys to the east and therefore to the coast and its long-distance trade. It is at this same time that Costa Rican-style artifacts as well as a variety of jadeite heirlooms were deposited at sites in the Yucatán Peninsula, including Cozumel and Chichén Itzá.

A final shift constitutes, of course, the decline and cessation of the jade lapidary tradition in Costa Rica, between ca. 700-900 CE by some estimates. This period coincides with two major historical events: the Quirigua rebellion against Copan in 738 CE, on the one hand, and the collapse of centralized rulership at Copan, on or about 822 CE (Mora-Marín 2002, 2005a, 2005b, 2008). These events probably affected the influx of jadeite in the trade networks, whether local or long-distance, and could have led to the Costa Rican artisans losing access to *all* new raw jadeite, and pushing them into the wholesale shift from jade to gold as the preeminent material for crafting the most valuable elite goods (Snarskis 2003).

Final Comments and Conclusions

The corpus of traded objects between Mesoamerica and Costa Rica indicates a long-standing relationship of exchange–not only of objects

but also of ideas. First, both the ancient Mesoamericans and Costa Ricans utilized jade as an indicator of high status and prestige. The initial impetus for jade-working and the appearance of the celt theme as a connotation of elite power originated among the Early Formative period Olmec, and likely was adopted and adapted by Costa Ricans as a result of Mesoamerican influence (either by late Middle Formative Olmec or Late Preclassic period Maya).

The Mesoamerican evidence indicates that jade was intimately linked to the ideology of cosmic Creation and the mythology of the Maize god as the supernatural foundation of rulership. Not only did the Costa Ricans share in the ideology of jade as a material connoting prestige and elite power, but Mora-Marín has posited the adoption of the Maize god-related ideology as evidenced by the so-called "Charlie Chaplin" rulership format (Mora-Marín 2005a, 2005b). He suggests this figural format is essentially a simplified version of the ruler-as-ritual-performer theme among the Maya in which the ruler re-enacts cosmic events, to rejuvenate the world, in the guise of the Maize god or other deities. This key Maya ideology can be traced to the Olmec theme of ruler as the *axis mundi.* The theme first appears in Costa Rica ca. 144 CE at the site of Mercocha, Atlantic Watershed. Thereafter, Costa Ricans adapted the theme according to local stylistic cannons, including its elaboration with such indigenous motifs as the double bird heads and its conflation with the avian axe-god theme, resulting in the anthropomorphic axe-god format by ca. 350 CE (Severo Ledesma).

The combined evidence indicates that the jade exchange network may have become systematized and institutionalized during the Late Preclassic period, primarily along the Pacific Coast but also along the Atlantic side of the continent. The patterns of interaction shifted during the Classic period, increasingly the case certainly during Early Classic times as the focus moved to Belize and the Atlantic Coast and later into Honduras.

The data imply that the Costa Ricans procured the highly-valued raw material from the Maya, which is not what is expected in a typical core-periphery interaction. Clearly, jadeite played an important role in the Costa Rican prestige redistribution system until the demise of the tradition after 500 CE. They, and their Mesoamerican counterparts, placed a high value on imported jade artifacts, and stylistic features of the Costa Rican-produced objects intimate the local artisans were influenced by the Maya jade tradition. Whether the Costa Rican and Maya jade workers were in direct contact is unknown at this time; however, the stylistic and technical similarities of their respective works suggest direct and focused knowledge of Maya-produced jades. The epigraphic data relevant to Copán's local politics is also likely significant: the defeat against Quirigua could have meant a disruption of direct access to jadeite starting around 738 CE, and the collapse of centralized rulership at Copán around 822 CE could have meant a more generalized disruption of the jade exchange network linking Copán to societies in eastern Honduras and farther south in Costa Rica.

In spite of the wealth of artifactual and archaeological data, the answers to vital questions remain elusive. Did the Costa Rican jade tradition influence the Maya tradition as well? What other items played an important part in the exchange? Certainly the highly desired quetzal bird feathers and cacao commodities drove Mesoamerican interest in Costa Rica from Late Postclassic to Classic period times and likely earlier. It bears mentioning in this regard that Terrence Kaufman and John Justeson (2007:216-217) have noted that the Chibchan languages of Costa Rica contain a loanword from Mije-Sokean **kakawa* 'cacao', as *kajuu* (Guatuso), *káw'* (Boruca), *kó* (Térraba), *ku* (Guaymí). These forms, Kaufman and Justeson (2007) argue, probably moved through two intermediate steps: from Mije-Sokean **kakawa* into Mayan *kakaw*, from Mayan (e.g. Ch'olan) into Honduran Lenca *#kaɣaw* (showing weakening of the medial *k*), and from Honduran Lenca into Chibchan *#ƙəəhú',* which gave rise to several variants. The intermediate Honduran Lenca form is particularly suggestive because Costa Rican artifacts have been found at a number of likely Lenca-affiliated sites in the Ulúa and Sula Valleys in Honduras (e.g. gold figurines and jade pendants), these sites also containing a variety of Maya artifacts (including, pottery and marble vases, and Maya jades). The Lenca residences at Copán, in the same foreign barrio where

Costa Rica-style metates were found, further suggest that the Lencans played an important role in the Late Classic trade routes between the Maya and Costa Rica regions. And it may have been through such interaction that the Costa Rican Chibchan languages borrowed the term for cacao from the Lencans. In addition to cacao, spondylus shell also is a probable trade commodity candidate.

And last, the primary question remains as to whether the Maya and the Costa Ricans were in direct contact. Present data do not afford a definitive answer. However, the temporal longevity, geographic breadth, and artifactual depth of the jade exchange point to a systematic and institutionalized network that provided the foundation for the roughly millennium-long development of the Costa Rican jade lapidary tradition and the endurance of the trade associations between these two eminent culture regions.

NOTES

[1] For an overview of the epigraphic evidence pertinent to the jade belt plaques reported from Costa Rica, consult Fields and Reents-Budet (1992) and Mora-Marín (2001).

[2] Lange (2005) has since reversed his opinion on the existence of a jadeite source in Costa Rica.

[3] Easby's (1963) criteria for determining it to be a copy, as opposed to an original piece from Costa Rica, may not be applicable any more. She argued that the somewhat asymmetrical composition of the piece, and the partial preservation of the original surface of the stone on the back of the piece are more likely to be the result of a Maya jade artisan than a Costa Rican one. However, there are numerous examples of Costa Rican axe-gods that display asymmetry, and also some that show partial unpolished surfaces, suggesting that the Tzajalob pendant could be a Costa Rican import.

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Postulating Trade and Historicizing Archaeology

Alice Beck Kehoe

Archaeology is moving from overemphasizing narrowly scientific methods toward recognizing the humanities' dimensions in human histories. Ethnohistories, ethnoarchaeologies, even philosophy of historical sciences (Turner 2007) contextualize archaeological data and may call into question, interpretations drawn from theoretical models. Something as apparently innocuous as a few filed human incisor teeth found at Cahokia can open avenues into disregarded interpretations and the canons of orthodoxy in American archaeology. In this paper, I will lay out some of the more compelling data on long-distance trade, and explain orthodox rejection of interpretations involving such trade. Basically, this is postcolonial archaeology.

The historic fur trade, well studied in Canada, offers models for trade. The medieval Scandinavian fur trade through Russia to Constantinople is a second historical case, congruent with the later North American trade. These cases show:

- Trade may be carried out over enormous distances, of thousands of kilometers, requiring boats as well as portering or pack animals.
- Trade may involve partners, one or more resident in cities, who provide capital, and others who journey to markets and to sources.
- Long-distance trade is more feasible using boats than by foot. This was true even for silk from China, the inland Silk Route complemented by a silk road of the sea (Paine 2013:262).
- Trade may be primarily for perishables.
- Trade may be part of imperial policy (the Hudson's Bay Company; Ahmed 2012), or challenging it (Kehoe 1978), or operating in alternative political space (e.g., Jews over the last two thousand years).
- Trade may entail protocols of ritual and honoring, or conversely as with African market women, be carried out through a multiplicity of socially egalitarian entrepreneurs.

Overall, trade and traveling for trade seem ubiquitous in historically known societies, and there seems no reason to deny such ubiquity in past eras, at least since the Terminal Pleistocene.

Orthodoxy in archaeology, particularly Anglophone archaeology, is based on nineteenth-century "conjectural history" (Stewart 1794 [quoted in Kehoe 1998:32]) postulating Progress from savagery through barbarism to civilization (Kuhn and Hovers 2013:S177). Correlated with this premise was that many societies failed to progress, and if they were extant historically, they represent survivals of less-advanced types of societies. They would exemplify negatives of

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progressed civilizations, thus if the latter had global trade, high mobility, rank and social classes, market economies, and intellectual abstract concepts, then backward peoples would have no or only local trade, would stay within small home territories, would be egalitarian, each household would be self-sufficient, and thinking would be limited to simplistic coping with practical problems. Textbooks contrasted "primitive peoples" with "us" (Kuper 1988). Given this framework justifying both internal class hierarchy (peasants were survivals from the barbarian stage) and colonial acquisitions, archaeologists who placed data within the framework were acclaimed and those who challenged it were marginalized (Kehoe 1998).

Like Protestant evangelicals (Kehoe 2007), orthodox archaeologists hold a set of tenets than must not be transgressed:

Five Fundamentals of mainstream American archaeology:

- The Americas were populated during the Terminal Pleistocene as continental glacier melting allowed migration out of Beringia. After the Early Holocene, the Americas were totally isolated from the rest of the planet until 1492.
- Indigenous Americans had no marine shipping except for coastal traffic on rafts from Peru to Ecuador, and a few Maya rafts and canoes in the Caribbean.
- No Europeans crossed the Atlantic until 1492, except for a few Greenland Norse taking timber from Labrador. There was only one brief Greenland Norse attempt at a settlement, at the tip of Newfoundland, 1000 CE.
- No Asians or Africans reached the Americas before sixteenth-century Iberian colonizations, nor did Polynesians reach the Americas.
- There were no contacts between North America (north of Mexico) and Latin America, except for limited trade between Mexico and the U. S. Southwest.

Denial of sea travel is a common thread in these premises.

In examining the validity of these premises, the first question is whether seaworthy boats were available before the European "Age of Discovery" beginning in the late fifteenth century CE (McGrail 2004:8-13). Logboats, plank boats, bark and hide boats, bundle boats, basket boats, and pottery boats are all known from the second millennium BCE or earlier, and may be distinguished by whether the shell or the skeleton of the vessel was constructed first (McGrail 2004:9). A useful classification is that by Edwin Doran, identifying three major shipbuilding traditions: the keeled plank-built sailing ships of Europe and the Mediterranean; the flat-bottomed junks of China; and the Polynesian outrigger or double-hulled sailing canoe (Doran 1973), plus a fourth "great tradition," sailing rafts (Doran 1971). Each of these produced large cargo vessels for trade and passengers. Doran did not include hide boats such as curraghs and umiaks, the large logboats of the North Pacific, or reed-bundle boats, all reliably documented and experimentally verified (Heyerdahl 1950, 1971; Severin 1978) as capable of carrying cargo and passengers. These boats were common in indigenous America, where the two known ethnographic occurrences of plank-built boats, in southern California and in Chile, are interpreted as Polynesian introductions (Jones and Klar 2005).

Given that watercraft capable of crossing open seas were available from 50,000 years ago, when ancestors of Australians crossed into that continent (Bednarik 1997), and cargo-carrying ocean-going vessels amply attested throughout Eurasia, much of Africa, and Oceania by the second millennium BCE, it is reasonable to expect occasional transatlantic and transpacific

contacts by explorers, entrepreneurs, and storm-blown sailors. Within the Americas, extensive water-borne trade is interpreted for Poverty Point (Gibson 200:180-181), the Olmec world (Evans 2004:174-184), and along South America's Pacific coast (Callaghan 2003). Yellowstone Obsidian Cliff obsidian in first millennium BCE sites in Illinois and at the Wisconsin-Upper Michigan border testify to long-distance transport probably along inland waterways (Hughes and Fortier 2007). What historically, with horses and wagons, were overland trails, such as the Santa Fe Trail between the Mississippi at St. Louis and Santa Fe near the Pecos River in New Mexico, likely were previously primarily river routes with portages, using the Arkansas River to link the Mississippi and Puebloan New Mexico. Marine shell, from conchs to small snails perforated for beads, were imported from both the Pacific and Atlantic into the Midwest from Middle Archaic to historic times (Henning 2005). Boats—the large logboats described to Coronado by his Midwestern captive guide (Wedel 1988)—traveled the Mississippi and Southeastern rivers into the Gulf of Mexico. Mobile Bay, Alabama, is the likely northern port for Postclassic Mesoamerican trade across the Gulf, judging from the use of Mobilian Jargon as the trade lingua franca throughout the Southeast at European contact (personal communication, Helen H. Tanner). During the Early Postclassic period, trade between eastern United States and Mexico is evidenced by at least eighteen human incisors recovered from Cahokia and its environs, filed in the manner fashionable in contemporary Mexico but not found elsewhere in Anglo-America except at Chaco in New Mexico. The grid layout of Cahokia, similar to the ideal city plan, Tollan, favored in Mexico is further evidence for Cahokia's trade with Early Postclassic Mexico (Kehoe 2011).

Globalizing the Americas

So, seagoing cargo vessels have been available in Eurasia, Africa, Oceania, and the Americas for at least the last four thousand years, and materials procured from resources thousands of kilometers distant testify to trade. Denying the possibility of transoceanic trade before 1492 is dogmatic, neither scientific nor historically reasonable (Paine 2013). Evidence for diffusion (in the proper sense of something that permeates a society [Hägerstrand 1967, Rogers 1962]) and for contacts overwhelms any demonstrated evidence for independent invention, as distinct from stimulus diffusion (Kroeber 1952(1940), Kehoe 1979). Allowing for the possibility of pre-Columbian transoceanic contacts opens a global view in which American societies participate in historical currents. As Schmidt and Mrozowski put it (2014), historicizing non-Western archaeological data brings "the death of prehistory," dissolving the divide between the "civilized" West and the "peoples without history," making all of them fully human.

Our historic fur trade model strongly supports a Norse trade with American furs going back to the early Norse settlements in Greenland, end of the tenth century, until their abandonment in the mid-fifteenth century, not long before—and conceivably merging into—European commercial fishing on the Grand Banks (Quinn 1974). For nearly five centuries, Greenland Norse relied on ships from Scandinavia to bring fashionable clothing and manufactures, to trade for furs and walrus tusks and hides the Greenlanders obtained by trade with indigenous Americans and their own hunting expeditions (Pringle 2012). Only dogmatic adherence to the myth of Columbus as first discoverer has kept medieval Norse—literate and Christian, not Vikings—out of standard histories (Kolodny 2012; Sutherland 2008). Historic fur trade as a model also supports the probability that the Kensington rune stone,

inscribed 1362, is authentic testimony to an episode of Norse exploration provoked by Hanseatic League takeover of the Scandinavian fur trade through Russia (Kehoe 2005).

Transpacific contact possibilities require different models than the Canadian fur trade. One model builds on ethnographic similarities running the enormous distance of the Pacific Rim, from northern California, along British Columbia and Alaska, northeastern Asia, coastal China, through Island Southeast Asia as far as New Guinea (Birket-Smith 1967). Kaj Birket-Smith, who carried out archaeological and ethnographic researches collaborating with Frederica de Laguna in southeast Alaska, argued that an ethos of potlatch-type formal feasts legitimating titles, coupled with chiefs' or men's houses displaying iconography of these titles, accompanied coastal trading that, in the north Pacific, supplied Northwest Coast nations with iron for knives and copper (McCartney 1991, 1986). Birket-Smith's formulation of a circumpacific series of trading contacts builds upon evidence, both archaeological and historical, of trade of iron and copper from northeastern Asian producers to American nations that did not smelt iron but did forge their tools from traded iron. That this trade fed into the pomp of potlatches, class structures, and warfare in coastal northwest America strengthens Birket-Smith's extrapolation to house displays and an ethos of competition over public merit.

Another model of transpacific contacts comes from Polynesian colonization of Remote Oceania. Discovery of a site on the Araucanian peninsula of Chile with chickens and artifacts resembling contemporary Polynesian types provoked anxiety (to use Kolodny's [2012] word), although it fits expectations that these masterful sailors would have somewhere hit the long American continent (Storey et al. 2007, Jones et al. 2011). Presumably they did not build colonies on the continents when they found that, unlike the islands they had colonized, these lands were already occupied. Polynesians, as Austronesians descended from southeast Asian populations, could have carried Asian technologies and ideas across the Pacific, but a more plausible hypothesis is that the plank boats and fishing gear compared by Jones and his colleagues to eastern Polynesian types, and the linguistic cognates recognized by Klar (Jones and Klar 2005), evidence relatively recent contacts by sailors many generations removed from southeast Asian ancestors.

Voyaging across the oceans adapts to prevailing winds and currents. The North Atlantic route taken by Norse, and possibly two thousand years earlier by Northwest European deep-sea fishermen (Kehoe 1971), is relatively short and could be interrupted on islands (Orkneys, Faroes, Iceland, Greenland). Going eastward, mariners are carried along the powerful Gulf Stream. Going westward, Atlantic currents take boats from Europe to the Caribbean, as Columbus experienced. Farther south, the Atlantic is narrowest between West Africa and Brazil, which might have brought African tuber cultivators to the Amazonian tropics (Lathrap 1977).[1] The Pacific is much wider and its islands farther apart, yet Polynesian colonizations and subsequent maintenance of contacts with older island communities prove that ocean is purposefully navigable (Lilley 2006). Lack of documentation in Chinese histories of transpacific trade voyages suggests that most of the intriguing similarities between Asia and Latin America would have been carried by Southeast and Island Asian ships.

In 1949, the International Congress of Americanists, meeting in New York, heard more than a dozen papers arguing contacts between Asia and the Americas (Heine-Geldern 1950). Those concerning Ipiutak, on Point Hope in Alaska, indicate that historic indigenous cross-

Bering trade dates back to end of first millennium BCE, transmitting the Scythian animal style that suffused so much of Eurasia. Robert Heine-Geldern outlined the detailed similarities between Northwest Coast art and arts of the western coasts of the Pacific, anticipating Birket-Smith's 1967 monograph on circum-Pacific styles and Noel Barnard's edited volume (1974). He and Gordon Ekholm summarized "parallels in the symbolic arts of Southern Asia and Middle America:" lotus in sacred art, the *makara* sea serpent, *kīrtimukha* ["Face of Glory" fanged pop-eyed monster], cosmic tree, gods standing on crouched humans, Atlantean figures, diving gods"; architectural parallels; *pachisi*/*patolli* game; India hook-swinging and Mexican volador; parasol, fan, and litter as signs of high rank; and cosmological systems (Heine-Geldern 1950:351). Ekholm, curator of Mesoamerican archaeology in the American Museum of Natural History, and Heine -Geldern created an exhibit of these parallels in the American Museum for Congress participants (apparently no catalog or record of this exhibit survived). An article at the time by Ekholm for the magazine *Natural History*, October 1950, cogently illustrates striking parallels.

Robert Heine-Geldern (1885-1968) was an Austrian trained in art history who specialized in the archaeology of Southeast Asia and Island Southeast Asia. During World War II, he came to New York as a refugee from Nazism and was welcomed to the Anthropology Department of the American Museum. His expertise on Southeast Asia partnered that of Ekholm on Mesoamerica, so that their collaboration on transpacific similarities elucidated details in historical and archaeological contexts for which each was, in his field, a highly respected authority. Each frequently expressed skepticism, questioning closely, seeking correlative data; Ekholm became a sought-after expert on Mesoamerican fakes. The expanded text version of their presentations to the Americanist Congress is very specific on the proveniences of the parallels and their dating: Amarāvatī art (Figure 1, top) of the first half of the first millennium CE in India, Southeast Asia and its islands, including Borneo and Celebes (Heine-Geldern and Ekholm 1951:302), with the Champa kingdom of coastal Vietnam a center of marine trade for this vast area. A second set of parallels is found in Pallava art of south India in the seventh century CE, which like Amarāvatī diffused eastward throughout southern Asia, Malaysia and Indonesia, again including Champa in coastal Vietnam. Each of these two surges of art and architecture out of India was inspired by Buddhist evangelism and drew deeply upon Hindu mythology, hence "Hindu-Buddhist" art style. Ekholm points out similarities in Classic Maya, first millennium CE, and in Chichén Itzá, eleventh century CE. Heine-Geldern attributes the parallels to "Buddhist and Brahman missionaries" who spread varieties of Hindu-laced Buddhism throughout Farther India (and China and Japan), and he makes the important note that "We know from the history of Southeast Asia how easily they [Buddhism and Hinduism] may disappear or be submerged in local paganism" (Heine-Geldern and Ekholm 1951:307). Heine-Geldern suggests (*ibid*. 308) that voyages across the Pacific diminished after about 1200 CE when wars brought down Champa and Cambodia.

"Evangelists" bring to mind monks, but merchants—some pious, some simply selling what brings profits—also diffused Hindu-Buddhist arts and ideas by carrying ex-votos, figurines, jewelry, embroidered and brocaded cloths, and carvings (Kuhnt-Saptodewo and Kuhnt 1999:325-326). Architects and engineers were recruited by foreign patrons (Dumarçay 2003). Astrologers, who knew astronomy as part of their craft, must have accompanied some voyages, because Mesoamerican calendar astrology is remarkably close to that which

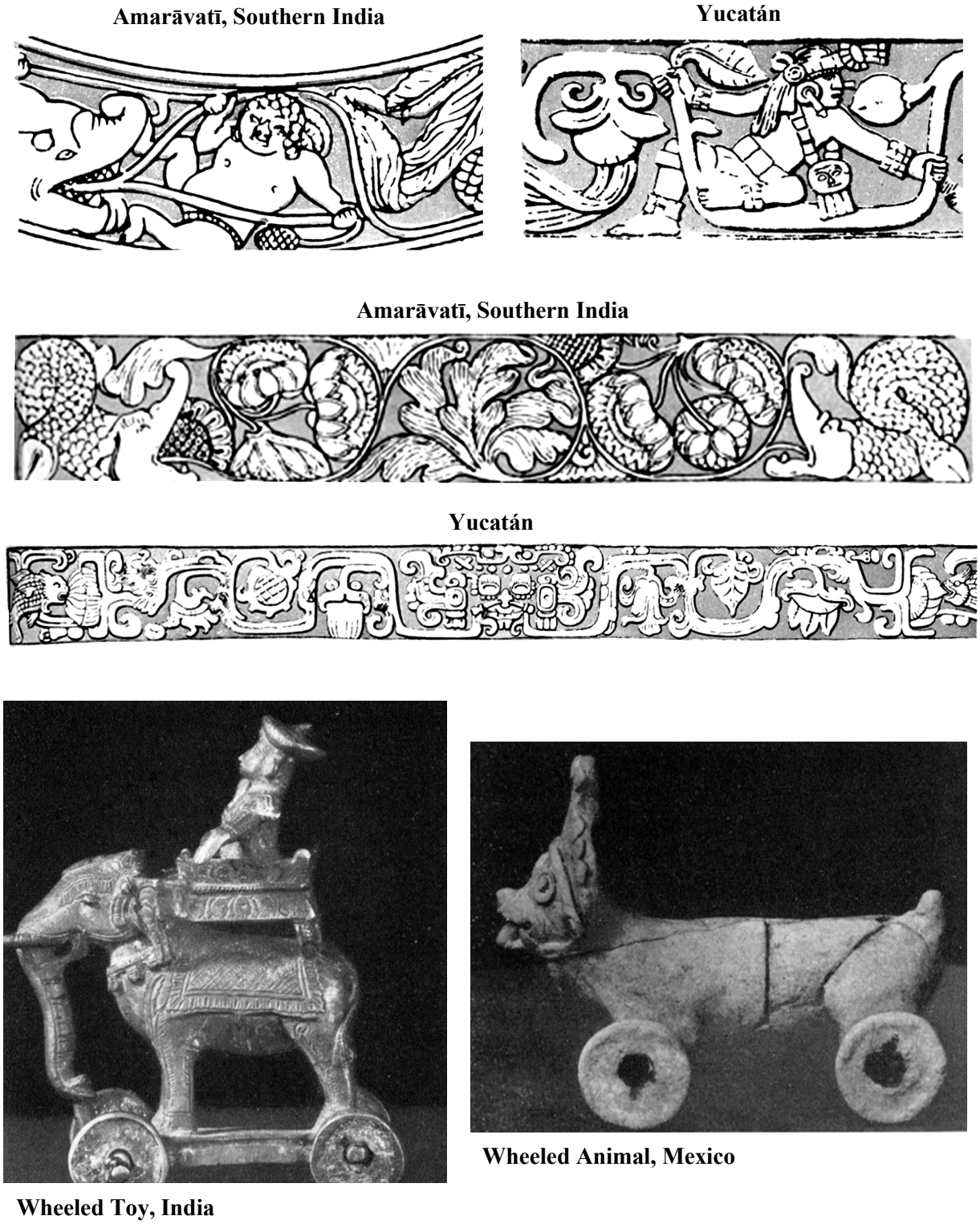

Figure 1: Courtesy of the Division of Anthropology, American Museum of Natural History. Reprinted with permission from Ekholm 1950.

clearly diffused throughout Eurasia (Kelley 1960). The unquestionable diffusion of "Hindu-Buddhist" art and architecture under Buddhism, both Theravada and Mahayana, documented by art historians, is strangely neglected by anthropologists. An art historian commented,

> "We must imagine the monks and traders of India and Indonesia traveling to and from their homelands. We know from inscriptions that the traders, devout Buddhists as well as sharp businessmen, commissioned works of art in the great centers, particularly in Bengal. Indonesians even built temples in Bengal as an act of homage or memorial. Lively commerce brought about great movement of people and of images" (Lee 1994:145).

The Amarāvatī stupas style in Andhra Pradesh, southern India, last century BCE to third century CE, inspired the art of the Gupta dynasty in Bihar, fourth through fifth centuries CE. "Gupta sculpture [is] the classic artistic expression of Buddhism in India . . . exported in two main directions—to Southeast Asia and Indonesia, and through Central Asia to East Asia" (Lee 1994:111). In all the regions it came into, there were "many secondary styles and regional variations" (Lee 1994:11). Documented in texts and inscriptions throughout southern Asia and Island Asia, International Gupta style baroque architecture and lively bas-reliefs went everywhere in Farther India. To see its ramifications even farther across the Pacific, as Heine-Geldern did, is not unreasonable.

In addition to the art and architecture and associated icons of Farther India's "Hindu-Buddhism," there are many parallels in technology on the two sides of the Pacific. These include the process of felting soaked strips of paper mulberry bark using a wooden or stone beater. The process must have originated in eastern Asia, where felting is common. In China, the process culminated in invention of true paper; true paper is also pre-Columbian in Mexico, where as in China, it is cut in patterns representing deities and spirits and used in rituals, a practice surviving among Otomí in Mexico, and in China as an honored art. Archaeologist Paul Tolstoy, whose fieldwork has been primarily in central Mexico, analyzed bark cloth technology and the beaters used, finding strong detailed parallels unlikely to be independently invented (Tolstoy 1963). He more recently tested the coherence of his data with cladistics, again finding small probability of chance in the parallels (Tolstoy 2008), even when he excludes the final steps of papermaking. Other complex technologies include processing a marine snail to make royal purple dye (Needham and Lu 1985:53, with references). Needham and Lu (1985) summarize other technologies that their analyses show to be more similar than coincidence of independent invention would indicate.

A particularly strong technology-cum-ritual argument for pre-Columbian transpacific contacts is wheeled animal figurines in Mesoamerica during the Early Postclassic era, 600-1300 CE. (Figure 1, bottom). Wheeled animal figurines seem to appear earliest in central Veracruz and then in northern Veracruz, central and Pacific Mexico, and the southern frontier of Mesoamerica, at Cihuatán, El Salvador, where they resemble those of the northern Mexico Mazapan style associated with Tula in Hidalgo (Diehl and Mandeville 1987; Fowler 1991:46-48). Gordon Ekholm (1946) did not at first interpret them as indications of transpacific contacts; after working with Heine-Geldern, he apparently did see them as such evidence (Ekholm 1950:350). He called them "toys", a label rejected by later scholars (Diehl and Mandeville 1987:243). Most of the animals

appear to be dogs, some appear to be jaguars (stylized, some can be viewed as canine or feline), and where excavation provenience is confirmable—in contrast to items in private collections "said to be from" someplace—they seem to be in smaller ritual spaces, perhaps elite households (Diehl and Mandeville 1987:243). Wheeled miniature animal figurines are the *only* evidence of knowledge of wheel-and-axle in the Americas. The figurines are similar enough and contemporary enough, and geographically within a broad trading area, that they may be hypothesized to represent a single introduction from mainland Asia near the end of the first millennium CE. The isthmus of Tehuantepec may have been the landing place of the Asian voyagers, whence the use of these uniquely mobile models spread north and south along the Gulf of Mexico and inland from the Gulf into central Mexico, with perhaps another landing on the Pacific coast of El Salvador. Already in his 1946 paper, Ekholm explained that the wheels are not spindle whorls and not derivable from whorls; the wheels are purpose-made perforated clay discs, not smoothly round and not balanced weights as whorls must be (Ekholm 1946:223). The animals must have rode roughly on their crudely finished wheels, another hint that the makers were copying objects for which they did not know the originals.

Carl Sauer, the founder of cultural geography, spent many years discovering and documenting organisms that evolved on one continent but were seen, before 1492, on another separated by oceans. Sauer's students continued the research, notably Carl Johannessen, who published an exhaustive compendium of such organisms—not just plants but also animals including human tropical parasites—with tables evaluating the data by probability of pre-Columbian exchanges (Sorenson and Johannessen 2013). Among plants, they find evidence that agave, cashew, pineapple, custard apple, peanut, Mexican poppy, chili pepper, papaya, cucurbits, datura, coca, sunflower, sweet potato, tobacco, prickly-pear cactus, jicama, morning-glory, lima and other beans, marigold, and maize were carried to Eurasia, most often India and China, before 1492 (Sorenson and Johannessen 2013:21-24). A few plants were carried in the other direction to America. Microoganisms seem to have accompanied people crossing from Eurasia to the Americas: hookworms, roundworm, pinworms, whipworm, whooping cough, relapsing fever, amoebic dysentery, herpes, tuberculosis, typhus, spotted fever, T-cell lymphotropic virus, trepones, plague, and the macro-organism lice (Sorenson and Johannessen 2013:63-64). Larger animals include the small hairless dog used for feasts in China and Mexico, and chickens kept in Latin America for feathers and fighting, both coming from Asia to America, and turkeys from Mesoamerica to medieval Europe (Sorenson and Johannessen 2013:65-71). Many of the plants would have required information on their cultivation to be transmitted along with them, and the tropical parasites and diseases required human carriers. Sorenson and Johannessen discuss other organisms for which the evidence of transoceanic carriage is less decisive, in addition to those with reasonably strong provenience data.

Conclusion

The myth of Columbus discovering a New World, so important for legitimizing European invasions and conquests of the Americas, militates against archaeologists accepting evidence for transoceanic contacts before 1492. Why archaeologists resist acknowledging data for long-distance and maritime trade within the Americas comes from that same concern to justify domination. Claiming that indigenous Americans were savages roaming wilderness, or at best simple villagers tied to localities, judges

and policy-makers refuse First Nations' land and economic rights (Ray 2011).

A second foundation for denying transoceanic contacts before the European "discoverers" is an obsolete belief that science requires replication experiments. Since these cannot be performed directly by archaeologists (Turner 2007:24), they seek natural experiments, that is, cases where one major factor is present in one, not in the other, so that comparing the cases may support inference that the selected variable is significant (Eggan 1954). If the Americas were in fact totally isolated from the Old World after early migrations through Beringia, then societal developments in the Americas that appear parallel to ones known in the Old World constitute natural experiments. With the Enlightenment premise that humans progressed toward the civilizations of western Europe, similar progressions in the supposedly independent isolated Americas would confirm that progress from savagery through barbarism to civilization is a natural law. If the Americas and the Old World were occasionally in contact through the millennia of the Holocene, then independent cultural evolution cannot be assumed, and there is no natural experiment to support the Law of Progress in the case of human societies. For adherents of obsolete science, Schmidt and Mrozowski's death of prehistory would toll the death of science for archaeology. The cure for despair here is reading history and philosophy of science (Cleland 2002 is a relevant discussion).

A postcolonial standpoint rejects the idea of a Law of Progress culminating in the ruling classes of nineteenth-century Europe and America. It rejects that century's unilinear cultural evolution on scientific grounds, that it is incompatible with evolutionary biology. Every society, like every species, has its own evolutionary history—what anthropology terms "historical particularism." What we see in text-based histories and the archaeological record are dynamic relationships between societies, linked by adventuring, trade, military actions, and proselytizing movements. The diffusion of gunpowder illustrates how valuable ideas spread globally regardless of efforts to contain them (Needham 1986). Archaeologists who care about empirical data and valid inferences need to push beyond hidebound ethnocentric postulates to accept that intersocietal contacts are the most probable source of innovations and changes in societies, and contacts produce variation. The Americas were not veiled by God until vouchsafed to Columbus. It's time to historicize the Americas, return our continents to their global nexus.

NOTE

[1] German doctor Hannes Lindemann crossed from Liberia to the Caribbean in a fisherman's dugout with sails, 1956: Lindemann, Hannes (ed. by Josefa Stuart). 1957. *Alone at Sea*. New York: Random House.

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Small Scale Trade with Large Scale Implications: or How to Produce a Surplus in a Fragile Environment

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Large scale, long distance trade has connected the shores of the Mediterranean with the forests of West Africa for around 2000 years. While a great deal has been written about the termini in Marrakech, Timbuktu, Ashanti, and Yoruba, less is known about the hinterlands through which the trading caravans passed. Travelers dating back to Abu Bakr in the 15th century and continuing through the late 1800s marveled at the size of the caravans which sometimes consisted of thousands of people and animals (Clapperton 1966 [1829]:68) that, moving at a rate of eight to ten miles per day (Arhin 1974:78), could take hours to pass by. Large caravans were necessary for security because such slow moving cumbersome entities were easy pickings for bandits, particularly as they traversed some of the vast stretches of sparsely populated territory between major centers. As such trade caravans consisted of diverse peoples, not only merchants whose business it was to trade but also people who hired themselves out as porters, or people who joined for safe passage to visit friends and relatives or to go to regional markets. In the 17th through the 19th centuries the caravans swelled with slaves, initially for the Atlantic slave trade then later for the domestic slave trade. Archaeologists and historians tend to focus on the history of the kingdoms and empires that grew rich off of this trade, but there has been very little discussion of the practicalities of provisioning caravans like this in highly seasonal environments where today, even with improved crops and agricultural technologies people barely grow sufficient food to last them the year. Caravans could not possibly carry their own food on these long journeys - the round trip from Kano to Salaga, for example, would take 7 months (Lonsdale 1882). Rather the caravans traveled in both directions laden with trade goods. Provisioning fell to the villages and towns along the trade routes (Sutton 1989).

In archaeology we are used to thinking about large scale trade and the way we can trace economic and political relationships through the distribution of exotic materials. We are also used to thinking about the relationship between large scale, long distance trade, social complexity, and the rise of centralized governments. But we pay relatively little attention to the small scale, localized trade that underpins rural economies world wide. Most of this trade is in the hands of women and children, and is conducted on such a small scale that it is easy to ignore. However, not only is small scale trade essential to the daily lives of individual people and households, but it is the way that surpluses are produced, making higher order trade and social, economic, and political complexity possible. In fragile environments agricultural surpluses cannot be

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produced magically by despots or charismatic feast masters urging an increase in production or productivity, but it is possible to produce surpluses in particular places by redirecting the small scale trade that already exists in a region so that its tiny contributions trickle, stream and eventually flood into the places where they are needed.

Small scale trade is more ubiquitous, important, and diverse than most archaeologists or even anthropologists give it credit for. Even in the heady days of the formalist - substantivist debate when Karl Polanyi and his followers (Polanyi 2001; Polanyi 1957; Bohannan 1962; Dalton 1969; Dalton 1968; Dalton 1961; Sahlins 1972) argued that neoclassical economic models do not apply to non capitalist societies, small scale trade was completely ignored when it wasn't being denigrated. The substantivists drew a distinction between the market and non-market economies. Market economies operate according to the market principle where everything is commoditized including labour and land, everyone seeks to maximize profits while minimizing costs, and agricultural and production decisions are made on the basis of supply and demand. In contrast, non market economies operate on the basis of reciprocity and redistribution. Market places are where people meet to trade small quantities of locally grown produce and crafts. Substantivists likened village markets to fairs, and Bohannan and Dalton (1962) described them as places where women went to gossip and have a good time, and also to make a little "pin money" if they were lucky. As such, village markets were considered to be unimportant to the main economy and they were dismissively referred to as peripheral, indigenous or internal markets, and the trade that went on in them was (and is) known as “petty” trade. The enormous amount of work on peasant markets that took place in the 1950s through 1970s, primarily in Latin America, focused on relationships between peasants and the state, and therefore favored the work of men and ignored women's trade unless it was on a large scale (Cleave 1974; Dalton 1971; Taussig 1978; Wolf 1966; Mintz 1971; Belshaw 1965; Hodder 1969; Ukwu 1969). More recently, feminist economists have exposed the ways in which the western fixation on Capitalist economics has rendered women’s work and non-capitalist forms of economic behavior invisible (Barker 2004; Waring 1988; Waller 1991; Ferber 2003; Faulkner 1986; Gibson-Graham 2006; Benería 1981; Boserup 1970; Boserup 1965). Today there is a huge interest in the work of Market Women, especially in Africa (Babb 2001; Clark 2001; Clark 2010; Clark 1999; House-Midamba 1995; Mayer 2005; Pietila 2007; Seligmann 2001; Clark 1994; Chamlee-Wright, 1997), but almost without exception the focus is on women who wield power in the vast urban markets, not on the small scale rural trading. The increasing interest in informal economies is similarly situated in the urban areas where motivations and opportunities are quite different from those in rural villages and towns (Gaughan 1987; Bruton 2012; Hansen 2004; Hart 1973; Robertson 1984). Development theory regards small scale trade as unproductive because its profits are so small, and some development projects specifically discourage women from trading by refusing to give them loans to expand their businesses, preferring to fund activities such as hog fattening, farming, and other endeavors that seemingly produce larger profits (Awanyo 2001; Botchway 2000; Mohan 2002; Dichter 1996).

I have been studying small scale trade in two places in northern Ghana, and in Tigray, northern Ethiopia—all very different environments and social/political/economic systems. Small scale trade is thoroughly embedded in all household economies and is an essential part of local and

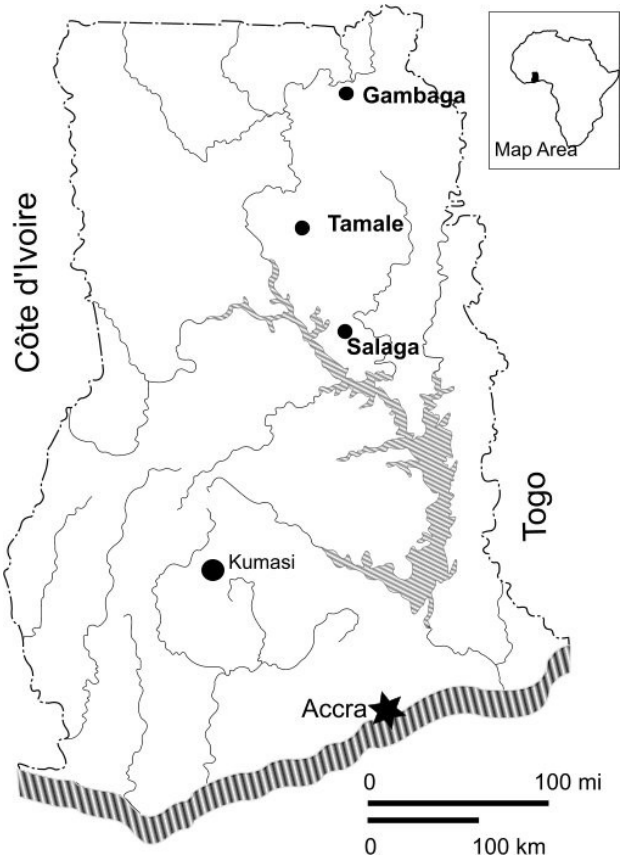

Figure 1: Gambaga escarpment, Ghana, West Africa.

regional economic systems that operate together without the guiding hand of the state. The question of provisioning caravans came to me during my research in Gambaga, so I am going to discuss their situation in the most detail, even though the Axumites in Ethiopia were also great traders and undoubtedly the same issues of provisioning caravans were similarly important in their past as well.

Gambaga is located at the top of the Gambaga escarpment in northern Ghana, West Africa (Figure 1). It is a small town that over the 25 years that I have been working there has grown from 5,000 to 8,000 people. It is within Mamprugu, the territory of the Mamprusi people, but people from many related ethnic groups also live there, and a large population of highly integrated Hausa people reflects Gambaga's former glory as an important hub on the trans Saharan trade route.

In Gambaga, small scale trade is seamlessly embedded in the highly gendered household economy. Virtually all able bodied men in Gambaga farm and identify themselves as farmers above all else. Farming is men's activity in Gambaga and women help only with sowing and harvesting. Mamprusi households are patrilineal and patrilocal, ideally consisting of a man with his wives, his adult sons and their wives and children. In addition to bearing children, a wife's primary duty is to cook. While the husbands supply the grains that are used to make *sa'abo,* stiff porridge that is the staple of the diet, wives are expected to produce the soup that accompanies it. Men give women money to buy salt, fish, and meat if there is to be any, but women must produce all the rest of the ingredients themselves. Some women plant gardens in the compound, between the houses or at the edges of the family farm where they grow soup ingredients, many of which can be dried and used throughout the year, but the majority of their ingredients are obtained through trade.

Women are expected to run a business as an extension of their household responsibilities, and most of these businesses contribute to women's job of cooking for her family. Men provide their wives with basic subsistence but women are expected to find their own money for all their other needs in addition to their required soup ingredients. Sometimes husbands set wives up in business as part of the wedding contract, but more often women learn production and trading from their mothers who sometimes help to set them up in business when they marry. All women rely heavily on their children, especially their daughters, to assist in all phases of trade so that they too will learn the skills of trading. Children play at trading with mud pies and found objects until they are old enough to participate in their

mothers' work and some children trade under their own initiative, collecting fruits in the bush and selling them along the pathways or outside the market.

Men strive to be self-sufficient in the production of grain. They try to grow enough to last the year, and their main reason for keeping animals is to sell to make up for any shortfalls. Men never sell their own grain until after the next harvest is secured, so grains that find their way to market are a year old, or have come from elsewhere. Although women could also be self sufficient in their household responsibilities, overwhelmingly they are not. Rather than growing all their own soup ingredients, foraging in the forests, rendering all their own oils and making all their own condiments, most women specialize in the production or retailing of particular products and use most of the money they make to buy other products that they could have made themselves. This lack of self sufficiency has two purposes in Gambaga. On the one hand it insures that everything is available all the time in the village so that if a crop fails or stored food spoils, if a woman travels or is too sick to perform her domestic duties, the parts of the meal can be easily obtained from the market. Second, and perhaps more importantly, trade is women's way of being in the world. At marriage women go to live in their husbands' family compounds, often far from their natal homes, where they have very little status until they have adult sons. Trading gets women out of the house and into the village where they meet and build friendships and alliances with women outside of their husbands' households. This is also their forum for demonstrating their industriousness and trustworthiness, which cement personal ties and also give them access to credit and other resources. This network of female alliances is essential to social and economic life in rural contexts. Although women participate only peripherally in chiefly politics in Mamprugu, this parallel universe has its own political system and its own dynamics although it operates according to quite different rules than the very rigid ones to which men must adhere.

It is the small quantities and low profits that make it easy to dismiss small scale trade, but these aspects of women's trade are strategic. In Gambaga, as in many places, people are obligated to share what they have with friends and relatives who ask for it. Money is particularly problematic, so people have elaborate ways of tying it up so that they never have any. Women tie their money up in inventory and buy on credit. That way whenever they receive money they give it to their creditors and get it out of their pockets. When I spoke to women about their profits, most could not tell me how much they make because frequently they spend it while they are making it. They give it to their children to buy food after school, or purchase their soup ingredients as they see them throughout the day. Some women whose business it is to make food for sale seemingly make no profit at all, but rather the food they make for sale also feeds the family and therefore does not cost them anything.

The small amounts and profits also mean that anyone can sell. The lowliest of the sellers collect firewood and other forest products, or carry water for a few *pesewas*. That little amount of money may be all an old woman needs to feed herself that evening, but I also met women who carried firewood and water, and saved their money until they could buy the pots they needed to go into brewing.

Not all trade goes on in market places. Women sell out of their houses or go door to door with trays of goods on their heads. They send their children to do this, or have them sell small piles of product by the road side. Selling is sometimes unconscious. On one occasion I interviewed a rare woman who had no business

only to find her the following day selling peanuts outside her home. She told me that she had begged them from her brother and was selling them just for something to do. On another occasion I was discussing another woman's business selling plastic bowls. During our conversation she lit a fire, got out a metal pot, made popcorn and sold it by the side of the road. When I asked if this was not also a business, she looked surprised and said that her children had been bugging her for popcorn so this was a way of giving them some without it costing her anything. As she cooked and sold, other women selling ingredients came by to chat and she gave the few coins she was making to them in exchange for their wares.

All of this is by way of saying that in this world of women there is a constant flow of goods and money that goes on continuously. This flow extends beyond the boundaries of Gambaga and into the nearby villages and hamlets. People from these small communities come to Gambaga to buy dry goods and have their grain ground into flour. Villagers rarely have money so they come to Gambaga with small loads of charcoal, malt for brewing, wild fruits and other field and forest products that they sell and then use the money to buy what they need and go home. Some women's business is to go to the far villages to take items such as fish, salt, and sugar which they cannot get there, and exchange them for field and forest products. This intervillage trade is often done by women who use it as an opportunity to regularly visit their natal homes, or their kin who have moved to other communities. Women have much more reason to carry on this kind of travel because they are the ones who move at marriage. These small communities rarely have official markets, but they often have places where people will congregate to offer small amounts of product. Some villagers set up at the more well traveled paths or roadways to sell to passers by or vehicular traffic.

Market places are only the most visible part of this chain of small scale trade. Gambaga shares a three day market rotation with two other nearby towns. On market day people come together at the market place and the variety of foods and merchandise on offer increases. Women who specialize in the sale of particular kinds of goods may go to each of the market days in turn, or even travel to more distant markets, especially if they need to purchase goods that are better or cheaper farther away. Markets are also places where people can buy in bulk. Some women, especially older ones who are no longer tied to domestic responsibilities, can increase the scale of their trade. Rarely do people sell large amounts of product at village or small town markets, but people interested in bulk sales can buy the same product from a number of merchants. People I spoke with sometimes prefer to do this because although it takes more time than buying a single sack, they can control the quality because they can see it. Women who do this kind of marketing bring back quantities of product which they break into smaller amounts for sale, or sell wholesale to higher order bulkers.

It is this way of going to higher and higher order markets that enables a low productivity area to produce a surplus. Gambaga is not a good market for buying large quantities of farm product, but Langbensi market, farther down the road is. The bulk products sold at Langbensi are not grown in the immediate vicinity, but are taken in small portions from wide catchments, making their way through traders and markets. People from the even larger market in Tamale, the biggest town in northern Ghana, travel there to buy in bulk because the product is inexpensive and good.

To return to the question of provisioning caravans, creating a surplus big enough to sustain them is not a matter of trying to get more product

out of a fragile area with limited productivity, but rather is a matter of redirecting small scale trade from throughout the region so that its final destination is the market towns and stopping places that caravans visit along the way. The caravans themselves have been described as "moving markets" because they buy and sell all along their routes and accumulate and shed people (Lonsdale 1882). People in these rural areas are not interested in exotic materials or imported goods as much as they are in insuring a supply of the foods they like. Unpredictable weather conditions mean that people intercrop, expecting that even if one crop fails another will succeed. While beans cannot be substituted for millet in the diet, a glut of beans can be used to buy millet if it is available. The trade caravans did their part to redistribute goods throughout the area, paying for what they needed in one area with foods they brought from another.

There have been a number of archaeological investigations along the trade routes in Ghana (Crossland and Posnansky 1978; Effah-Gyamfi 1985; Kankpeyeng and Nkumbaan 2008; Posnansky 1973; Swanepoel 2004) but even in places where intensive trading activity has been known to have taken place, apart from the location of a few market places (Crossland and Posnansky 1978; Posnansky 1973; Shinnie and Ozanne 1962), evidence for long distance trading activity is extremely scarce. Most of the important items in circulation, such as *kola*, slaves, textiles, leather, paper, salt, animals, and foodstuffs (Saul 2004) would not have survived, while some other items such as gold would have been too valuable to have routinely been lost along the way. A lack of durable trade items is interesting because it suggests that local communities did not accumulate them, perhaps because they had more value when passed along, either in immediate profits, taxes, and duties (Skinner 1960), or in encouraging and facilitating trade for other kinds of benefits. The trade goods and evidence for the intensification of production that archaeologists rely upon to identify and study commerce and trade in the past do not appear to be the best means of approaching trade where goods are largely perishable and where bulk commodities may be sourced from wide catchments rather than locally produced on a large scale. While we cannot know for certain that the system that prevails in Northern Ghana today is identical to that that existed in the past, an approach that recognizes that the work of feeding the family is inextricable from the processes of trade and that considers that large scale trading operations rely upon the networks of localized trade that exist within and between communities is likely to yield more results than an approach that views aggrandizing capitalist structures as both universal and necessary to large scale production and trade. Our primary problem as archaeologists is a lack of ethnographic information about how alternate forms of trade work and how to look at economic systems from different perspectives. This paper suggests that changes to households and local, small-scale trade networks can reflect important information about larger scale, seasonal trading operations.

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