CULTURAL VARIATION IN THE MAYA CITY OF PALENQUE

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Mesoamerican archaeological research has made recent inroads toward an understanding of the cultural diversity inherent in hinterland settlements and amongst commoners. Research in other disciplines has long shone a light on the many ways in which people who imagine themselves part of the same larger community may construct their identities through varying interpretations of community characteristics. Little archaeological research has been undertaken at the intersection of these concepts: the role of the city in hinterland identity and vice versa, particularly in the ways that common people living on the fringes of urban centers and people living in the urban core of ancient cities might differentially perform identity through domestic ritual and daily practice.

This research presents a case study in the elaboration of difference across commoner households in two hinterland neighborhoods associated with the ancient Maya city of Palenque, focusing particularly on the ways in which the dynamic force of human agency can shape production, exchange, and domestic ritual. A diachronic examination of domestic remains reveals a high degree of complex heterogeneity at the level of the neighborhood. Two clusters of house groups located approximately fifteen kilometers apart were situated differently in the economic, political, urban, and ritual landscapes of the Palenque polity. Commoners living in these neighborhoods both shaped and were shaped by the ritual practices and political economy of Palenque's dynastic elites.

A set of unifying political and economic trends which span the region played different roles in the lives of people living in different neighborhoods. Some distinctions between neighborhoods, such as variation in household ritual, the use of fossils and fossil-bearing materials, food processing and feasting practices, the use of imported volcanic materials, and the technostylistic choices made by potters, demonstrate ways in which people living in close proximity to one another were selective about their engagement with larger trends.

Other distinctions, such as differences in chipped stone tool production, consumption, and exchange, ceramic production and exchange, and the kinds of imported resources used in hinterland households, illustrate the different roles played by inhabitants of different neighborhoods in the political economy of the Palenque polity.

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PREFACE

This dissertation is associated with a series of online datasets available through the University of Pittsburgh's Comparative Archaeology Database, which can be accessed directly at http://www.cadb.pitt.edu. The datasets contain original data including ceramic, lithic, obsidian, faunal, and ground stone inventories.

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Finally, I'd like to thank my family for their patience and support throughout this project: Rory McCarthy, Riley McCarthy, Sadye Herckis McCarthy, Jack Herckis, and Rayna Herckis, I could not have done it without you.

1.0 INTRODUCTION

The past decade has seen a new focus on the archaeology of ancient cities (Arnauld and Michelet 2004; Cowgill 2007; Esmonde Cleary 2005; LaViolette and Fleisher 2005; McIntosh 2005; Marcus and Sabloff 2008; Orum and Xiangming 2003; Sabloff 2007; Smith 2005, 2006; Yoffee 2005), with the realization that that ancient cities were sometimes heterogeneous, cosmopolitan and culturally varied in ways that transcend class, gender, and occupation. We think of modern cities as places that contain cultural variability unseen in smaller aggregations of people, and we also think of them as containing people with complex identities based on any number of factors which shape their lives, their perceptions of themselves, and the way they interact with others on a daily basis. People can be differentiated according to their affiliation with class, gender, or occupational groups as well as with socially, politically, and/or geographically defined groups. Socially defined groups may be composed of people from all walks of life, all types of occupations and of varied means, but their members share a sense of group identity which may be reflected in their culture; in their food and possessions, in their homes and rituals, and in the ways they raise their children. This subject has been explored in the past several decades by historians, sociologists and cultural anthropologists interested in urbanism and race, in enculturation and in ethnic enclaves (e.g., Angel et al. 2005; Park, Burgess, and McKenzie 1984; Bettencourt et al. 2007; Harris 1945; Hoyt 1939). In studies of modern cities, scholars have often pointed to cultural diversity as an important catalyst for social, political and economic change

and innovation and as an organizing principle. Much of the dynamic nature of modern cities has been attributed to their multicultural character (Angel et al. 2005; Bettencourt et al. 2007; Glaeser 1994; Hall 1998; Henderson 1991; Mumford 1961). One recent study (Bettencourt et al. 2007), for example, found that increased human interaction and cultural diversity in modern urban centers is correlated with dramatic increase in innovation, wealth, and other variables. There has been a great deal of new information added to the literature surrounding Mesoamerican civilizations, and in particular research at both the household level and at various levels between that of the household and the city, kingdom, or empire (Arnauld, Manzanilla, and Smith 2012), including the barrio, neighborhood, district, and zone.

Our current understanding of the Classic Maya city of Palenque presents a tantalizing picture of a rapidly urbanized dynastic capital, founded in a cosmopolitan region during a time of dynamic change and extensive interaction. Palenque is unusual among Maya cities for its location on the edge of the Maya area and its interaction with non-Maya groups (to the west) as well as with Maya groups (to the east). These factors, along with Palenque's unusual topography and rapid growth, make Palenque a place where the archaeological evidence of diversity ought to be strong and where differences between households and neighborhoods should play a visible role in political, social and economic change.

Our archaeological understanding of the city has been shifting over the past decade to allow for the diversity of configurations which constitute urban centers (Marcus and Sabloff 2008). The urban/rural dichotomy which long figured in archaeological theory leaves much to be desired (Marcus and Sabloff 2008; Smith 2003), and it is now generally agreed that a more nuanced approach to understanding the multivalent relationships between monumental centers and people living in a city's suburbs or hinterland settlements is required (Yeager 2003). This

research generally takes place in the context of an examination of political and economic organization. Research in mesoamerican archaeology has recently included inroads into an understanding of the diversity inherent in hinterland settlements and amongst commoners (e.g. Yaeger and Robin 2004). Research in other disciplines has long shone a light on the many ways in which people who imagine themselves part of the same larger community may construct their identities through varying interpretations of community characteristics. However, little archaeological research has been undertaken at the intersection of these concepts: the role of the city in hinterland identity and vice versa, particularly in the ways that common people living on the fringes of urban centers and people living in the urban core of ancient cities might differentially perform identity through domestic ritual and daily practice.

The current research selects the ancient Maya city of Palenque as a case study in the elaboration of difference across two neighborhoods within the hinterland of a major urban center, focusing particularly on the ways in which the dynamic force of human agency can shape production, exchange, and domestic ritual. Variation in households in the hinterland of Palenque was investigated through a diachronic examination of domestic remains. A comparison of two neighborhoods in Palenque's inner hinterland reveals common participation in the regional economic and political system as well as shared material culture across a wide variety of contexts, such as production and use of chipped stone tools and production and style of ceramics. These commonalities are not surprising and present clear evidence of participation in the larger shared fabric of urban life. However, differential participation in local and long distance exchange networks as well as patterns of craft production do distinguish one neighborhood from another, and differential engagement with a symbolic system evident in both Palenque's monumental palace and in modest hinterland domestic contexts serves to exemplify the

"interplay between royal or imperial ritual and domestic or community ritual" (McAnany 1998:117) which contextualizes our understanding of political and economic integration and permits a glimpse of the fine-grained cultural variation which shaped the lives of commoners in ancient Maya hinterlands just as it shapes the lives of ordinary people living in suburbs around the world today.

1.1 REGIONAL CONTEXT

The ruins of Palenque are nestled in the last reaches of the sierras in what is now northern Chiapas, Mexico, on the far western edge of what is considered Classic Maya territory (Figure 1.1). The urban core of Palenque was located on a 3km x 1km plateau which lies approximately 100m above plains to the north (Figure 1.2); until the 1960s, these plains were seasonally flooded and swamp-like (Barnhart 2001). To the south, a sharp rise reaches 300m above the ancient city's central plazas, and to the east and west of the plateau "the mountainside becomes more karstic and areas of habitable land appear only in isolated pockets" (Barnhart 2001:3). Palenque is unique in the Maya area for its unusual topography. In sites such as Mayapan, artifactual evidence in the form of earthworks allows us to locate the boundaries of the city. At Sayil, a dramatic change in residential density can serve the same purpose. Tikal's initial boundaries were determined to be bajos to the east and west of the city, though settlement continued outward; when these bajos were determined to contain chinampas, settlement in Tikal's 16 km^2 core and 120 km^2 periphery were determined to be tightly integrated zones. The steep slopes bounding the north and south and the karstic nature of the plateau to the east and

west create natural boundaries for the urban core of Palenque. More gently sloping hillsides were rendered habitable by extensive residential terraces.

Figure 1.1 Regional context of Palenque

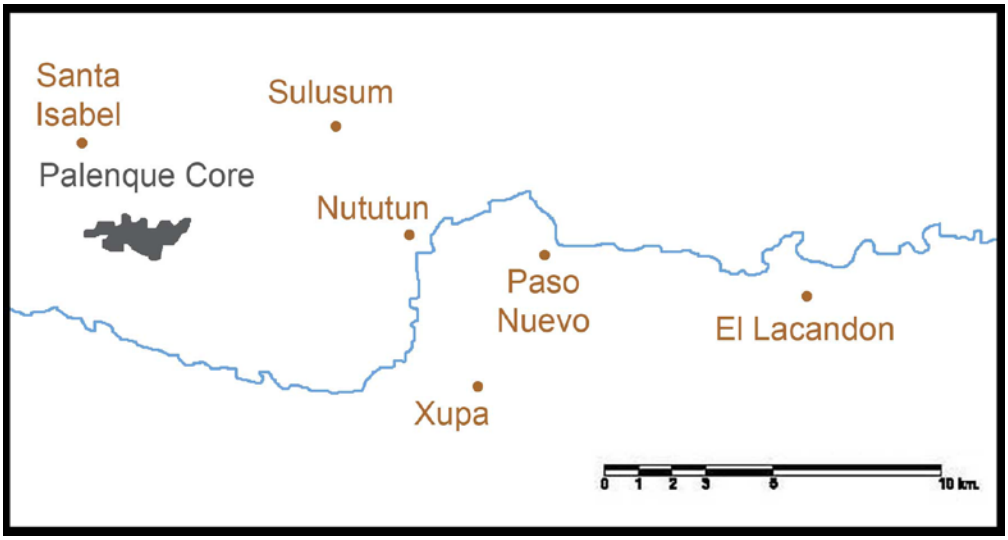

Figure 1.2: Three parts of the ancient city. Regional secondary centers are indicated in brown.

Today, our understanding of the political and social dynamics of ancient Palenque derives primarily from settlement pattern studies, epigraphic analysis, and ceramic evidence. These provide information about dynastic and elite activities as well as a chronology of settlement but give little insight into the lives of the majority of the population. While middle and Late Preclassic ceramics are available in abundance in the broader region, Late Preclassic ceramics are sparse in excavations at Palenque (Rands 1977). The Early Classic appears to have been a time of population nucleation into Palenque's urban core and secondary centers (Liendo Stuardo 2002b), which have been described as hierarchically organized and linked to a broader regional network (Bishop 1994). The establishment of a ruling dynasty at Palenque in the early fifth century CE corresponds to the period of Teotihuacán's greatest influence in the Petén (Martin and Grube 2000).

Palenque peaked at a dynamic moment for the larger region as well. As the Maya dynasties to the southeast flourished, some major urban centers to the northwest (such as Teotihuacán) were collapsing and others (including the Classic Veracruz) were coming to power. Extant trade and political networks stretched thousands of kilometers. Ambassadors and spouses, war parties, trade goods and artisans moved across great distances and interacted with groups across the region. To the east of Palenque, the area occupied by the Classic Maya is generally described as having comprised a number of independent and politically distinct polities, each defined by separate dynastic lineages but sharing a number of redundant characteristics. Palenque's interaction with other Maya polities included diplomatic visits and trade, warfare, and captive-taking. Extensive ceramic, sculptural, and epigraphic evidence suggest both political and economic relationships between Palenque's ruling dynasty and elites from centers in various parts of the Maya area throughout Palenque's fluorescence.

The spatial organization of Classic Palenque has been explored through epigraphic research (Marcus 1976, 1993), analysis of ceramic exchange (Bishop and Canouts 1993; Rands 1967a; Rands and Bishop 1980), and a series of settlement pattern studies (Liendo Stuardo 2002a, 2002b, 2005, 2011) which paint a picture of a large state with a complex political hierarchy, seated at the center of a 30km radius area of intensive economic exchange which in turn comprised two different areas (an "Inner Hinterland" and an "Outer Hinterland") which each display distinct population distribution patterns (López Bravo 2013). The political machine of the Palenque dynasty reached farther into what López Bravo has termed the "Remote Hinterland", exerting political power over local dynasties of other major and minor centers at a distance. Settlement patterns research by Liendo Stuardo (2002a, 2002b, 2005, 2007) suggests three politically and geographically distinct "micro-regions" (Liendo Stuardo 2005) in the "Outer Hinterland", each with a secondary center identified as a seat of political and social complexity (Liendo Stuardo 2007) and associated hinterland population (López Bravo 2013).

The current research focuses on house groups in the "Inner Hinterland" (following López Bravo 2013) or "Palenque regional core" (following Liendo Stuardo 2007) and in the "Outer Hinterland" (following López Bravo 2013) or "El Lacandón-Nututún subregion" (following Liendo Stuardo 2007). These areas are part of a continuous band of settlement which stretches east from the monumental core of Palenque along the foothills of the sierras.

1.2 EVOLUTION OF THE CURRENT RESEARCH

This project was undertaken with an initial aim of identifying household-level variation in cultural affiliation or practice, and of relating any cultural variants identified to political factions

and change or to economic developments already identified in the Palenque dynastic context. A program of excavation in commoner house groups was selected with the intention of recovering a representative sample of diagnostic ceramics, which would be subjected to a fine-grained microformal analysis as well as a battery of standard tests and classification. Previous research by Rands suggests a great deal of ceramic complexity, and this project was designed with the expectation that this ceramic complexity might map variation in isochrestic style to multiple cultural variants.

Soil conditions, a record-breaking rainy season, and a variety of other factors resulted in a ceramic assemblage which was not equal to such an analysis. Of thousands of sherds, the number which retained surface treatment could be counted on two hands. Due to acidic soils, ceramic materials recovered in nearly every house group lacked integrity and were difficult to stabilize for analysis. A fraction were stable and large enough to measure even the most basic characteristics of form. The vast majority were so poorly preserved that they were sorted by paste class and weighed: the act of collecting these sherds obviated the possibility of counting them, as many crumbled at a touch. Beyond the preservation of materials, three of the sites examined were so stratigraphically mixed that assemblages could not be reliably seriated. As a result, ceramics could not comprise a major artifact class for a detailed, household-level examination of isochrestic style and cultural affiliation. Ceramic assemblages were analyzed for temper and other paste characteristics as well as for construction technique. For the ceramics which retained sufficient structural integrity, measurements including rim and base diameter, rim eversion, and width to height ratio.

Several types of artifacts were unaffected by soil conditions and flooding, however: those made of stone and shell. Ground and chipped stone tools, including obsidian blades, proved

exceptionally informative in a comparative analysis, and both snail shells and fossils proved unanticipated but incredibly illuminating lines of evidence. Though quantities of sufficiently preserved diagnostic materials did not permit an analysis of the kinds of variation in practice and affinity which this project sought, it did permit an analysis at the level of the neighborhood. Two geographical clusters of house groups, separated by more than 10km, display distinct patterns of craft production and differential engagement with regional economic, political, and symbolic systems. This differential engagement operates on both synchronic and diachronic levels, permitting a useful discussion of neighborhood-level variation in practice and integration.

2.0 PREVIOUS RESEARCH

2.1 PALENQUE AS AN URBAN CENTER

A brief discussion of Palenque as an urban center and some of its characteristics can serve to contextualize the role of domestic ritual and household production and exchange in Classic Palenque's hinterland settlements. While the "city" remains an elusive term to define, models abound and an exploration and interest in refinement of these models has persisted for over 150 years across diverse disciplines including urban planning, economics, history, archaeology, sociology, and geography (Wheeler 2005; Bulmer 1984; Park, Burgess, and McKenzie 1984; Childe 1950; Fustel de Coulanges 1864; Harris and Ullman 1945; Marcus 2000; Mumford 1961; Park 1915, Scargill 1979; Smith 2003; Southall 1973; Wirth 1938; Wolf 1966). Every city is unique, though some characteristics such as large, heterogeneous population, high residential density, special organizational features, and central institutions which mediate between parts of the polity occur again and again as scholars attempt to set a basis for comparison. By any measure, including each of these, Palenque was a city.

Within a hundred years, Palenque became one of the most densely populated cities in the Maya area, as well as more aligned with Classic Maya ceramic, architectural, and political structures. The most recent estimates of population size at Palenque's core suggest between 4,200 and 6,250 individuals at its Late Classic peak (Barnhart 2001), though to date surveys are

limited and this estimate is certain to increase. This population size compares to Copán, which had a peak core population estimated at 7,600; to Santa Rita, with an estimated population of 6,840; and to Komchen, at 2,750 (Barnhart 2001). Beyond the cities' cores, a comparison of population estimates changes. Population estimates for Palenque entire, core and hinterland included, have been comparatively quite small. Barnhart estimates (2001) no more than 7,500 individuals: a number in stark comparison to many sites such as Tikal (Haviland 1970), Caracol (Chase and Chase 1996) and Calakmul (Martin and Grube 2000), all of which have reported populations of over 100,000 at their peaks. If these numbers are accurate Palenque's population density at this time was the third highest in the Maya area, at an estimated 1,900-2,800 persons/km^2 in the core. Comparatively, Copán has the highest estimated density in the Maya area at an incredible 9,600-15,800 persons/km^2, Sayil the second highest with 2,400-2,900 persons/km^2, and Komchen and Siebal follow Palenque with 1,250-1,500 and 1,000 persons/km^2, respectively (Rice and Culbert 1991). It is worth noting that the population of Palenque has been described as exhibiting a degree of concentration at the core on a level unlike any other urban center the Maya area, with 92% of the total population located in the core. This degree of nucleation may be an artifact of the limited hinterland settlement surveys which have been performed to date and may expand in the future after further research. If these numbers are accurate, however, the two sites which most closely approach this degree of nucleation are Tayasal with 48.5% and Copán with 44.8% (Liendo Stuardo 2002b). This rapidly increasing urban population density co-occurs with the rapid proliferation of ceramic types, suggesting an increase in the diversity of Palenque's population corresponding to its growth.

These numbers, however, should be taken with a grain of salt for two reasons: First, the numbers for total population and population nucleation at Palenque were generated before

extensive settlement surveys had taken place in the hinterland; indeed, such survey work is still largely incomplete. While it is clear that settlement was incredibly dense on the limestone shelf which was home to the monumental architecture which made Palenque famous among epigraphers, it is still largely unknown the extent to which surrounding slopes and valleys (to the south) and alluvial plains (to the north) were contemporaneously settled. Much research remains to be done in this arena.

Second, Palenque's topography is unique in the Maya world. The other urban centers described above generally have much lower relief topographic profiles, resulting in a settlement pattern unconstrained by many of the concerns which shape a great deal of Palenque's organization. Water management played a very different role in Palenque's monumental core than it could have in contemporaneous Maya cities, and the sweeping slopes of mountainsides made large swathes of the surrounding area unfit for construction. Degree of nucleation is therefore acted upon at Palenque by additional forces which did not affect similarly other settlements.

Monumental architecture and public works on the limestone shelf long identified as the core of Palenque required a large, coordinated, highly organized labor force over a long period of time. These include architecture which almost certainly had access restricted to elite groups, including at least one palace, a ballcourt, and many temples, in addition to public works that benefited the city's larger residential populations. These particularly include the terracing mentioned above and an extensive water management system (French 2002). Terraces along the plateau seem to have been used to stabilize hillsides and expand the area on which residential architecture could be built (Barnhart 2001). Terraces are generally more than two meters (and up to four meters or more) in height and interconnected, and have remained intact in the face of over

1,000 years of hillside soil erosion. Erosion must have been a serious concern at Palenque, as the at least nine arroyos and more than fifty natural springs (French 2002) made fresh water Palenque's most abundant resource and defining characteristic; indeed, Palenque's emblem glyph reads Lakam'ha, usually translated as "Big Water" (Martin and Grube 2000). Each of the arroyos was lined and canalized, and the entire plateau is blanketed by an extensive drainage system (French 2002). The portion of the city core surveyed by the Palenque Mapping Project (Barnhart 2001) recorded four aqueducts, two more probable aqueducts, three "waterboxes, two bridges and the remains of canalization in virtually every arroyo in Palenque. Over 70m below and 500m to the northeast of Palenque's central plaza, the Ach' Group is dominated by an 80m x 80m plaza. This plaza is bounded to the south by a structure named Maya L, which measures 67m across at the front. A wide staircase climbs 5m to the top of the structure, where "stubs of fifty columns testify to the Maya L's open colonnade architecture." Barnhart (2001:11) describes the Ach' Group as "one of the strongest examples that Palenque had multiple public gathering areas."

Barnhart (2001) points to an area called the Picota Plaza as a public activity center, with the site's only stela and a line of temple-like structures reminiscent of the line of structures in Palenque's primary center created by Temple XII, XIII and the Inscriptions (Barnhart 2001). Much like the primary center, the main plaza at the Picota group is formed by an aqueduct, with a temple built into a hill that overlooks the plaza and a probable ball court. The elevations of the two plazas are within half a meter of one another, on average (Barnhart 2001). The Picota group is built on a natural level area which slopes down to the Picota River which bounds it to the north. The central plaza at Palenque was built up as much as four meters in many places (Barnhart 2001). Rands has identified the Picota Group as the oldest section of Palenque based

on his ceramic sequencing, and Barnhart suggests that the larger central plaza was emulating the earlier Picota Plaza (Rands 1974; Barnhart 2001). Barnhart believes that this earlier center could be the site referred to as "Tok Tan" in inscriptions at Palenque, identified as the place of origin for the royal lineage of Palenque and perhaps an explanation for the fact that archaeologist have found very little evidence of a royal lineage before the time of Pakal in the eastern portion of the city. While it is possible that an earlier center to the west was joined by the area we now know as the central plaza in a type of joint or subordinate rulership, there is no evidence to date to support such a situation. It is also possible that an earlier center to the east was replaced in time in a massive urban renewal project, and that the city had a single center which shifted at some point in the city's history. In addition to these two these two public zones, the rest of the city core is composed of residential and public buildings, in groups of which many have small centers of their own.

It seems unlikely that the two centers were functioning separately and simultaneously. If the area centered around Picota Plaza is in fact a second center, dating and inscriptions would indicate a shift in focus from one center to the other over time rather than dual political or economic hierarchies operating in conjunction with of compliment of one another. As such, it would be misleading to call Palenque a multiple-nuclei city; rather, it has multiple nuclei diachronically but a synchronic examination is likely to reveal a city with a single political, economic and ritual center. The existence of clusters of residential groups, referred to by Blom and Barnhart as discreet groups, zones or neighborhoods, suggests a city conforming to Hoyt's sector model. Sectors might include both the Picota group and the later center, as well as residential areas, the Maya L complex, quarry and associated buildings, and other groups with distinct economic and ritual compositions.

A recent argument for Palenque urbanism (Barnhart 2007) invokes the city's high levels of settlement density and population nucleation, as well as public works. Barnhart recognizes both the vital role of social diversity in urbanism and the challenge of identifying said diversity in the archaeological record, pointing to the variation in architectural styles as support for "generalized assumptions of Classic Maya social diversity" (Barnhart 2007:112).

2.2 ELITES AND COMMONERS

Archaeological examination of the Maya has taken place on two basic levels. The first of these occurs at the dynastic level and examines the complex interactions of the Maya elite. These lineages fought, allied, interacted diplomatically and economically, and shared elements of art and architecture among themselves. They exchanged spouses and diplomats, artisans, and resources; polities competed and allied. Individuals moved from one political center to another for any number of reasons and left evidence of their passage in the archaeological record. This level of investigation generally focuses on political groups and groups delineated by status.

A second level of investigation takes place at a smaller scale, exploring the lives of subjects within these polities. Usually, this research takes place at the household level and considers the role of elites and commoners within the larger machine of their particular polity, especially in regard to such characteristics as status and occupation. Investigation at this level tends to focus on topics such as household ritual, gender, subsistence, and social organization in a given area. Domestic relationships and relationships of political and ethnic alliance are often intertwined (Yanagisako 1979; Spence 1996), and household studies can reveal the ways in which individual households interconnect with larger social, economic and political processes

(Robin 2003). Political change for a polity or region, however, does not necessarily imply dramatic changes in the household; practices in the household may be conservative, and therefore display continuity or may change at different rates (Bermann 1994). Investigation within a polity has assumed a monolithic culture with variability evidenced only through interaction with other polities, primarily through trade and diplomacy (Webster 1997), and has been explored primarily among the elite (Schele and Freidel 1992). In the Maya area, our understanding of commoners is often limited to comparison with the elite (Lohse and Valdez 2004) and by stereotyped perceptions of commoners as homogeneous and incapable of impacting cultural development (Marcus 2004). Interaction between distinct groups of commoners within a polity has tended to imply interaction across class, trade, gender, or political affiliation. Recent evidence, however, suggests that a fine-grained approach may provide a more complex picture of variability at the level of the commoner. An examination of ancient Maya commoners (Lohse and Valdez 2004) challenges researchers to integrate commoner roles and contributions into archaeological frameworks for analyzing social complexity, and to incorporate non-elites into our account of the past.

Our understanding of Classic period Palenque derives first and primarily from epigraphic evidence and the archaeological exploration of monumental architecture. Surveys and mapping projects are beginning to reveal the shape of lived existence for the many nameless people who lent their numbers to create the teeming landscape which mark Palenque as a city, but we are at the bare beginnings of this understanding. Excavations in low status house groups in the urban core and in secondary centers (López Bravo 2013; Venegas Durán 2005) shine a sliver of light onto the commoner majority of Classic Maya Palenque, though this population remains largely unknown and unexplored.

2.3 NEIGHBORHOODS

The concept of the neighborhood is a social one, originating from sociology and often identified on the basis of social features such as interaction and identity as well as physical features such as boundaries, size, and aesthetics. As difficult to define as a "city" has proven, the nature of the heterogeneity considered inherent to urban living and the relationship between a city "itself" and "its hinterland" has proven still more difficult. A city-centered perspective, therefore, leaves something to be desired, leading archaeologists to focus instead on the complex web of social, political, and economic relationships that connect one part of a city to another (Yeager 2003). Such a broad frame of reference allows us to examine a social or cultural middle ground, somewhere between the larger polity or politically defined district and the individual household (de Montmollin 1988; Iannone 2002; Yaeger and Canuto 2000) in examining the interplay between larger political and economic systems which might play a role in social and political organization of a given settlement, the larger political and social organization of the settlement itself, and the practices undertaken by individuals and families who lived and interacted "within [a] settlement and beyond its boundaries" (Yaeger 2003:145). Following Yaeger (2003), I prefer to discuss "center" and "hinterland" rather than "urban" and "rural", moving away from a conceptual dichotomy and thinking about both pieces as parts of a tightly woven whole. Data from around the Maya area strongly supports the idea that center and hinterland were linked into a single imagined community, a city which conceptually spanned areas beyond tightly nucleated cores or politically circumscribed boundaries (Yaeger 2003). Strategies orchestrated by elites and engaged with by people throughout the community might extend far into the hinterland.

The two clusters of households identified in this work as Area A and Area B were part of the larger social sphere of Palenque, participating in practices which unified the region but

distinguished on the basis of differential economic interaction and further differentiated by differential engagement with the symbolic and ritual complex characteristic of Palenque. These differences go beyond the functional and suggest not merely districts engaged in different economic endeavors or managed by different political entities, but a cultural distinction between neighborhoods which united them as communities and distinguished them from one another.

2.4 WATER IN MAYALAND

Ancient Maya cosmology has been explored extensively in other contexts, and so I will give the relevant elements a very brief treatment here: Watery flora and fauna, as well as water itself. As previously mentioned, the limestone shelf which harbored the greatest part of Palenque's royal and ritual architecture was also the source of many mountain springs. These fed a complex water management system and simultaneously played a significant role in Palencano cosmology. The natural world was seen as a point of contact between the sky and a watery underworld, which was portrayed in iconography and art as through images of standing water, deep holes, water lilies, and crocodiles (Reilly 1989). This underworld was a locale for death and resurrection which could be accessed through caves and at springs, and entrances to Xibalbá were often portrayed alternatively as caves and as the gaping maw of the crocodile. The Classic Maya identified their plazas as the surface of Xibalbá (Schele and Grube 1990), and at Palenque water flowed beneath the plaza accompanied by images of water flora and fauna which included a crocodile, located at a point in an aqueduct at the nearest point between both the palace and ball court. Plazas throughout the Maya world "were the locus of rituals in which the Maya elite publically accessed the power of the ancestors, and thus the supernatural, as they danced across

the surface of the otherworldly ancestral realm" (Reilly 1989:1). Sweatbaths, used as symbolic stand-ins for caves, served as locales for purification and ritual rebirth and are in evidence throughout the site. Fifty-six known springs supply nine separate watercourses in the core of Palenque (French 2002), many of which fed the sweatbaths which peppered the city, and stone pools dot the site center, associated with ritual and residential structures (Child 2007). In Palenque, as in other Classic Maya centers, riverine fauna and flora are present in architectural elaborations, frescos, and sculptures aboveground, as well. Flowing water was associated with purification and with fertility, and was both highly visible in daily life in the form of natural and artificial waterways and in the symbology of Maya cosmology.

Recent studies have identified fossilized water creatures including fish and mollusks incorporated in to architectural elements in Palenque's ceremonial architecture, contributing to the literature a new medium through which Palencanos created a symbolic link between the natural world and the watery underworld below. Fossils were prepared and incorporated into the plaster used to line the corridors of Pakal's tomb and other important restricted-access ceremonial spaces, and many stones selected for construction of important civic and ceremonial buildings, such as the altar in the Palace tower, contained well-preserved and easily recognizable fossils of fish and other water fauna (Riquelme et al. 2012). It is likely that many these fossils were covered in plaster and paint; most were located in areas which would have had restricted access if ever they were accessed beyond their completion. They were incorporated for their symbolic weight and supernatural power, in the construction of ritually important spaces such as aqueducts and palaces, tombs and altars: Not intended for daily visibility but clearly and consistently selected for ritual use in the elite center.

It is unclear what these fossils might have meant to the men and women who incorporated them into ritual contexts. With their resemblance to riverine and marine resources and incongruous mineral composition and provenience, they would surely have been curiosities at the least. Cuevas García and Alvarado Ortega (2012) link the use of fossils in monumental architecture to creation stories and flood myths in the Ancient Maya world.

2.5 POLITICAL INTEGRATION OF THE HINTERLAND

The high degree of nucleation in Palenque's central precinct means that there was simply no room for in-fields. Substantial monumental architecture, extensive aqueducts, many kilometers of residential terracing and thousands of residents were packed tightly onto a plateau 1km wide by 3km long. There is no evidence to date of intensive farming in the city, but Barnhart identifies six areas on the plateau as potential in-fields (2001). Barnhart proposes that these in-fields were tree groves, and that diets at Palenque were supplemented by fruits from these groves. None of these six potential in-fields exceeds 100m in diameter, and even should they have been intensively cultivated they are unlikely to have filled subsistence requirements for the estimated 5,000 individuals residing in the urban core of Palenque during the Late Classic. A large proportion of subsistence requirements must have been met with provisions cultivated outside the city's core, and the people living in the periphery and providing the core with these provisions must have had lives inextricably linked to the lives of those living in the city center.

Cultivated land and residences populated the valleys and plains spread out to the north below the densely settled urban population during the Late Classic. As the population living in

these foothills grew and produced a greater proportion of provisions for the rapidly expanding population in the city center, they would have become tightly integrated into the political, economic, and social structure centered in the ceremonial centers nearly half a kilometer above. Liendo Stuardo has found that, in the hinterland area explored in his studies, settlement density expands by several orders of magnitude between the Middle Classic and the Late Classic.

Agricultural intensification took two major forms: Terracing in the uplands and channelized fields which drained and irrigated the swampy lowlands. Liendo Stuardo (2002) suggests that elite households associated with intensified fields may have managed the production and distribution associated with those fields. The intensive farming techniques employed in these areas indicate a labor requirement that could not have been satisfied by single households (Liendo Stuardo 2002b). A majority of rural house groups show little variation in wealth indicators among themselves, but are located close to intensive fields, suggesting labor mobilization requiring a degree of centralized organization and management. Sites associated with intensified fields have low levels of construction volume, indicating that these sites did not directly benefit from field intensification. This suggests elite groups residing in the city core with direct control of agricultural sites in this peripheral area. These fields have mound groups located in close proximity, which might indicate permanent settlement of laborers working on elite landholdings.

Political integration of Palenque's regional system has been the focus of extensive research over the past two decades (Liendo Stuardo 2002a, 2002b, 2005a, 2005b 2007, 2011). Liendo Stuardo (2007) identifies four "sub regions" which "can be defined by their different occupation histories, multiple subsets of population densities, architectural variation, causeways connecting micro-regions with the larger region, and the existence of a clearly defined set of

frontier zones" (Liendo Stuardo 2007:97). He identifies most of the sites within these zones as belonging to the Late Classic period and discusses three major periods for political change in the region. The first of these takes place during the Early Classic and is "characterized by the development of political centralization with the founding of the ruling dynasty at Palenque and an increase of population figures" in the city core (Liendo Stuardo 2007:100). During this period, a regional settlement hierarchy appears likely but its nature remains unclear. During the Middle Classic, a point when Palenque's political control was rapidly expanding in the region, population figures grew and an explosion of construction transformed the city core. Liendo Stuardo points to a concurrent increase in intensive agriculture during this period (Liendo Stuardo 2007:100) as evidence of integration with the hungry population in the city core. During the Late Classic, settlement density in the hinterland rose rapidly, and Liendo Stuardo suggests that "rural populations within the Palenque area might not have constituted a homogeneous unitary sociopolitical unit responding in similar ways to strictly top-down mechanisms impinging upon them" (Liendo Stuardo 2007:100).

It is clear that the lands surrounding the core of Palenque were integral to the daily survival of the large populations at the core; that the organization, maintenance and control of these lands must have played a very important role in the political, social, and economic organization of the city.

2.5.1 Secondary Centers

Secondary centers in Palenque's hinterland have been explored most recently by Liendo Stuardo (2007, 2011) particularly in Chinikiha and López Bravo (2013) particularly in El Lacandón, though a history of archaeological exploration of these centers goes back half a century or more

(Adams and Culbert 1977; Bishop 1994; Bishop and Rands 1982; García Moll 1991; Grave Tirado 1996; Rands 1967a, 1967b, 1973, 1977b, 1987, 2002; Rands and Bishop 1980). Excavations at El Lacandón suggest that Late Classic Palenque was a political machine which created secondary centers such as El Lacandón as "second level center(s) in the political hierarchy, to preside over elite and commoners distributed" farther from the city center (López Bravo 2013). López Bravo's examination of El Lacandón suggests that hinterland economies concentrated production of obsidian blades during the Late Classic by elite household while other types of production may have taken place in households across the spectrum of status. The local production of goods, however, "does not fit into the interventionist state program, which would seek the development of a capital-rural dichotomy, with production removed from the smaller communities and the subsequent establishment of specialized workshops at the capital" (López Bravo 2013:147).

López Bravo has found that feasting activities were preferentially enacted in El Lacandón's elite households. This preference was not as strong as that of Palenque's central precinct, however, where elites and commoner feasting activity rates appear more starkly disparate (López Bravo 2013:148). Fine wares were present in both commoner and elite house groups in similar proportions, a stark distinction from the disparity evident in the city center where commoner households did not have access to these wares (López Bravo 2013:149).

Finally, examination of figurines, censers, and burial practices in Late Classic El Lacanón "suggest that the ideology of the super elite… was intimately related to Palenque's *great tradition*... On the other hand, it seems that …an elite household had an ideology that included more diverse practices that … was possibly related to a local *little tradition*" (López Bravo 2013:199).

2.6 DOMESTIC RITUAL AT PALENQUE

An examination of ritual at Palenque has been largely limited to elite contexts (Marken and González Cruz 2007). A great deal has been written about the complex and numerous incense burners abundant at Palenque (Bishop, Rands, and Harbottle 1982; Rands and Rands 1959; Fanjat et al. 2013), the monumental architecture which includes numerous sweatbaths and other ritual spaces (Child 2007), and extensive burials from the most opulent tombs to more modest burials (López Bravo 2000). Recently, researchers have discovered the incorporation of fossils into architecture and sacred spaces (Cuevas García and Alvarado Ortega 2012) and explored the diversity and symbolic import of springs and watercourses (Child 2007; French 2007; French, Duffy, and Bhatt 2012). López Bravo's examination of burials, censers, and figurines (2013) appears to be the only in-depth examination of commoner domestic ritual.

Palenque's monumental core contains an abundance of symbolic sweatbaths, in addition to the two functional sweatbaths that have been identified to date (Child 2007). These were an integral part of Palenque's monumental evocation of caves and water, and in concert with hieroglyphic texts reveal a special focus at Palenque on transformation rites and movement between life's stages (Child 2007).

2.7 CERAMICS AT PALENQUE

The ceramics of Palenque have been extensively studied and described (Bishop 1992, 1994; Rands 1973a, 1973b, 1974, 1977, 1987, 2002; Rands and Bishop 1980, 2003; Rands and Rands 1959). They provide the fundamental chronological tool for dating stratigraphic layers in

household remains, and open a window into the kinds of formal stylistic variation which indicate the sort of cultural variation which is the central focus of this research.

Palenque's Preclassic (350 BCE – 150 CE) ceramics are regionally distinctive. The presence of some characteristics and absence of others appears congruent with Mixe-Zoque trends in the region (Lowe 1977; Rands 2002). "Most Preclassic pottery known at Palenque has been subject to marked redeposition and breakage" (Rands 2002:32), and chronology has been exceedingly difficult to determine. For the broader area including Palenque,

> "Initial Middle Preclassic similarities tend to be stronger outside the Maya Lowlands than with other Lowland Maya sites, and a few ceramics also have non-Maya Early Preclassic correspondences. Depending in part on the survey site under consideration, Olmec/Greater Isthmian features and Chalchuapa-like treatments are noted. Usually, however, relationships are observed on a modal rather than a typological level, perhaps reflecting the reworking of external influences from varied sources and the occasional retention of earlier features as archaisms" (Rands 2002:1).

A lack of characteristic Chicanel ceramics suggests that local traditions persisted and more typically Maya types were not well-established in the region (Rands 2002). Ceramic types such as thick, perforated white-slipped tecomates; white-slipped restricted bowls; flared dishes or bowls with a double-line break design or a field of incised diagonal lines have been termed Chiuaan, and are considered by some as a Xe equivalent at Seibal or close to Nacaste at San Lorenzo (Rands 2007).

The Early Classic Picota complex (150–350 CE) at Palenque has been identified as a localized tradition which differed markedly from Maya norms (Rands 2007), lacking polychrome, figural painting, painted glyph bands, basal flanges, and ringstand bases. Characteristics include treatments that extend back into the Preclassic, such as vertically groove-incised and everted rim vessels. Some ceramics dating to this period correspond to more typically Maya types, but the levels in which they occur do not comprise complete assemblages of typical Early Classic Maya, or Tzakol, types (Rands and Rands 1957). The later half of the

Early Classic (350–500 CE) is characterized by the Motiepa ceramic complex, the introduction of Petén Gloss ware and the use of polychrome pottery, suggesting an initial Maya incursion (Rands, 1974). A second complex, distinct from the major Motiepa complex and local traditions and apparently of local manufacture (Rands 2007) has been labeled "Exotic Motiepa" (Rands 1987) and is characterized by stylistically distinct ceramics of fine-grained carbonate pastes. After an early period of correspondence with the ceramic types of Piedras Negras, 60 miles away, Palenque,

> "seems to have diverged markedly from that middle Usumacinta site… Polychrome continued to be more abundant at Piedras Negras… utility wares showed heavily scored surfaces as opposed to the very lightly brushed or tool-marked surfaces at Palenque… Features of form and decoration, while occasionally coinciding at the two sites, were seldom combined in well-knit, comparable types. Connections with the Peten were still more remote. To exemplify, Palenque's pottery as a whole was… lacking in Early Classic (Tzakol) horizon markers such as basal-flanged bowls and slab-leg cylindrical vases" (Rands and Rands, 1957).

Late in the Early Classic there is evidence of an increase in population in Palenque's urban core and secondary centers, which has been interpreted as an increase in population nucleation (Liendo Stuardo 2002). This has been linked to a more hierarchical organization and integration with a broader regional network (Bishop 1992). The establishment of a ruling dynasty at Palenque in the early 400s CE corresponds to the period of Teotihuacán's greatest influence in the Peten (Martin and Grube, 2000): a time when long distance trade was extensive and major players to Palenque's east and west interacted regularly.

In the 37km^2 of hinterland explored in Liendo Stuardo's (2002) initial settlement study, no settlement was identified before the Middle Classic period (500-600 CE) and only three sites in Liendo Stuardo's area of study were dated to the Middle Classic period. This period is characterized by the Cascada ceramic complex and a general increase in the frequency of fine paste pottery. Reduced frequency of imported pottery indicates a weakening of links with the

southern Usumacinta region. Rands suggests that a less apparent, distinct subcomplex of imported ceramics implies "a wider range of contacts as well as a greater reworking and incorporation of diffused traits into the local Palenque ceramic tradition" (Rands 1987). The Middle Classic (500–600 CE) is characterized by the Cascada ceramic complex and a general increase in the frequency of fine paste pottery. Three ceramic complexes, Otolúm, Murciélagos and Balunté, have been identified for the Late Classic (CE 600–800), the period of greatest expansion, population nucleation, construction and interaction with Maya centers to the east. Rands has described Otolúm as more recognizably Maya than previous ceramic complexes identified at Palenque, characterized by an exceptionally wide everted rim, use of polychrome, dichromes, and geometric patterns. Despite being the moment of clear Classic Maya affinity at Palenque, a profusion of ceramic stylistic types remain. The fine pastes characteristic of Murciélagos ceramics include members of Chablekal and Yalcox ceramic groups sometimes incorporating decorative treatments such as those found on Telchac composites (Rands 2007).

During the Late Classic (600-800 CE) the ceremonial center at Palenque seems to have shifted from the eastern portion of the city center to a western civic-ceremonial complex which has been more extensively explored (Barnhart, 2001), and a great deal of construction took place both in the urban core of Palenque and at several other sites located in the foothills of the Sierra de Chiapas (Liendo Stuardo 2002). A dramatic change in ceramic form and style during the Late Classic leads Rands (1973b:194) to the conclusion that late in the Late Classic, "Palenque's position as a center of [Maya] Classicism had been shattered." At any given moment during the Late Classic, anywhere from one to four ceramic complexes have been identified (Rands 2002) among the profusion of patterns. At times these complexes have been pronounced chronologically distinct (e.g., Rands 2002) and at others they have been described as overlapping

(e.g., Rands 2007). The extremely Maya Otolúm complex emerged during this period, and "for the first and only time, orange-slipped pottery and polychrome ceramics are produced in quantity at" Palenque (Rands 2002:219). Several local stylistic preferences, such as rim eversion, reach extreme proportions (Rands 2002). Neither "Exotic Motiepa" types nor the jar tradition evident during the Early and Middle Classic are in evidence during the Late Classic. The Otolúm complex has been described as the first of Palenque's Classic ceramic complexes "known to be approximated at a number of sites in the low sierras" (Rands 2002:222). The Murciélagos complex comprises a sustained brown paste tradition with stylistic and formal elements which seem a natural extension of Early Classic Motiepa dishes (Rands 2002) though with innovations such as ornate flanged-incensario stands. The Balunté complex has sometimes been further divided into two separate complexes, one of which more closely resembles Murcélagos and others which indicate the substantial utilization of new clay sources in local production (Rands 2002). Rands has suggested further subdividing Balunté ceramics into two to four distinct subgroups (Rands 1987), acknowledging that the profusion of patterns presents a problem for periodization. "Ceramic classes show discontinuity, some of the new patterns lasting throughout Balunté" (Rands 1987). Balunte is most notably characterized by the appearance in frequency of several new paste classes, "including some, such as Fine Gray ware, which "have long distance affiliations" (Rands 1987). Others have been interpreted as indicating "an intensification of short distance exchange or… the substantial utilization of new clay sources in local production" (Rands 1987). Rands notes stylistic differences in functionally equivalent ceramic types and attributes them to exchange, despite a brown paste tradition which seems to unite these vessels.

Primarily epigraphic evidence has led to the argument this period represents social decline for Palenque. The Postclassic seems to have been marked by political instability; rulers

came to power and fell in rapid succession, ceramic links to sites located to the west diminished drastically (Liendo Stuardo 2002:109), and ceramic links to the north and east suggest a rapid settlement of the area by people leaving the Low Sierras (Rands 1977:163). A dramatic change in ceramic form and style during this period leads Rands to state that "in late Balunté, Palenque's position as a center of [Maya] Classicism had been shattered" (Rands, 1973b:194).

2.8 STYLISTIC VARIATION AND CULTURE AT PALENQUE

There is thus at Palenque throughout its sequence a remarkable profusion of the kind of stylistic variability in ceramics that is usually taken by archaeologists to represent cultural group identities and affiliations. For each period of Palenque's development, several ceramic complexes have been identified. To date, however, the way that these many different styles intersect within the city of Palenque and its immediate hinterlands has not been explored through systematic analysis of their spatial distributions and associations within the city and its environs. The current study design relied upon the ceramic stylistic complexes already defined and some subdivisions of them, which provided the basis for identifying chronological periods for archaeological contexts. While the assemblage of recovered materials was insufficiently robust to define ceramic variants which tend to co-occur spatially within the Palenque zone, some variation in ceramic style was identified between neighborhoods.

People in the two neighborhoods were producing different variations on the same progression of themes throughout their occupations. This suggests a cultural distance which is reinforced by differences identified through the analysis of other artifact classes. From what we already know of Palenque we expected to see a culturally diverse ancient population. The socio-

spatial patterning of this diversity within the Palenque zone was not identifiable at a finer scale than the level of the neighborhood. Differences between neighborhoods, however, imply different cultural identities and a corresponding difference in roles within the sociopolitical landscape for people living in Palenque's outlying neighborhoods.

3.0 METHODOLOGY

Across two field seasons in 2010 and 2011, Proyecto Variación Cultural en la Región de Palenque undertook to examine cultural variation amongst house groups in Palenque's hinterland through a program of excavation and analysis. The goal of this project was to describe spatial distributions of cultural materials and stylistic variation on a microregional level through excavation in a series of commoner households. With the household as the primary unit of analysis, an examination of differences in cultural identity as indicated by assemblage characteristics can be studied in relation to geographical location as well as to status and economic activities as indicated by assemblages of obsidian, ceramics, lithics, and other artifacts, features, and architectural information.

Extant information on house group size, layout, and location in an area covering several valleys in the eastern hinterland of Palenque to a radius of approximately 20km from the city core, collected by Liendo Stuardo (2005) formed the basis for sample selection. Ten house groups were selected for further investigation after evaluation for size and complexity, preservation, estimated time-depth of occupation, and accessibility. This sample included sites located within 2km of the Chacamax River, ranging between 6km and 15km east of the urban core of ancient Palenque. Each consisted of between two and seven structures, sometimes associated with terraces or raised fields.

House groups were selected on the basis of their state of preservation, their time-depth, accessibility, and the presence of a varied assemblage of ceramic types. These were identified, surface collected, and comprehensively mapped in the course of Proyecto Variación Cultural en la Región de Palenque over the course of two field seasons. The project team then placed between two and five 1m x 2m test pits in each house group in an effort to recover a sample of artifacts. Excavations were conducted with an eye to collecting a sample of sherds large enough to characterize the proportions of different ceramic variants present in each house group during each period of occupation. The aim of this strategy was to produce a sample of artifacts from which to characterize cultural affiliation, and in particular to collect a representative sample of ceramic artifacts from each house group. As previous research has returned no significant pattern in the location of middens among households in this region, test pits were be located in front of and behind structures, and in patios where applicable, with a minimum of two and a maximum of four excavation units per house group. House groups were mapped and architectural information regarding shape and relative positions of structures upon arrival. Additional architectural information was recorded as it was revealed through clearing of land or excavation of test pits. Each excavation unit was 1m x 2m, located in an area deemed likely to contain a robust sample of ceramic remains. Initial surface collection, followed by removal of large flora and a subsequent second round of surface collection, preceded removal of overburden and excavation. Excavations proceeded following natural stratigraphic levels from the surface down to sterile soil.

Field crews consisted primarily of local labor, with the assistance of several graduate and undergraduate students from the University of Pittsburgh, Pennsylvania State University, and Centre College as well as local guides and assistants who have participated with this researcher

in past projects and have expressed interest in the current research. Two to three excavation units were open at a given time with three to four individuals working at each unit, eight hours a day, six days a week, from July through early September 2010 and February through early April 2011. Data entry and processing of recovered materials took place in a laboratory located at the field headquarters in Palenque two hours a day 6 days a week during the excavation period.

Soil samples were floated and packed, and all archaeological artifacts collected were processed and analyzed, in the laboratory located at the field headquarters in Palenque and at the Fundación Arqueológica del Nuevo Mundo in San Cristóbal de las Casas. Intensive material analysis took place in September and October of 2010 and April through June of 2011. Material processing and analysis was completed by the researcher in conjunction with students from the University of Pittsburgh, Pennsylvania State University, Brigham Young University, Universidad de Ciencias y Artes de Chiapas, and Universidad Intercultural de Chiapas. Lithic and obsidian materials were analyzed for information on usage, production, and exchange. Ceramic remains were analyzed for modal characteristics and formal attributes associated with known stylistic complexes, including shape class, rim type, and evidence of production techniques such as unobliterated coiling marks and paste composition. Recurrent combinations of these characteristics were used to constitute complexes of traits which can be identified as cultural markers.

Ceramics, ground stone, plasters and architectural elements were analyzed by the author at the Instituto Nacional de Antropología e Historia (INAH) archaeological facility in Palenque and at the Fundación Arqueológica del Nuevo Mundo in San Cristóbal de las Casas. Obsidian and lithic artifacts were analyzed with the generous assistance of John Clark of the Fundación Arqueológica del Nuevo Mundo. Faunal and floral remains were analyzed at the INAH

archaeological facility in Palenque with the help of Samuel Lopez Vazquez and Jacinto Mendez Dias.

Fossils were analyzed with the generous assistance of Albert Kollar of the Carnegie Museum of Natural History. I first engaged with fossils as cultural artifacts upon the appearance of a feature in house group 76 which consisted of a tremendous number of fossilized mollusks. That these were not part of a native fossil bed but had rather been spatially displaced, and contained only one morphological type, *Crassostrea*. These fossilized oyster shells seemed to generally constitute large, relatively complete specimens with no evidence of cultural modification, only of relocation. Their distribution indicated that they had been used to level a hillside and expand the area suitable for construction, creating a platform on which a structure was maintained throughout the Middle and Late Classic. A plaster floor had been constructed immediately on top of this fill.

INAH archaeologist Martha Cuevas García, whose project examining the use of microfossils in the production of plaster for the Temple of the Inscriptions in Palenque's urban core co-occurred with the current project, offered several personal communications regarding the analysis of fossils in archaeological context in the region. Albert Kollar of the Carnegie Museum of Natural History was an invaluable resource in the identification of individual fossils and their original geological context.

Upon completion of material analysis, data from these house groups were compiled in an effort to identify recurrent combinations of attributes. Such a complex of attributes represents a distinctive style, which has long been associated with cultural identity. It was the intention of this researcher to subject ceramic assemblages from house groups to a series of statistical tests with the aim of identifying recurrent combinations of microformal and decorative attributes, which

would represent a distinctive style of the type long associated with cultural identity. Soil conditions at a significant and geographically constrained minority of house groups resulted in ceramic assemblages insufficiently preserved to undertake such an analysis.

4.0 HOUSEHOLD UNITS AND NEIGHBORHOODS

A recent focus on the extent and organization of regional settlement and political integration in the larger area including Palenque has dramatically improved our understanding of the region's growth and development over time (Marken 2007). The center of Palenque itself is easy to define as a city, comprising a large, dense, and heterogeneous population with many urban qualities (Andrews 1975; Barnhart 2007; Childe 1950; Marcus 1993; Wirth 1938). The high degree of nucleation in the city center of Palenque is a clear statement of integration with the surrounding hinterland, and suggests either urban farmers commuting to hinterland fields or a high level of agricultural production outside of the city, with food imported to the city regularly for the maintenance of the urban population. Regular interaction between at least some residents of the city's central precinct and people who lived outside the natural boundaries of the city center can therefore be assumed.

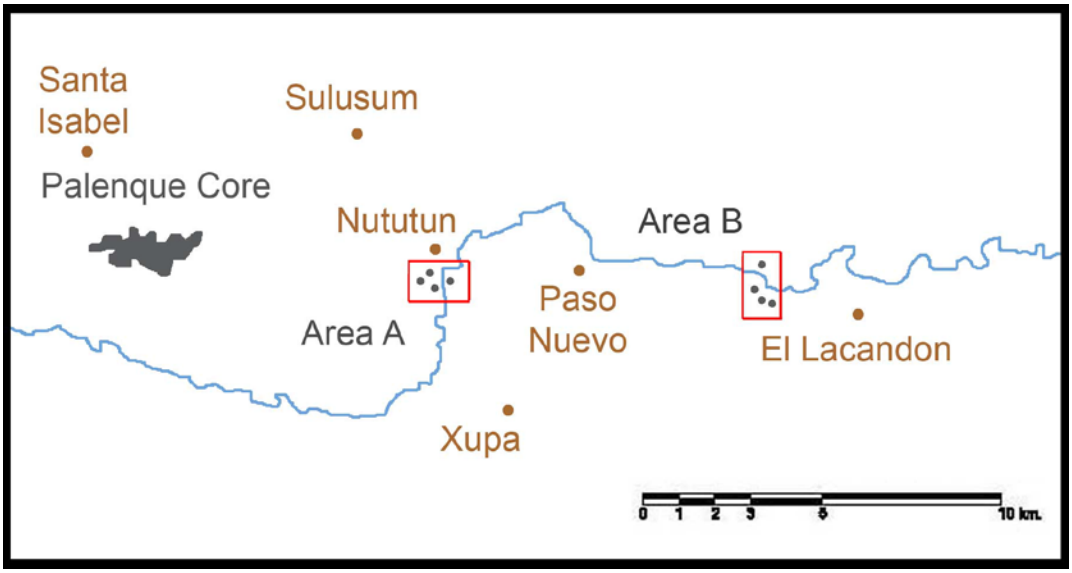

Figure 4.1: Palenque Area, including two neighborhoods selected for investigation: Area A and Area B.

The two neighborhoods contrasted in this work (see Figure 4.1) were selected by virtue of their location in areas identified by Liendo Stuardo as distinct "sub-regions" or "districts". These sub-regions were "defined by their different occupation histories, multiple subsets of population densities, architectural variation, causeways connecting micro-regions with the larger region, and the existence of a clearly defined set of frontier zones" (Liendo Stuardo 2007:97). Area A is placed more or less firmly in a zone Liendo Stuardo identifies as "Palenque's immediate hinterland", an area limited to the 40km^2 surrounding the city core and bounded to the east by the site of Nututún. This region is described as lightly settled (25 persons/km^2) and characterized by architectural homogeneity: "With few exceptions, sites correspond to single patio groups composed of low platforms" (Liendo Stuardo 2007:97). House groups within this area are clustered irregularly. One of the sites selected for intensive exploration in the current project (Site 94) lies farther to the north than expected by Liendo Stuardo by less than 100m.

Area B associated with the zone Liendo Stuardo identifies as "the El Lacandón-Nututún subregion", though some of the sites in our Area B similarly lie farther to the north than indicated in Liendo Stuardo's schema. This sub-region is characterized by Liendo Stuardo in relation to El Lacandón, and described as having a higher structure density per km^2 than that observed in the Palenque regional core, with 19 structures per km^2 as opposed to 9.6 (Liendo Stuardo 2007). Liendo Stuardo also finds that settlements in this sub-region appear more evenly distributed than those located closer to the city center (Liendo Stuardo 2007).

Nututún, located along the banks of the Chacamax River near to Area A, and El Lacandón, located several kilometers to the east of Area B, were much larger settlements than those in their immediate vicinities. Both show evidence of settlement as early as the Late Preclassic through the Terminal Classic, and while we still know little about the relationships of people living in these smaller centers with the people living in the surrounding areas or with the inhabitants of Palenque urban core, shared architectural and ceramic traditions unite the region and imply important enduring relationships of some kind. These and other small settlements within 20km of the site center of Palenque represent a relatively continuous constructed landscape as one travels east from Palenque, through Area A, past Nututún, along the banks of the Chacamax River to Area B and eventually to El Lacandón, the Usumacinta, and beyond, into the heart of Mayaland. The people living in the Area A house groups examined here were all located within a couple of kilometers of one another, and would surely have been able to hear and see one another without straying far from their homes or fields. They would have seen the light and smoke from fires in the urban core of Palenque, visible on a limestone shelf far above, and they would have been able to walk up to the central plazas in an hour, if unimpeded. They would have been able to reach their neighbors in Area B, passing larger settlements, smaller

homesteads, and numerous terraced and channel-fed fields along the way, and made their way home in the span of an afternoon.

The intersite spaces associated with these settlement(s) have not been extensively explored, but a preliminary synthesis of research to date suggests a continuous occupation across the area, no single component of which can be understood in the absence of its social context. The people living in Area A and those living in Area B may not have seen one another often, or traveled daily to Nututún or Palenque's central plazas, but their nearby presence surely shaped daily life in profound ways.

Ten house groups were selected for investigation in the current project. This sample comprised sites located within two kilometers of the Chacamax River, ranging between 6km and 15km east of the urban core of ancient Palenque. Each consisted of between two and seven structures sometimes associated with terraces or raised fields. These house groups could be further divided into two geographically clustered neighborhoods, both located within López Bravo's (2013) "Inner Hinterland."

4.1 AREA A HOUSE GROUPS

The first of these two neighborhoods, here referred to as Area A (Figure 4.2), lies 6km east of the site center of Palenque. The current investigation undertook excavations in four house groups located in this neighborhood, three of which are located within half a kilometer of one another (Sites 76, 78, and 79), half a kilometer south of the secondary center of Nututún, and to the west of the Chacamax River. A fourth house group associated with Area A (Site 94) is located 1.2km

north northeast of the other three, on the eastern floodplain of the same Chacamax River and 0.5km east of Nututún. These sites taken as a group represent a steady occupation from the late Preclassic through the Early, Middle, and Late Classic periods.

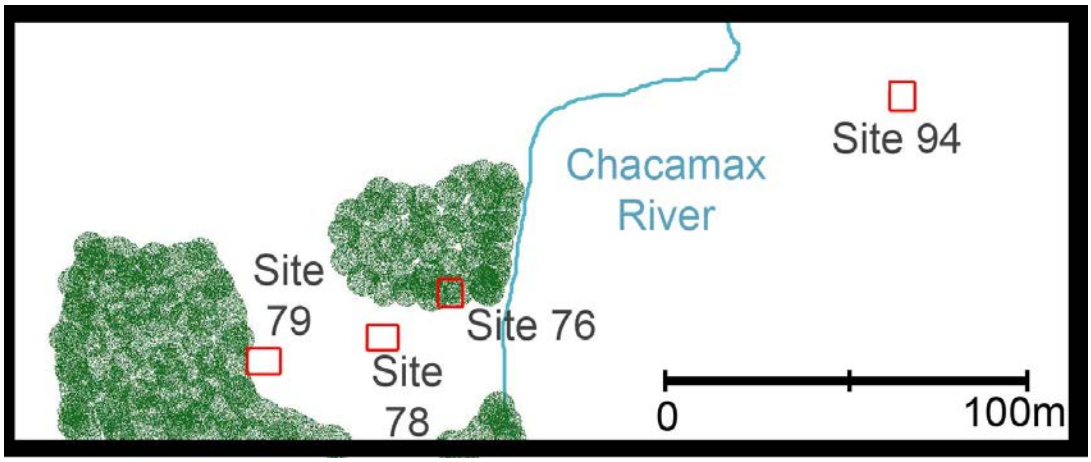

Figure 4.2: Area A house groups

4.1.1 Site 76

The house group registered as S1E2-76 (Liendo Stuardo 2005) and here referred to as “Site 76” is located on a ledge in the crook of the Chacamax River. It lies approximately 7.5km east of the Zona Arqueologíca of Palenque and approximately 0.7km south of Nututún, a secondary center on the banks of the Chacamax River. During the dry season today the bank of this still-navigable river lies approximately 50m east of the house group. This site is part of the continuous dispersed settlement characteristic of the area, and was likely integrated into a larger body of construction: Uphill and about 200m west of the platform on which the house groups’s structures stand lies additional, extensive construction comprising at least 15 structures sitting atop the ridge of a

hillside. That hillside is itself entirely faced with complex structures (to the north) and backed (to the south) by a sheer drop-off which overlooks a dramatic crook in the river as it turns west. The platform and three structures identified as Site 76 (Figure 4.3) is located precisely at the point where the Chacamax River cuts through the foothills, exits the Sierra Madre of Chiapas, and enters the northern plains.

The house group consists of a raised 20m x 25m platform built to an apparent height of 0.8m on a level portion of the eastern slope of the aforementioned hillside with three structures arranged around a patio. The patio is open to the west (to face the terraced hillside which supports multiple structures). Three structures on the raised platform are rectangular and measure 2m x 7m (northernmost, east-west orientation), 3m x 6m (westernmost, north-south orientation), and 4m x 6m (southernmost, north-south orientation). Today, the area is densely overgrown (Figure 4.4).

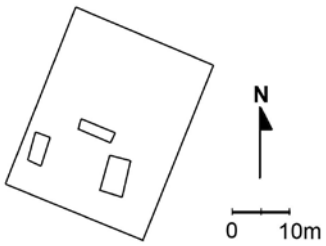

Figure 4.3: Site 76 architecture and orientation

Figure 4.4: Site 76 overgrowth, with archaeologist Charles Amman

Upon excavation, it became clear that the leveled area and the platform built on top of it were artificially constructed, and took considerable labor to create. At the center of the platform, fill composed of large unshaped stones reach at least 2m in depth. There were at least two major phases of construction. Before the area was leveled to take its final form, it contained complex construction (as evidenced by the staircase encountered at 2m below the datum in Unit Three) which holds a different orientation from the platform and structures built on top of it.

One 1m x 2m unit was excavated immediately east of the easternmost face of the platform. A second 1m x 2m unit (U2) was excavated in the center of the patio. A third 1m x 2m unit (U3) was excavated immediately north of the north face of the platform. Excavation revealed multiple periods of occupation interspersed with periods of disuse and construction. The northern portion of the house group shows evidence of earlier occupation than the southern portion. Two of the three excavation units presented floors and other architectural construction.

This house group was occupied from the Preclassic through the Late Classic, with the bulk of its occupation during the Early and Middle Classic. Early residents constructed a smaller residential unit primarily in the northern portion of the area. Early occupation was likely smaller and less integrated into the larger economic and cultural machine of the region. Riverine

resources from the nearby Chacamax River are in evidence throughout the occupation. During the Middle Classic, residents leveled and expanded the available area for further construction.

4.1.2 Site 78

The house groups registered as S1E2-78 and S1E2-79 (Liendo Stuardo 2005), which I will refer to as “Site 78” and “Site 79”, probably interacted regularly with Site 76 throughout their occupations; all are very near to one another geographically. Site 78 was also part of the same larger regional settlement as Site 76; the constructed hillside described above lies immediately to the west of Site 76 and Site 78 lies almost immediately to the west of the constructed hillside, along the top of the same ridge. Occupation of Site 78 began during the Early Classic, with sporadic occupation continuing into the Postclassic.

Site 78 is located on a natural T-shaped foothill which runs east to west with a lower hillock extending from the apex of this foothill to the north. This site lies approximately 7km west of the Zona Arqueologíca de Palenque (ZA) and approximately 0.3km west of both the Chacamax River and Site 76. Three mapped structures (Figure 4.5) are associated with terraces on the northern extension as well as terraces on the eastern and western hillsides, though there are additional structures within 0.5km as described above. Two structures are located at the apex of the foothill, at a somewhat higher altitude than the third structure a short way downhill to the south. This entire area is located in a field which was covered with tall zacate (Figure 4.6) at the time of excavation. It would appear that Site 76 and Site 79 are both visible from this location, with a long view of the seasonally flooding plains to the north, settlement along the Chacamax

River (probably including Nututún, which lies approximately 0.5km to the northeast), and a partially obstructed view towards the urban core of ancient Palenque.

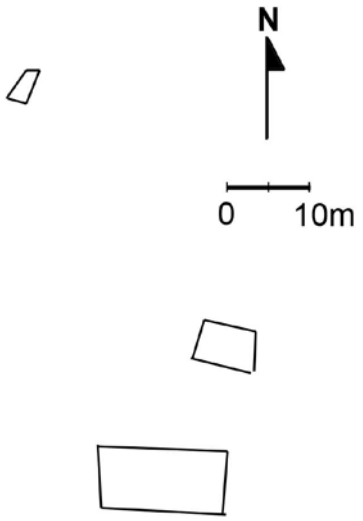

Figure 4.5: Site 78 architecture and orientation

Figure 4.6: Site 78 view to the north from between the two major structures

4.1.3 Site 79

House groups located at Sites 79 and 78 are more similar to one another than to any other site in my sample. Registered as S1E2-79 (Liendo Stuardo 2005), Site 79 is a smaller house group associated with agricultural terraces. Occupation was initiated relatively late and extended through the Middle and Late Classic. Site 76 appears to have made use of the same riverine resources available to 76 and 78 as well, despite the fact that it lies a bit farther away from the river. The house group consists of two structures (Figure 4.7) on the apex of a ridge that runs east to west, paralleling the last foothill of the sierra. To the north and below the ridgetop are the remains of raised fields (Figure 4.8).

Excavation units were located immediately to the west of the westernmost structure and immediately to the north of the easternmost structure. One interesting feature of this house group is an element of architectural construction. In Unit 2, located immediately west of the westernmost structure, a platform comprised of a large number of fossilized mollusks and no other cultural material, runs approximately 17cm deep and extending throughout the unit. These were not part of a native fossil bed but had rather been spatially displaced. Only one morphological type is present in this feature, *Crassostrea*, and these fossilized oyster shells seemed to generally constitute large, relatively complete specimens with no evidence of cultural modification. The distribution of these ecofacts indicated that they had been used to level the hillside and expand the area suitable for construction, creating a platform on which a structure was maintained. A plaster floor had been constructed immediately on top of this fill. While this house group is on a Paleocene foothill littered with stones of comparable size, these Eocene *Crassostrea* were transported from a minimum of half a kilometer downhill, the nearest Eocene outcrop, and likely from farther away. The nearest Eocene quarry identified by Riquelme and his

colleagues (2005) lies 6km east of the house group. In each of these contexts, *Crassostrea* fossils are found in conjunction with a wide variety of other Eocene flora and fauna. We can infer that these fossils were intentionally selected and transported, and then used to prepare a platform on which a structure stood. Site 79 was occupied far more briefly than Sites 76 and 78, with occupation restricted to the Late Classic.

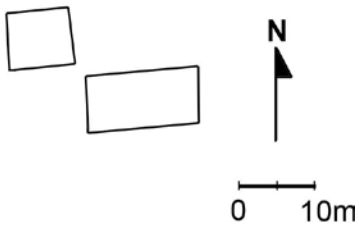

Figure 4.7: Site 79 architecture and orientation

Figure 4.8: Site 79 view from the north

4.1.4 Site 94

Across the river from the previous sites but still quite nearby is the house group registered by as S1E2-94 and here referred to Site 94 (Figure 4.9). This house group was located on a rise which sits above a vast stretch of seasonally flooded plains (Figure 4.10), indicating that the residents here were likely relying on this seasonal flooding food production in ways distinct from their neighbors at Sites 76, 78, and 79. Though classified as a commoner house group in the same rank of other sites in the current sample, this is a larger house group comprising seven structures. These are arrayed along a ridge running northwest to southeast approximately 0.5km east and 0.75km south to the nearest approach of the Chacamax River. Structures range from approximately 0.3m to 0.6m in height and are arranged in an informal group along the ridge from east to west. One structure is L-shaped and the other six are rectangular; all are oriented east-west with the exception of one rectangular structure which runs north-south. The largest structure shows evidence of looting.

Three excavation units were located immediately east of the L-shaped structure, the easternmost structure in the group (U1); immediately north of the northernmost structure (U2); and halfway between the two southernmost structures (U3). This site was occupied during the Early Classic, with continuous occupation through the Late Classic.

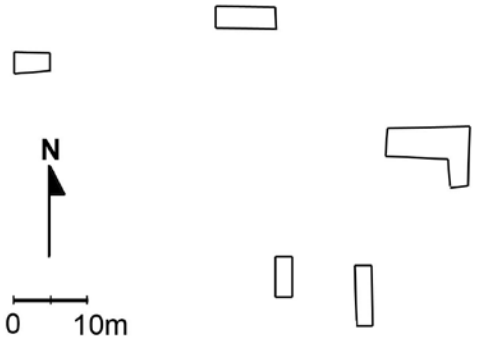

Figure 4.9: Site 94 architecture and orientation

Figure 4.10: Site 94, view to the north

4.2 AREA B HOUSE GROUPS

A second neighborhood, which is here referred to as Area B, is located approximately 15km from the Zona Arqueológica de Palenque. Five house groups (Sites 122, 123, 125, 128, and 129) are located along the southern bank of the Chacamax River, within 1.7km of one another and approximately 2km northwest of the El Lacandón, a nearby secondary center. A sixth house group, Site 149, is located 2km to the north and on the opposite side of the river (Figure 4.11).

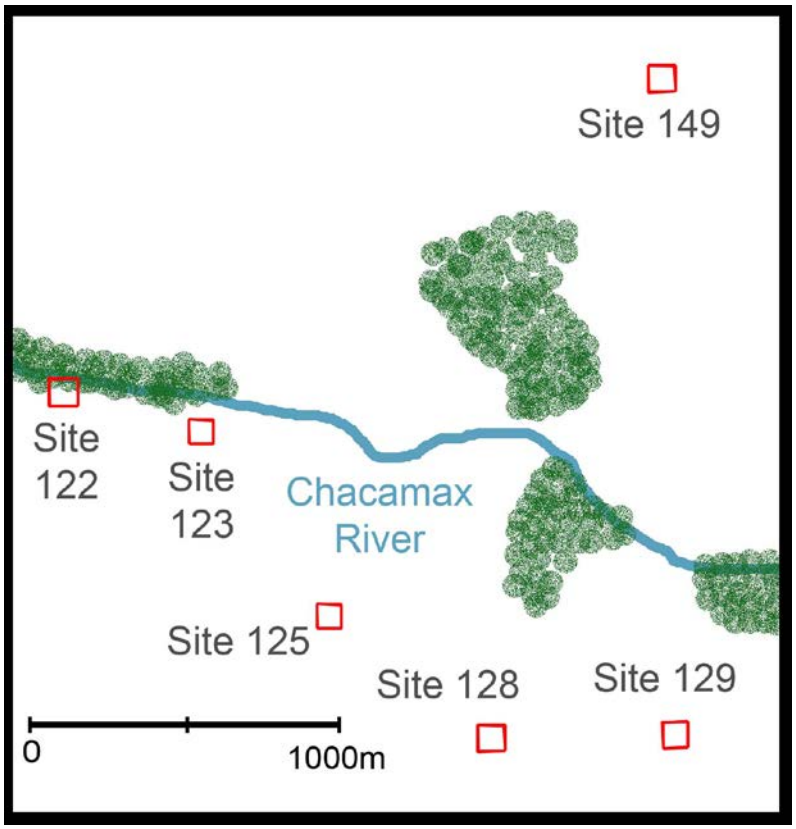

Figure 4.11: Area B House groups

4.2.1 Sites 122 and 123

The house groups registered by as S1E4-122 and S1E4-123 (Liendo Stuardo 2005) and here referred to as Site 122 and Site 123 are likely part of a larger, sprawling occupation which is more dispersed than the house groups explored through excavation at Sites 76, 78, 79, and 94. Sites 122 and 123 might be considered part of one complex. Occupation began by the Early Classic and continued through to the Postclassic. The ceramics recovered from this site are incredibly diverse, representing every chronological period identified by Rands (2007).

Site 122 comprises three structures arranged north-south around a patio (Figure 4.12), with additional possible structures in the area. These structures are arrayed along a hillside which sloped gently (approximately 5°) down to the Chacamax River approximately 100 m to the north (Figure 4.14). Approximately 500m east of this site stands a large, unmapped plaza with associated major architecture. Site 122 is located on a steep and irregularly sloping hilltop. Additional architecture appears to along the same hilltop approximately 100m to the west, in an area inaccessible for survey. Two excavation units were located immediately west of the northernmost (U1) and centrally placed (U2) structures.

Site 123 is similarly located on a gently sloping hilltop (an approximately 10° grade to the south and 15° grade to the north), about 175m south of the Chacamax River. It consists of four structures arranged north-south around a patio (Figure 4.13) with additional possible structures in the area. Additional architecture is apparent along the same hilltop approximately 100m to the west, in an area inaccessible for survey. Two excavation units were located immediately south of the southernmost (U1) and centrally placed structures.

Both house groups were occupied throughout the Middle Late, and Postclassic, though Site 122 enjoyed its heaviest occupation during the Late Classic and Site 123 during the Middle Classic.

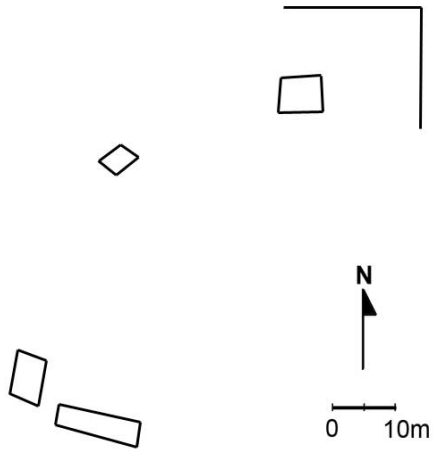

Figure 4.12: Site 122 architecture and orientation

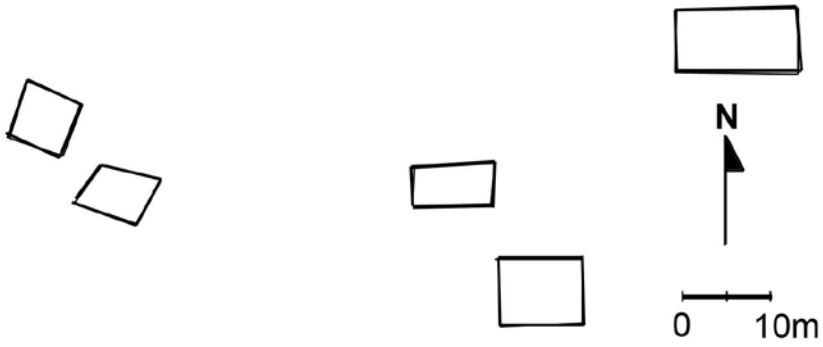

Figure 4.13: Site 123 architecture and orientation

Figure 4.14: Site 122, located on a gently sloping hilltop

4.2.2 Site 125

Very little material was recovered at this site, and with only one diagnostic sherd and a great deal of stratigraphic mixing the period(s) of occupation are difficult to pinpoint for this site. The site is composed of two large, isolated platforms arranged north-south. The northernmost is L-shaped and measures approximately 12m x 5m. The southernmost is rectangular and measures 16.5m x 10m.

4.2.3 Sites 128 and 129

The house groups registered as S1E4-128 and S1E4-129 and here referred to as Site 128 and Site 129 were likely associated with one another as well, and may have been one extended household. Both are part of the more dispersed settlement which lies farther from the ancient city center than Sites 76, 78, and 79. Settlement at both sites spans the Early, Middle, and Late Classic periods, while 128 has some evidence of Postclassic occupation as well. Sites 128 and 129 had recently been planted as a palm grove (Figure 4.15).

Figure 4.15: Site 128 is currently located in a palm grove.

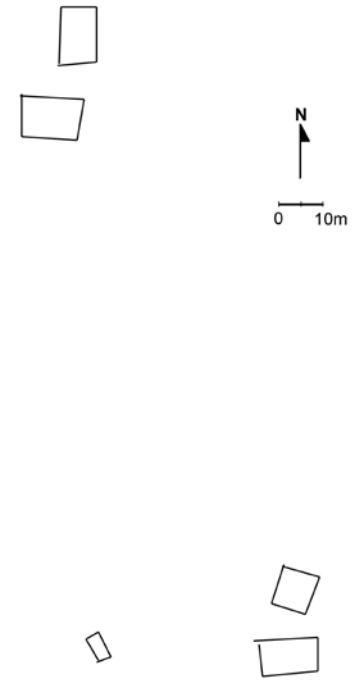

Figure 4.16: Site 128 architecture and orientation

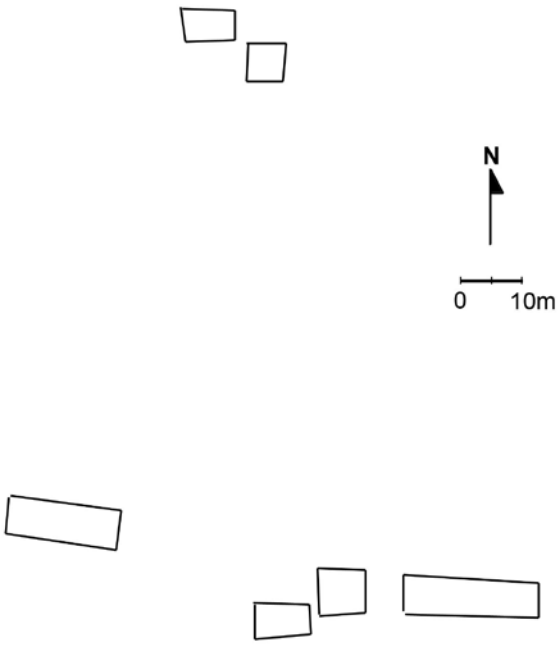

Figure 4.17: Site 129 architecture and orientation

4.2.4 Site 128

Site 128 comprises an informal patio group with five rectangular structures ranging from 4m to 8m in width and 5m to 12m in length (Figure 4.16). None were more than 1m tall. The hillside contained several terraces as it sloped north toward the Chacamax River less than 250m away. One excavation unit (U1) was placed immediately south of the northernmost structure and another (U2) was placed between the two southeastern structures.

4.2.5 Site 129

Site 129 is composed of six structures arranged into an informal patio group (Figure 4.17). The four southernmost structures are arrayed east to west along a natural terrace. The easternmost and westernmost of these structures are quite long. One excavation unit (U1) was placed in the corner formed by the two northernmost structures and another immediately south of the southeasternmost structure.

4.2.6 Site 149

The site registered N1E4-149 (Liendo Stuardo 2005) and here referred to as Site 149 is unique in this sample. This site contained incredibly inhospitable soils: Much of the time, excavation appeared to produce large concentrations of ceramics which then fell apart to the touch and became difficult to distinguish from the surrounding matrix. Relatively large numbers of

incensario and figurine fragments were identified here, though few were collected intact. The site consists of three structures arranged north to south around a patio with additional possible (unmapped) structures in the area. The northern side of patio is bounded by two rectangular structures which are aligned east to west. Extremely large architecture is visible approximately 700m east of this group. Additional architecture is indicated at least 45m downslope, but is in poor condition at best. The northernmost structure is rather tall, at nearly 1.5m in height.

4.3 ECOLOGY AND TOPOGRAPHY

This work discusses similarities and differences amongst house groups located in a 17km corridor, all within 2.5km of the Chacamax River. The 1km x 3km area generally identified as the urban core of Palenque sits on a north-facing ledge on the northernmost foothills of the Sierra Madre de Chiapas. The heavily constructed civic-ceremonial center which densely populate this artificially leveled, channeled, and elaborated escarpment enjoy a view north to the horizon from a vantage point 150m above fertile plains, which themselves have enjoyed a very limited degree of archaeological settlement survey.

The vast focus of previous archaeological work in the area has taken place on this escarpment, which has played a special role in the exploration of Maya epigraphy, architecture, and political systems for more than a hundred years. Some of the most unique features of the ancient Maya center were driven by the uniquely high-relief topographic profile of this urban core which is crosscut by numerous spring-fed streams. It comes as little surprise that presence and control of water in and around the civic-ceremonial center played a central role in both the

complex civil engineering and the ritual-symbolic complex evident throughout the urban core of Lakam'ha. Elaborate aqueducts which guided streams beneath plazas and palaces, dams, drains, bridges, walled channels, pools, and water storage facilities which protected against periods of drought (French 2007) created public space, protected against flooding and erosion, traced cosmograms through public and ritual spaces, and supplied water to ritual places such as sweatbaths and pools.

To the south of this ledge, the foothill rises to a peak 300m above before dropping sharply nearly half a kilometer to the Chacamax River below. This river originates approximately five km west of ancient Palenque's urban core, and picks up speed as it rushes east in the valley below. Five kilometers to the east of the city center, the river takes a turn to the north and finds a pass in the foothill to emerge on the alluvial northern plains, which seasonally flooded until the 1960s (Barnhart 2001). It is at this point that the river passes between the house groups of Area A. As it flows east along the foothills tracing a path to the Usumacinta, the Chacamax River was a source of nutrients (in the form of jute snails and other riverine resources), a unifying presence, and in all likelihood an important trade route and symbolic touchstone for people living along its banks. Ten kilometers farther to the east, the river passes among the house groups of Area B. Forty miles farther on, the Chacamax River meets with the Usumacinta and thereby joins one of the major overland thoroughfares of the Maya world.

4.4 COMPARING AREAS A AND B

As we will see below, Areas A and B show marked differences in their affiliation and economic integration with Palenque's city core: those in Area A, closer to the economic, political, and religious center, were more tightly wound into the economic system centered there and the symbolic system manifested there. Differences between these neighborhoods can be viewed through the lens of differential involvement in a regional trade network affecting procurement and consumption of lithic, obsidian, and ground stone artifacts in commoner households along the Chacamax River, and also by differential use of marine fossils in the context of domestic ritual, food production, personal ornaments, and architecture.

5.0 LONG DISTANCE EXCHANGE IN THE LOWLANDS

A great deal of research has expanded our understanding of Classic Maya economies (Aoyama 1999; Blanton and Feinman 1984; Clark 1986; Demarest and Foias 1993; Marcus 1983; Sabloff 1986; Santley 1983; Voorhies 1989). Regional exchange included items important to subsistence, including obsidian, ceramics, and food, as well as goods which played a larger role in patronage and status, such as jade, fine ceramic vessels, and feathers (Demarest 2004). The Maya lowlands were environmentally complex and extremely varied, and basic needs could generally be met through the use of resources available within 25km of a given Maya city (Demarest 2004). Long distance trade appears to have been centrally controlled along a continuum, with different polities experiencing different levels of economic centralization at different times during their trajectories (Sharer and Traxler 2006). Different goods and commodities were distributed via different economic networks, often concurrently and within the same region. Some aspects of the Maya economy were controlled by the political elite and contributed to their prestige, cementing social status differences; others were controlled by individual members of society.

A discussion of long distance exchange in two of Palenque's hinterland neighborhoods relies on four lines of evidence: obsidian artifacts, ground stone tools made from imported volcanic materials, ceramics tempered with imported ash, and imported fine wares.

5.1 OBSIDIAN EXCHANGE

Volcanic glass provided the sharpest cutting edges in the Maya world, and was widely used throughout the Maya area during the Classic period. Obsidian is commonly used to reconstruct long distance trade systems, as (1) there are relatively few sources of obsidian in the Maya area and (2) reliable sourcing techniques enable researchers to trace individual artifacts to individual sources. Most obsidian recovered in the Maya lowlands can be traced to the southern highlands of what is now Guatemala, especially the El Chayal, or to Ixtepeque in the far southeastern lowlands (Demarest 2004). The distribution of obsidian to Classic Maya centers has been linked to elite patronage networks (Aoyama 1999), and the presence and quantity of obsidian artifacts in Maya households has been associated with other markers of status (Demarest 2004).

5.1.1 Exchange of Obsidian in the Western Lowlands

The Maya Lowlands received obsidian from different sources in turns, relying heavily on one or two sources in unison during any given period of time. Obsidian was a utilitarian good, likely obtained through a marketplace exchange during the Classic Period (Clark and Lee 2007). During the Early Classic, limited data suggest a shift from “total reliance on obsidian from San Martín Jilotepeque to a nearly sole reliance on El Chayal obsidian” (Clark and Lee 2007). It was also at this time that macrocores disappeared as an import, replaced permanently by finished prismatic blades. At Kaminaljuyú, which controlled access to El Chayal obsidian, the manufacture of goods for export became centralized and more productive; El Chayal obsidian became more widely available, and San Martín Jilotepeque obsidian became increasingly less common (Hay 1978). During the Early Classic, obsidian exchange was controlled by elites in

Kaminaljuyú; by the end of the Early Classic, however, elites in importing areas were able to exert more control over the trade of obsidian.

During the Middle Classic, Teotihuacan influence in the region is often seen in the presence of Pachuca and other Mexican obsidian sources; by the Late Classic, a few finished products from other Mexican sources were making their way to the lowlands of northern Chiapas. These artifacts were similarly brought into Chiapas as finished products (Clark and Lee 2007) and exchanged for local goods. At the same time, Kaminaljuyú obsidian workshops disappeared, resulting in wide trade of prepared cores as part of what was likely a commercial undertaking (Clark and Lee 2007), as the dominant source of obsidian in the region.

5.1.2 Exchange of Obsidian in and Around Palenque

A clear picture of obsidian exchange was first and most comprehensively detailed in Johnson's (1976) "Chipped Stone Artifacts from the Western Maya Periphery." Residents of Palenque and other primary centers clearly received more obsidian than residents of secondary centers, and people living in tertiary centers received very little obsidian, generally speaking. As the rank order of the site declined, the ratio of obsidian to chert declined, indicating that local tools were made of local materials when obsidian was not available.

Secondary centers such as El Lacandón show evidence of prismatic blade production in all Late Preclassic households, though commoner households appear to have been more involved in obsidian production than elite households (López Bravo 2013). Due in part to small sample sizes, little research has addressed obsidian blade production in and around Palenque during the Early and Middle Classic periods.

Nearly all Late Classic material from the city center of Palenque (94%) has been sourced to El Chayal, with small amounts originating from Ixtepeque and San Martín Jilotepeque. At Toniná just over 100 km away, on the other hand, about 20% of Late Classic obsidian originated in San Martín Jilotepeque with another 3% from central Mexico (Clark and Lee 2007). Johnson found that most manufacturing of Late Classic obsidian blades took place at Palenque and secondary centers, with little taking place at tertiary centers and none in outlying villages and households. Johnson interprets this to indicate a lack of reciprocal redistribution in concert with elite control of importation and production (Johnson 1976): he identifies the system as central place redistribution. Clark and Lee (2007) suggest that the limited consumption of obsidian at Palenque (only 994 pieces were recovered and incorporated into Johnson's 1976 analysis) implies a single, possibly part-time, specialist producing obsidian for the area. They suggest that markets at Palenque and secondary centers were periodic and the locus of blade production by such an itinerant part-time specialist, and that therefore rural villagers and inhabitants at tertiary centers had very little access to this resource.

By the Late Classic period, the urban center of Palenque and associated secondary centers such as El Retiro, Chinikiha, and Miraflores participated in larger lowland exchange networks with some distinctions: notably, the absence of green Pachuca obsidian, the rarity of San Martín Jilotepeque obsidian, and the "unique" occurrences of Mexican and Ixtepeque obsidians (Johnson 1976). Johnson posits that this is the result of costal trade routes with considerable time depth.

5.1.3 Exchange of Obsidian in the Neighborhoods

Three hundred and ten obsidian artifacts were recovered from nine out of ten house groups (no obsidian was recovered from Site 125) in the course of the current research. Sources were identified for each of these artifacts using visual sourcing techniques (Braswell et al. 2000; Hirth 2003; Moholy-Nagy 2003) and with the generous assistance of John Clark, and results indicate a shift in patterns of procurement over the occupational sequence. El Chayal obsidian dominated as the primary source for house groups across the region during the Early Classic (Table 5.1), though a smaller number of artifacts made of Ixtepeque obsidian were also present. By the Middle Classic, San Martin Jilotepqeue had become a source of obsidian rivaling El Chayal, and various Mexican sources began to appear in low numbers. Over time, San Martín Jilotepeque overtook El Chayal as the region's primary source of obsidian (χ^2(16, N=1701)=418.577, p<.001, V=0.248), determined through examination of N=1701 chipped and other worked stone artifacts collected across 10 house groups (Figure 5.1). This stands in stark contrast to the patterns of exchange we would expect given research conducted on obsidian collected from larger centers, including the urban core of Palenque.

Table 5.1 Obsidian by source as a proportion of all worked stone artifacts (N=1701) at the 95% confidence level.

	Early Classic	**Middle Classic**	**Late Classic**	**Postclassic**
El Chayal	8.7% ± 1.3%	8.9% ± 1.4%	9.4% ± 1.4%	**19.5% ± 1.9%**
San Martín Jilotepeque	0	12.4% ± 1.6%	16.2% ± 1.8%	**53.4% ± 2.4%**
Ixtepeque	1.1% ± 0.5%	0.9% ± 0.5%	0.3% ± 0.3%	**0**
Mexican Sources	**0**	**0.4% ± 0.3%**	**1.0% ± 0.5%**	**2.5% ± 0.7%**

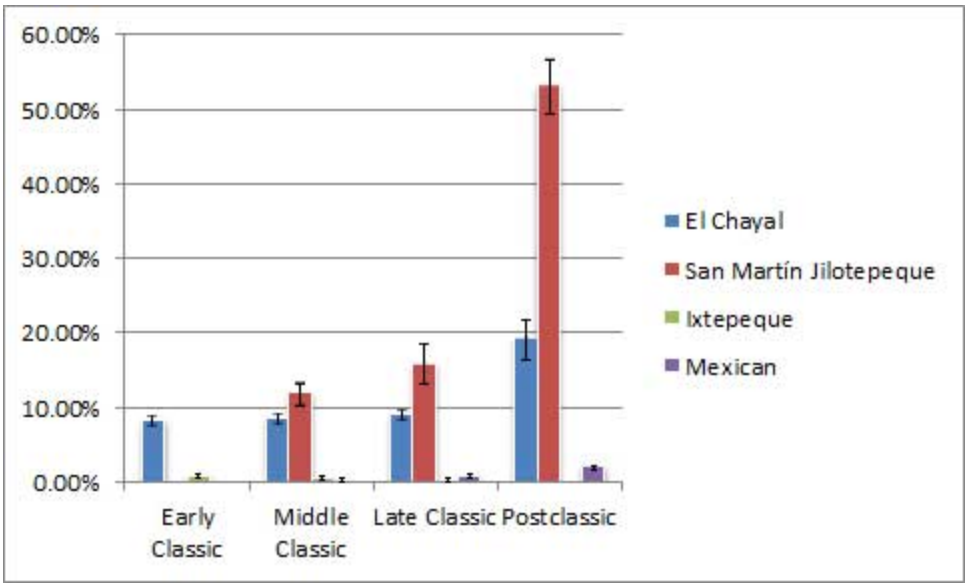

Figure 5.1: Proportions of all hinterland obsidian artifacts by source by period, out of N=1701 chipped stone artifacts. Error bars represent the 95% confidence level.

While over the course of the study period El Chayal and Ixtepeque obsidian became less common than San Martín Jilotepeque or Mexican obsidian in the region as a whole, different house groups participated in this trend differentially. Few house groups, however, have sufficiently large obsidian assemblages for any given period to report statistically meaningful results. However, an interesting and highly statistically significant (χ^2(16, N=1701)=418.577, p<.001, V=0.248) pattern emerges across this sample: those house groups in Area A (Table 5.2, Figure 5.2) utilized material from various sources at different times and to different extents than those house groups situated in Area B, farther to the east (Table 5.3, Figure 5.3).

Table 5.2: Area A obsidian from a given source as a proportion of all worked stone artifacts (N=1701) for a given period at the 95% confidence level

	Early Classic	Middle Classic	Late Classic	Postclassic
El Chayal	9.2% ± 1.4%	10.4% ± 0.1%	7.1% ± 1.2%	50.0% ± 2.4%
San Martín Jilotepeque	0	6.3% ± 0.1%	14.3% ± 1.7%	37.5% ± 2.3%
Ixtepeque	1.3% ± 0.5%	1.4% ± 0.1%	0	0
Mexican Sources	0	0.7% ± 0.04%	0	0

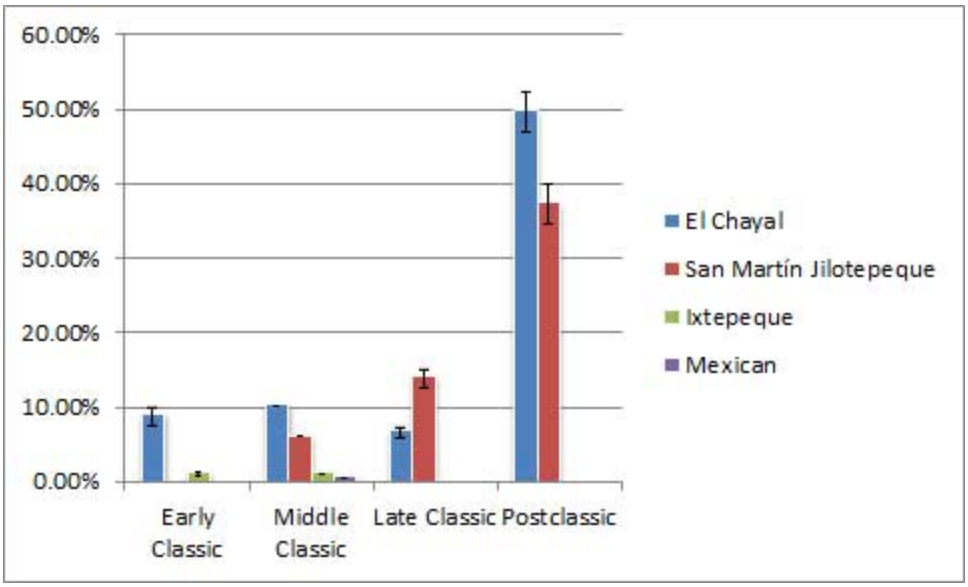

Figure 5.2: Proportions of Area A obsidian artifacts by source by period, out of N=1701 worked stone artifacts. Error bars represent the 95% confidence level.

Table 5.3 Area B obsidian from a given source as a proportion of all worked stone artifacts (N=1701) for a given period at the 95% confidence level

	Early Classic	Middle Classic	Late Classic	Postclassic
El Chayal	6.3% ± 1.2%	6.2% ± 1.2%	9.5% ± 1.4%	17.3% ± 1.8%
San Martín Jilotepeque	0	23.5% ± 2.0%	16.3% ± 1.8%	54.5% ± 2.4%
Ixtepeque	0	0	0.3% ± 0.3%	0
Mexican Sources	0	0	1.0% ± 0.4%	2.7% ± 0.8%

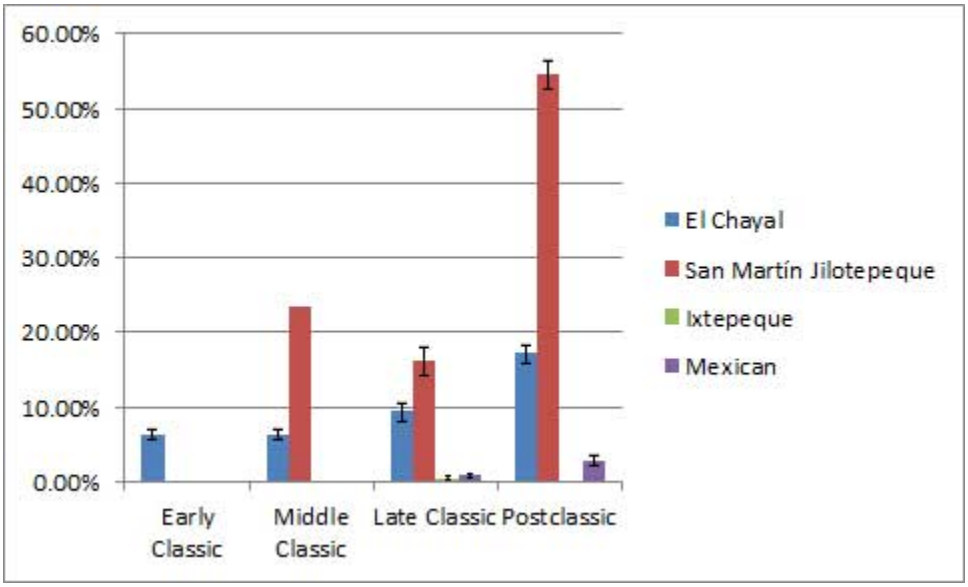

Figure 5.3: Proportions of Area B obsidian artifacts by source by period, out of N=1701 worked stone artifacts. Error bars represent the 95% confidence level.

Members of each house group received quantities of obsidian from Guatemala, primarily El Chayal during the Early Classic and then from both El Chayal and San Martín Jilotepeque through the Middle and Late Classic periods. As consumption of obsidian grew in house groups around Palenque, Ixtepeque and other central Mexican sources of obsidian became more important. This is consistent with what we currently know about exporting areas such as Kaminaljuyú control and commercial trade of material from these two sources during the Early Classic. During the first part of the Early Classic, elites in exporting areas likely exercised more control over obsidian exchange, while in the latter part of the Early Classic, elites in importing

areas exercised more control over obsidian exchange (Clark and Lee 2007). However, these findings stand in contrast to our previous understanding that San Martín Jilotepeque diminished and El Chayal dominated the obsidian imports after the Early Classic. It would appear that hinterland commoner households were receiving their obsidian from a different set of sources than the elite producers who practiced blademaking in the region's primary and secondary centers. This effect was more pronounced in Area B than it was in Area A.

5.1.4 Obsidian Use

Another line of evidence through which we can infer availability of and access to obsidian is an examination of usewear. All obsidian fragments were visually assessed for distinctive fracture patterns which indicate function (Clark and Lee 2007). Higher proportions of unused or lightly used blades indicate ready access to the resource; heavy use, retouching, and repurposing indicates a scarcity (Clark and Lee 2007; Hirth 2003; Johnson 1976).

The proportion of obsidian blades recovered from ten house groups in the hinterland of Palenque which show little or no usewear rises throughout the sequence, from no clean obsidian blades (and nicked blades comprising only 4.3% ± 4.0% at the 95% confidence level of all stone artifacts, N=1701) recovered during the Early Classic, to 0.9% (±1.2 % at the 95% confidence level, N=1701) clean and 6.7% (± 3.3% at the 95% confidence level, N=1701) nicked blades during the Middle Classic, 1.0% (± 1.1% at the 95% confidence level, N=1701) clean and 7.4% (± 2.9% at the 95% confidence level, N=1701) nicked blades of all stone artifacts recovered during the Late Classic, and 12.7% (± 6.1% at the 95% confidence level, N=1701) clean and

14.4% (± 6.3% at the 95% confidence level, N=1701) nicked blades of all stone artifacts recovered during the Postclassic (Figure 5.4).

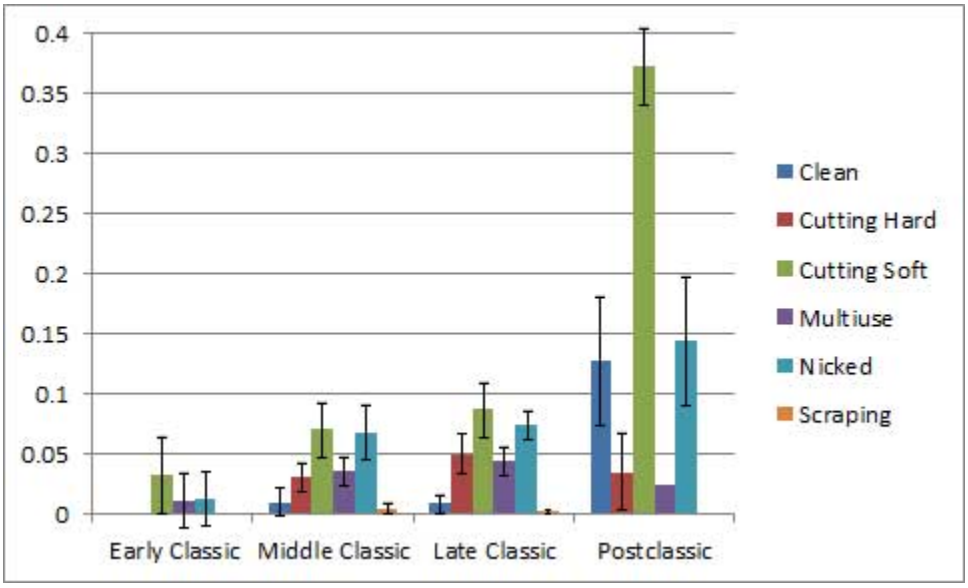

Figure 5.4 Proportions of all hinterland obsidian artifacts by usewear by period, out of N=1701 chipped stone artifacts. Error bars represent the 95% confidence level.

While different house groups or neighborhoods may have used obsidian blades for different activities, or had differential access to obsidian resulting in proportionally more lightly or unused blades, sample sizes are not sufficient to compare assemblages with a high degree of statistical confidence.

5.1.5 Exchange of Obsidian in the Neighborhoods

Area A made use of obsidian arriving in the neighborhood through a long distance exchange network which provided both El Chayal and San Martín Jilotepeque obsidian to people living on the outskirts of Palenque. Over time, El Chayal and San Martín Jilotepeque obsidian vied for dominance in household assemblages, while other obsidian sources to the north and west supplied small but significant proportions of local obsidian needs through the Middle Classic.

This fits neatly with what we expect given previous research in the region: During this period, El Chayal and San Martín Jilotepeque dominated the obsidian supply. However, in more densely settled parts of the region (such as the urban core of Palenque, El Lacandón, and other centers), San Martín Jilotepeque obsidian dominated until the Early Classic after which it was almost entirely displaced by obsidian from El Chayal. In Area A, this trend is very nearly reversed: an Early Classic reliance on El Chayal obsidian is met with a growing prominence of San Martín Jilotepeque obsidian in the Middle Classic and virtual disappearance of El Chayal obsidian by the Late Classic. Other obsidian sources, such as Ixtepeque, were rarely present in assemblages drawn from primary and secondary centers and dated to early in the Classic (Clark and Lee 2007; Johnson 1976; López Bravo 2013) but become more numerous as obsidian itself became a more widely available resource. Mexican obsidian is generally identified as rarely available and therefore likely valued (Johnson 1976), with some researchers arguing that its relative paucity in regional assemblages indicate acquisition of these rare obsidians by elites further up the supply chain, who would have had access to them first (Johnson 1976). In Area A, however, Ixtepeque and Mexican obsidians are present and compose significant fractions of the assemblage. The presence of material from these sources does not support a model in which rural, commoner house groups represent the last station for a long supply chain.

Area B likely made use of obsidian through the same long distance exchange network which provided El Chayal and San Martín Jilotepeque obsidian in quantity to households in Area A, though different proportions of material from various sources indicate a separate mechanism of procurement for households in this area. As in Area A, a shift from reliance on San Martín Jilotepeque obsidian in the Early Classic to El Chayal obsidian thereafter is not in evidence. In fact, a trend to the contrary is more clearly evident than in Area A: A near total reliance on

obsidian from El Chayal gives way to San Martín Jilotepeque domination of the obsidian assemblage after the Early Classic. Other exotic sources, including Mexican and Ixtepeque obsidian, appear in the record as well, but in markedly different ways than they do in Area A: In Area B, these sources do not appear until the Late Classic, after which they continue throughout the remainder of the occupational sequence. Area B was late to the game in importing exotic obsidian, but did so consistently, in quantity, and at a time when use of these sources was becoming less prevalent in primary centers and by elite consumers.

These patterns suggest that, while the same (likely coastal) trade routes were in place throughout the Classic period, they were accessed by people who lived in and around Palenque in widely divergent ways. While elites in primary and secondary centers dominated consumption of obsidian from one source, rural commoners received greater quantities of obsidian from other sources.

5.2 OTHER VOLCANICS

5.2.1 Exchange of Volcanic Ash in and Around Palenque

Volcanic ash is commonly used as a tempering agent in ceramic production throughout the Classic Maya lowlands (Ford and Glicken 1987; Ford and Rose 1995; Jones 1986; Kidder 1937; Rands and Bishop 1980; Simmons and Brem 1979; Thompson 1962), and particularly in and around Palenque during both the Late Preclassic and the Late Classic (Rands 1973, 1967).

Palenque appears to be unique in the Maya area for prevalence of volcanic ash in Late Preclassic ceramics (Ford and Rose 1995; Rands 1973). Ash tempered ceramics are rare or

absent elsewhere in the Maya world throughout the Early and Middle Classic. It is not until the Late Classic that, as the growth of centers in the southern highlands falters, that the widespread use of volcanic ash as ceramic temper spreads throughout the rapidly expanding lowlands. It is estimated that 30-40% of Late Classic ceramics are tempered with volcanic ash (Ford and Rose 1995). While it has been proposed that the ash widely used throughout the Maya area was the result of periodic ashfalls which would have made this a locally available resource throughout the region (Ford and Rose 1995), volcanic ash used as ceramic temper by Classic period Maya is generally understood to have been imported in abundance from highland sources (Simmons and Brem 1979; Villaseñor and Graham 2010). Though these sources have not been identified, it is suggested that they were more likely to have originated in what is now southern Guatemala and Belieze than central Mexico (Simmons and Brem 1979; Villaseñor and Graham 2010), and to have likely been exchanged for salt (Simmons and Brem 1979).

5.2.2 Volcanic Temper in the Neighborhoods

Paste composition for 1033 diagnostic sherds recovered across ten house groups was identified using a binocular reflecting microscope. Of ten house groups, nine contained ceramics tempered with volcanic ash. Over the study period, a decrease in the use of these imported ash tempers in the region is weakly significant ($\chi^2(8, N=1033)=12.631$, p=.074, V=0.078).

Table 5.4: Ash tempered ceramics as a proportion of all diagnostic sherds at the 95% confidence level

	Early Classic	**Middle Classic**	**Late Classic**	**Postclassic**
Ash tempered	73.9% ± 2.7%	61.8% ± 3.0%	50.6% ± 3.1%	43.6% ± 3.1%
Other Tempers	26.1% ± 2.7%	37.5% ± 3.0%	49.4% ± 3.1%	56.4% ± 3.1%

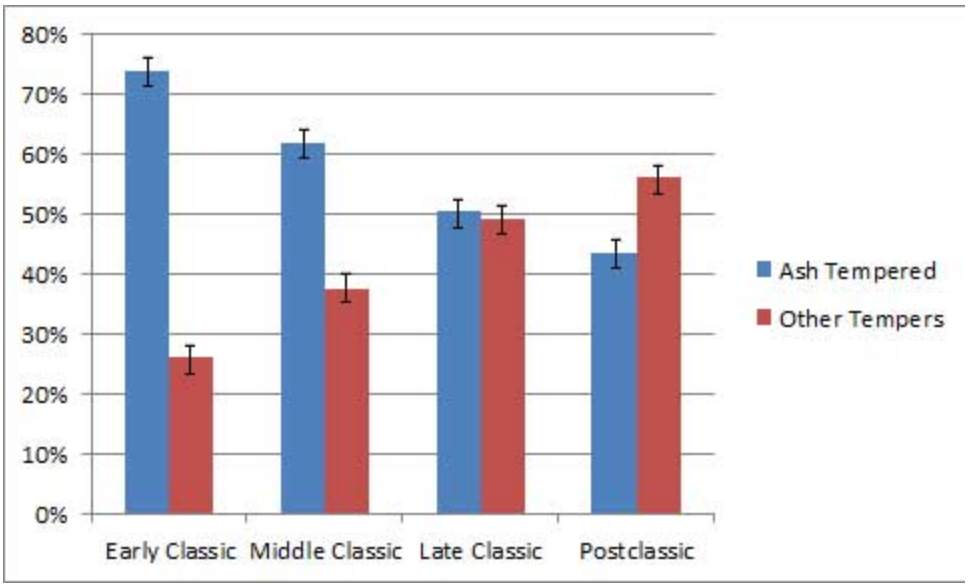

Figure 5.5 Proportion of diagnostic sherds (N=1033) in which volcanic ash was employed as a tempering agent. Error bars represent the 95% confidence level.

Over the course of their occupations (Table 5.4), residents of a majority of house groups studied used ash tempered ceramics as well as ceramics tempered with local materials, though individual house groups appear to have used these tempers to different extents and at different times (Figure 5.5).

Three house groups, Sites 123, 128, and 149, were so stratigraphically mixed that it cannot be determined at which point in the occupation these ash tempered ceramics were incorporated into the household inventory. In none of the remaining sites is there a large enough sample of ceramic sherds to identify chronological trends in the use of exotic volcanics for the preparation of ceramic temper. Both geographical areas appear to have participated in the general trend of decreasing incorporation of ash into ceramic temper, though a weakly significant relationship between chronological period and neighborhood suggests that the use of ash in ceramic tempers lasted longer and was more prevalent in Area B (Figure 5.7) than in Area A (Figure 5.6). (χ^2(8, N=1033)=12.631, p=.073, V=0.078)

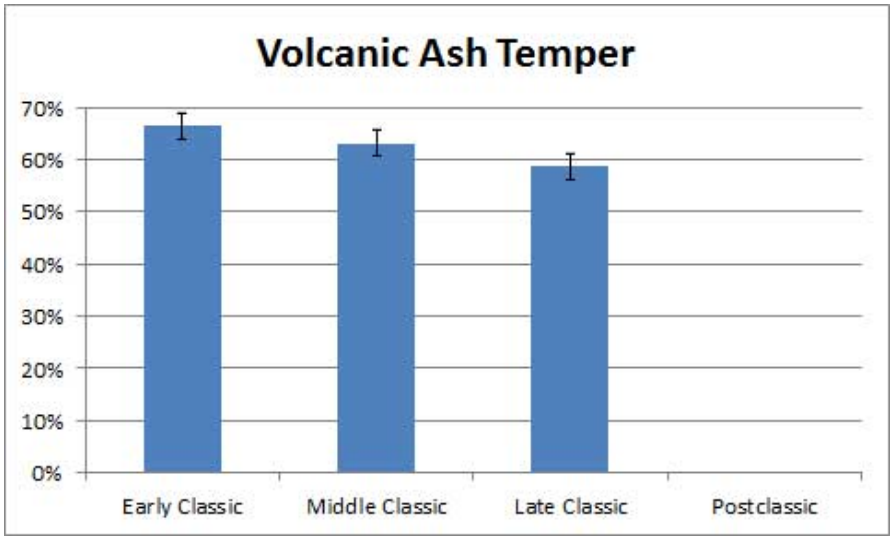

Figure 5.6 Proportion of Area A diagnostic sherds (N=129) which could be classified temporally and in which volcanic ash was employed as a tempering agent. Error bars represent the 95% confidence level.

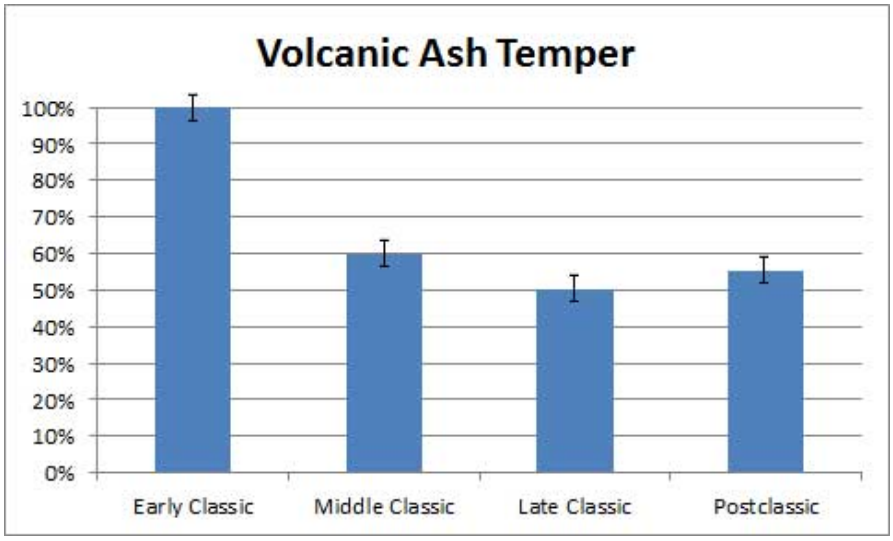

Figure 5.7 Proportion of Area B diagnostic sherds (N=904) which could be classified temporally and in which volcanic ash was employed as a tempering agent. Error bars represent the 95% confidence level.

5.2.3 Exchange of Volcanic Ground Stone in and Around Palenque

Worked stone of volcanic origin appears throughout the lowlands. It can be safely assumed that these, either in raw material or finished form, originated in the highlands. While manos and

metates themselves are not particularly valuable, those of volcanic stone have properties including hardness which make the transport of very heavy goods worthwhile.

Ground stone tools recovered from the urban center of Palenque are primarily composed of limestone. A few examples, however, are made of imported volcanics (Venegas Durán 2005), including a mano de metate recovered from an offering in the Temple of the Sun (Villaseñor, Cuevas García, and Pingarrón 2009). These are rare and identified consistently as imported exotics which were likely part of a local political economy.

Research in El Lacandón reveals a dearth of ground stone: In the excavation of four house groups (two elite and two commoner), three grinding stones were recovered. Two of these were recovered from the same elite house group. Grinding stones recovered from Late Classic El Lacandón are even more clearly concentrated in the hands of the elite, with 17 recovered from a single super elite household, one grinding stone recovered from the two elite house groups explored during one project, and five recovered from the two commoner house groups explored in the course of the same research (López Bravo 2013). There is no evidence of the utilization of materials of volcanic origin in the construction of these ground stone artifacts.

Three worked stone artifacts made from imported volcanic material comprise 0.2% ± 0.13% of all stone artifacts recovered from ten house groups in the Palenque hinterland. All date to the Middle Classic. These were recovered from Site 76 (an andecite pecked hammerstone), Site 94 (a basalt metate), and Site 129 (a grinding stone). Remaining worked stone artifacts were made from obsidian, as discussed above, and locally available materials including chert, coquina, limestone, fossils, quartz, quartzite, sandstone, and stalactites.

5.2.4 Exchange of Volcanic Materials in the Neighborhoods

Volcanic ash has been held up as one of two non-perishable goods which was traded long distance extensively throughout the Maya area in great quantities for utilitarian use. It has been noted that "the presence of ash temper at some sites and its absence in the same wares at others… can mean only that local northern potters utilized different ingredients in manufacturing vessels within ware traditions shared throughout the region" (Simmons and Brem 1979:85). At least three sources of ash likely fed demand in the lowlands (Simmons and Brem 1979), and it is likely that some traders trafficked in obsidian as well as other volcanic materials including ash.

Wherever they appear in Palenque's sequence, volcanic tempers are most commonly associated with waxy red slips (a common characteristic of Preclassic pottery) and fine pastes (Rands and Bishop 2003). Palencano ceramics, however, do not lend themselves to neat categorization. Within any given time period, stylistic trend, or other slice of the ceramic assemblage, a great deal of variation betrays production fractured amongst a wide variety of workshops, likely with distinct recipes and techostylistic traditions (Rands and Bishop 2003). That imported volcanic temper was common in the area as early as the Preclassic, before Palenque's rise to prominence as a major political force in the Maya world, suggests both access to long distance trade systems which would have supplied this material as well as a local significance attached to its use in production of ceramics. The use of volcanic ash in fine Late Classic ceramics in major centers such as Palenque's urban core may represent elite access to volcanic ash through a prestige economy, or may represent the incorporation of a local tradition of volcanic tempers into a new, elite context.

Given previous research in public, elite, and commoner contexts across the region, there are several surprises in the prevalence of volcanics recovered from commoner households in the

hinterland of Palenque. First, the presence of ash tempered ceramics in commoner house groups in both neighborhoods not only during the Late Classic, but throughout the Classic period, represents a significant difference from the patterns of consumption of volcanic ash in major regional centers. In fact, it appears that, while ash tempering disappeared after the Preclassic in major regional centers after the Preclassic and did not return until the Late Classic, commoners in the hinterland continuously tempered their ceramics with volcanic ash, though its use diminished over the course of the occupation. It would appear that this exchange was not restricted to elite control, and that local potters practice often included a local tradition of ash tempering which was not shared in elite contexts nor common in more densely settled areas. The presence of volcanic ground stone in hinterland commoner house groups offers further evidence of direct commoner access to long distance trade of valuable resources.

Recent research describing the incorporation of volcanic glass and ash into pozzolanic plasters throughout the lowlands suggests that volcanic materials may have been more widely used in the Maya area than previously known (Villaseñor and Graham, 2010), and may have had additional symbolic significance.

5.3 EXCHANGE OF FINE WARES IN THE MAYA AREA

Maya communities included part- and full-time specialists who produced pottery for local consumption. Much domestic pottery was produced by part-time specialists at the household level, though if such specialists produced an excess of vessels they might be exchanged through heterarchical interactions with other households in the community or through local markets (Sharer and Traxler, 2006). Pottery production centers staffed by full-time specialists represented

larger loci of production, with specialists distributing finished goods at local and regional markets and through long distance trade. In some Late Classic Maya contexts, there is evidence that fine polychrome vessels were produced by commoners at household workshops but finished by skilled full-time specialists associated with elite households (Sharer and Traxler 2006). By the Terminal Classic, there is "evidence of mass production of ceramics such as Plumbate and Fine Orange wares using pottery molds in specialized workshops" (Sharer and Traxler 2006:653). Fine wares were widely distributed via overland and water trade routes by the Late Classic as part of the political economy.

5.3.1 Exchange of Fine Wares in and Around Palenque

LeCount (1999) asserts that exotic ceramics could work as a political currency, as elites control the exchange of these wares and distribute prestige goods to those lower on the social hierarchy in order to consolidate support (López Bravo 2013).

In the urban core of Palenque, fine wares such as Chablekal Gray vessels were concentrated in elite households, especially in the palace, while people living in lower status households had little or no access, suggesting elite or dynastic control of this resource. There is more homogeneity in the distribution of these fine ceramics at secondary centers such as El Lacandón, where homogeneous distribution has been interpreted by López Bravo (2013) as a sign that local elites were using these vessels as a political currency to consolidate commoner support.

5.3.2 Exchange of Fine Wares in the Neighborhoods

Ceramics recovered from the house groups explored in the course of the current study cannot easily be quantified as a result of uncooperative soils. In the course of excavation of many house groups, removal of sherds from the surrounding matrix was impossible, and the resultant crumbs of ceramic material available for collection, visual examination for paste characteristics, and drying for weights, but unquantifiable as a number of sherds nor measurable for formal or surface characteristics. As a result, the primary unit of analysis was a unit weight, rather than a number of sherds. During the course of excavation, 513 units of stratigraphic excavation contained non-diagnostic ceramic sherds of identifiable wares, comprising 24.62kg of ceramics across 133 analytical units. Of these 201.40g were fine wares, 51.48g of which could be associated with specific periods of occupation. Remnants of fine wares were recovered from nine out of ten house groups. Three of these house groups, Sites 123, 128, and 149, were so stratigraphically mixed that it cannot be determined at which point in the occupation fine wares were incorporated into the household inventory. The remaining six house groups provide sufficient depositional information to identify moments in which fine wares were deposited. Site 76 shows evidence of fine ware consumption during the Middle Classic, site 78 during the Early Classic, and site 79 during the Late Classic. Evidence of imported fine wares is present in Site 94 during Early, Middle, and Late Classic occupations, and in Site 122 during the Middle, Late, and Postclassic periods of occupation. Fine wares were identified at Site 129 in both Early Classic and Late Classic strata. While fine wares were available to house groups beginning late in the Early Classic, it is possible that different house groups consumed these wares at different points throughout their occupational histories and that different neighborhoods had differential access to fine goods. During each chronological period, however, at least one house group in each of the

two areas presents evidence of access to fine wares. Chablekal grey ware, restricted to elite and dynastic households in the center of Palenque and heterogeneously distributed at El Lacandón, can be tentatively in eight out of ten hinterland house groups.

A number of fine paste manufacturing centers in the region likely supplied households with fine ware (Ancona Aragón and Jiménez Álvarez 2005; Armijo, Gallegos Gómora, and Álvarez 2005) during the Classic period. Large-scale, long distance trade of these artifacts united Classic Mayaland, particularly in the Usumacinta Basin and along the Gulf Coast (Jiménez Alvarez 2015). The presence of fine wares in house groups both near and far from Palenque's urban core demonstrates the accessibility of these goods to people living in all parts of Palenque's urban landscape. This may be evidence of elite redistribution of prestige goods in the interest of consolidating power, as suggested by López Bravo (2013) and LeCount (1999), but it may instead indicate a heterarchical rather than hierarchically organized access to these goods outside the extremely stratified dynastic center.

5.4 LONG DISTANCE EXCHANGE IN AREA A

Four lines of evidence paint a picture of long distance exchange in Area A: obsidian, volcanic ash used in ceramic temper, hard minerals for grinding stones, and ceramic fine wares. In the region's densely settled centers, San Martín Jilotepeque obsidian dominated until the Early Classic, after which it was almost entirely displaced by obsidian from El Chayal. In Area A, this trend is very nearly reversed: an Early Classic reliance on El Chayal obsidian is met with a growing prominence of San Martín Jilotepeque obsidian in the Middle Classic and virtual disappearance of El Chayal obsidian by the Late Classic. This trend is accompanied by the

presence of obsidian from other less widely available sources, including Ixtepeque and central Mexican obsidian. The consumption of obsidian from different sources than were consumed in dynastic centers, along with the presence of material from rarer sources, does not support a model in which rural, commoner house groups represent the last station in a long supply chain , nor a model in which a single specialist was producing obsidian for the area (as in Clark and Lee 2007), nor a system of central place redistribution (as in Johnson 1976). The ready and extensive consumption of obsidian, including sources which were not prized by dynastic and other elites in nearby primary and secondary centers, suggests a different avenue of acquisition and primary access to obsidian through markets and traders.

A sizable proportion of ceramics in Area A were tempered with volcanic ash as early as the Early Classic and continuing with diminishing importance through the Late Classic. This represents a continuation of local practices: as early as the Preclassic, ash tempered ceramics were characteristic of the region. While this practice was not maintained in the dynastic heart of Palenque it did remain an important practice in hinterland households. While ash tempered ceramics returned to Palenque's elite and urban households in the Late Classic, in Area A a trend towards disuse was maintained. This has two major implications: First, that local tradition played a greater role in ceramic temper recipes than trends favored in the nearby primary center. Second, the continued consumption of imported volcanic ash throughout the Classic period similarly demonstrates access to long distance trade not mediated by elites or the fashions of the core.

The presence of both volcanic grinding stones and imported fine wares, and in particular the presence of imported fine wares throughout the occupational sequence, adds supporting evidence to our understanding of Area A as inhabited by people who, while living literally in the

shadow of the dynastic elite at Palenque, nonetheless enjoyed access to the types of long distance trade often which in other contexts are often restricted to elite households and a prestige economy. This access may have occurred as long distance traders visited local markets in addition to regional markets, or may indicate that different but similarly supplied traders visited markets in different parts of the region. While elites may have controlled access to prestige goods in their own neighborhoods, this kind of management apparently did not extend into the hinterlands.

5.5 LONG DISTANCE EXCHANGE IN AREA B

The same four lines of evidence provide insight into long distance exchange in Area B. The near-reversal of obsidian consumption trends seen in Area A is matched by a complete reversal in Area B: an Early Classic reliance on El Chayal obsidian is replaced by overwhelming dominance of San Martín Jilotepeque obsidian in the Middle Classic and Late Classic, while obsidian from other less widely available sources, including Ixtepeque and central Mexican obsidian, represent significant fractions of the assemblage through the later part of the sequence. This pattern of consumption similarly suggests that the inhabitants of Area B were not bound by the same political economy as people living in nearby primary and secondary centers, and that these commoners enjoyed ready access to the long distance obsidian trade regularly assumed to be under the control of ruling elites.

The use of ash to temper ceramics in Area B paints a compelling picture of a dominant local tradition surviving the shifting fashions adopted by regional elites. Ceramics tempered with volcanic ash were prevalent in the Preclassic and then absent until the Late Classic in the densely

settled core of Palenque. In Area B, however, an overwhelming majority of ceramics remained ash tempered through the Early and Middle Classic periods, and similar recipes composed a significant fraction of the ceramic assemblage throughout the remainder of the Classic period. Inhabitants of Area B additionally enjoyed access to imported fine wares and to grinding stones fashioned from imported volcanics. To live in the far hinterland did not indicate an impoverished lifestyle, at least not as measured by access to goods generally identified as belonging to an economy managed by ruling elites. The people living in Area B had access to plentiful obsidian and volcanic ash for ceramic temper, and were also able to access imported volcanic grinding stones and exotic fine wares.

5.6 LONG DISTANCE EXCHANGE IN CONTEXT

Long distance trade of raw materials, finished utilitarian goods, and prestige or luxury items was a deeply entrenched and widely practiced component of Maya life. Economic exchange creates an interdependence between communities at regional and interregional levels (Sharer and Traxler 2006). The dense network of trade relationships across the Maya world has long been recognized to tie polities to one another and local producers to local and regional communities. Early research into long distance trade in Mayaland focused on the import of exchange of luxury items, such as jade, cacao, and feathers, in the political economy. The Maya elite used their relationships with one another to acquire exotic goods which were highly valued and bestowed upon subordinates as a means of both demonstrating power and cementing political relationships. Much long distance trade in the Maya world, however, trafficked in critical utilitarian goods such as salt, obsidian, and grinding stones, which has been described as a source of wealth and power

for controlling elites and a contributing factor in the enforcement of social stratification throughout Mesoamerica (Sharer and Traxler 2006).

Obsidian, fine wares, volcanic ground stone, and volcanic ash used to temper ceramics constitute the major categories of exotic goods recovered from hinterland house groups in the region. In all house groups explored in the course of the current research, obsidian tools were used to more or less the same extent and the same ends. The obsidian from which blades were made came from primarily Guatemalan sources, especially El Chayal and San Martín Jilotepeque. Different households and neighborhoods participated differentially in this exchange network. Other exotic sources, including Mexican and Ixtepeque obsidian, appear in the record in both Area A and Area B but in notably different ways: in Area A, these sources make up significant proportions of the assemblages in both the Early and Middle Classic, though they are not apparent during later periods of occupation. In Area B, these sources do not appear until the Late Classic, after which they remain through the rest of the occupational sequence.

House groups in both Area A and Area B provide evidence of obsidian consumption from different sources than were consumed in dynastic centers. While elites in central Palenque may have enabled acquisition of obsidian by some individuals or households in Area A, the majority of obsidian was acquired through other sources. Individuals or households in Area B enjoyed ample access to obsidian, but from different sources than those which underwrote the trade relationships of elites in nearby centers. It seems highly unlikely that either rural, commoner house groups represent the last station in a long supply chain or that elites controlled distribution of this resource, doling it out to local subordinates in an effort to consolidate power. The ready and extensive consumption of obsidian, including sources which were not prized by dynastic and other elites in nearby primary and secondary centers, suggests a different avenue of acquisition

and primary access to obsidian through markets and traders. If elites were controlling the distribution of obsidian in the dynastic capital, this control did not result in restricted access to obsidian by commoners in two hinterland neighborhoods.

Fine ware, volcanic ground stone tools, and ash tempered ceramics were not recovered from stratigraphically sound contexts consistently enough to allow a diachronic analysis of variation in consumption of these goods across house groups. It is evident, however, that both neighborhoods had access to volcanics for ground stone tools, both neighborhoods had access to fine wares, and both participated in a trend of decreasing incorporation of volcanic ash into ceramic temper.

The use of imported volcanic ash in ceramic tempers throughout the Classic period in commoner hinterland house groups has three important implications. First, a local tradition of tempering ceramics with imported volcanic ash both preceded the founding of a Maya dynasty at Palenque and was maintained in the face of rising power in the region. In both hinterland neighborhoods, ash tempered ceramics remain common even after they have fallen out of use in Palenque's area of densest settlement. A resurgence in the popularity of this tempering agent in the Late Classic dynastic capital is not accompanied by similar renewed emphasis in the hinterland.

Second, long distance trade relationships which provided volcanic ash to the region's hinterland predate the founding of a Maya dynasty at Palenque and were maintained well into the Classic period. This is despite a lack of concurrent parity of practice by potters who supplied the nearby dynastic center. These trade relationships were evidently maintained throughout the Classic period, as evidenced by the continuing use of volcanic ash to temper ceramics. Though

the frequency of such use declines over time, the presence of this resource speaks to the maintenance of trade relationships.

Finally, potters of Area A appear to have been influenced somewhat more than those of Area B by the ceramic trends prevailing in central Palenque. While ash was used to temper ceramics in Area A, this practice declines dramatically beginning in the Early Classic, and by late in the Classic period it has dropped to levels similar to those seen in Palenque's core. This suggests participation in the social and political economies dominated by dynastic interests to a greater extent than enjoyed by inhabitants of Area B.

That people living in Area B, an afternoon's travel from the dynastic monuments of Palenque, were able to access ample obsidian and volcanic ash for ceramic temper, as well as volcanic grinding stones and imported fine wares, suggests that the models which assert hierarchical control of long distance trade by elite households do not obtain in the northern Chiapas hinterland. Commoners in house groups outside of Palenque had direct access to long distance trade relationships, likely through local or regional markets, and acquired goods through heterarchical exchange which, in other contexts, might have been used as part of a prestige economy. Inhabitants of both neighborhoods received long distance exchange items from sources distinct from those which fed the dynastic core. The demands of elites in primary and secondary centers may have shaped the availability of some trade goods, such as obsidian from specific sources, but it did not restrict that availability. The changing practices of potters which supplied the dynastic core may have influenced potters in some outlying neighborhoods, such as Area A, where use of volcanic ash in ceramic temper more closely resembles patterns of use by those potters. But trends in the core did not dictate either practice or availability of this resource: volcanic ash remained available to potters in both neighborhoods, and its wide use in the

tempering of ceramics represents the greater influence of a local tradition over the practices of the ruling dynasty.

The presence of volcanic grinding stones and imported fine wares in the hinterland add two lines of evidence to a coherent picture of long distance trade relationships which existed outside of the control of dynastic elites. Rural commoners in neighborhoods around the region were able to negotiate their own economic relationships with far-flung producing territories, likely through intermediaries such as traders who frequented local markets.

6.0 CRAFT PRODUCTION

The reconstruction of the ancient Maya economy is a work in progress, but we do know that some goods were produced and utilized in great quantities throughout the region. Ceramic vessels and chipped stone tools were among the most widely produced and distributed, and they make up the bulk of archaeological materials through which we can begin to discuss the loci, organization, and methods of craft production in the ancient Maya world. Some aspects of the ancient Maya economy were managed and controlled by the political leadership and others were the domain of individuals or households. In different regions of the Maya world, different goods and services were valued and incorporated into the political economy to create bases of power through which elites could maintain and consolidate their status. The degree to which elites controlled resources, the organization of this control, and which specific resources were controlled varied widely from one polity to another. Some of these goods may have been traded over long distances and others never utilized far from their points of production; exchange often took place in regional markets which were likely controlled by elites. Some states exercised a great deal of control over production facilities or trade routes (Sharer and Traxler 2006).

Individual Maya households met many of their own needs, but all Maya households were dependent on commodities provided by outside produces. Some households engaged in specialized production of goods and would have relied more heavily on exchange with members of the community or local and regional markets to meet other household needs. It is generally

understood that Maya commoners choreographed a complex economic network which was organized outside of state control and regulated by its participants. This network would have intersected, however, with the political economy, in that it was the source of raw materials which were used to produce prestige items while commoners were also able to access "exotic commodities, such as salt and basalt grinding stones, from distribution networks managed by elites" (Sharer and Traxler 2006:635).

An examination of craft production in commoner house groups on the outskirts of Palenque can provide insight regarding the social and political organization of the area, as well as degree and kind of integration with the political economy managed by elites in nearby primary and secondary centers. Evidence for craft production from such house groups includes characteristics of ceramic paste, formal attributes, and firing characteristics, as well as the products and byproducts of obsidian and chert tool production.

6.1 PRODUCTION OF CERAMICS IN THE REGION

The ceramics of Palenque represent a dramatic proliferation of forms, styles, and production techniques, so much so that they have defied more than half a century of continuous attempts at classification. This tremendous variability has raised questions about the centralization of economic power, the origin of ceramic similarities including whether these "resulted primarily from trade or the sharing of concepts relating to pottery making and decoration" (Rands and Bishop 2003:110), and whether distinct styles of ceramics were created or utilized within geographically bounded spaces or times, among other lines of inquiry (Rands and Bishop 2003). A recent ceramic chronology asserts that ceramic complexes both cannot be firmly and

individually dated and also that they overlap chronologically, with multiple complexes produced and distributed contemporaneously. Soil conditions in the region are notoriously poor for the preservation of ceramic remains, and surface treatment is rarely retained on ceramic materials recovered archaeologically. As a result, characterization of these ceramics has relied on attributes of production, such as paste and temper choices, construction and firing techniques, and formal attributes such as height to diameter ratios and degree of rim eversion (Rands 2003; Rands 2007). Such classification is further complicated by the fact that regional ceramics display a marked "redundancy within a given form: over time, a greater number of shapes, each standardized, is made and used to meet the same basic function" (Rands 2007:22). Rands and Bishop (2003) suggest that this is the result of an increasing number semi-independent local workshops, especially during the Late Classic.

6.1.1 Ceramics Recovered from Hinterland Commoner House Groups

Ceramic materials were recovered in all hinterland commoner house groups selected for excavation. Analysis of 24.62kg of ceramic materials recovered from 513 units of stratigraphic excavation (which comprised 133 units of analysis) included paste tradition and temper characteristics. These materials were not sufficiently well-preserved to enable a sherd count or analysis beyond basic visual assessment. An additional 7.25kg of sherds from 1,033 individual vessels recovered across nine house groups were selected on the basis of preservation for further analysis, including paste characteristics, firing technique, and oxidation conditions. Wet chemical analysis was used to identify calcite tempers with locally procured commercially available acids as a reagent, and visual assessment with the aid of a binocular microscope at 10x, 40x, and 100x levels of magnification was employed in the identification of other temper

materials, including organics and volcanic ash. Calipers and visual assessment were used to identify cross-sectional patterns of discoloration which are correlated with firing technique and oxidation conditions.

The current research shows that ceramic construction techniques are consistently inconsistent across the region: each house group varied independently over time in the use of calcite, volcanic, organic, and other temper material; firing technique; and oxidation conditions. No patterned variance of construction technique can be identified across time throughout the region as a whole, between areas, or between house groups, though a larger sample of diagnostic sherds may produce more information. Individual house groups did vary in the formal style, paste, and temper choices apparent in individual household assemblages, both during individual occupations and over the course of the regional sequence.

6.1.2 Organic Tempers

Ceramics produced with the use of organic tempers were present in eight out of 10 house groups. Sites 78 and 125 did not contain any evidence of ceramic production using organic tempers, though as a result of small samples of diagnostic sherds (Site 78 contains N=15 diagnostic sherds; Site 125 contained N=1 diagnostic sherd) this absence may be due to the vagaries of chance and so we cannot report absence with a high degree of statistical confidence. Of the remaining house groups, Sites 123, 128, and 149 were so stratigraphically mixed that it cannot be determined at which point in the occupation ceramics tempered with organic materials were deposited, though all three contained ceramics constructed with organic tempers (Site 123: 12.2% ±4.2%, N=240; Site 128: 4.9% ±3.6%, N=138; Site 149: 7.3% ±3.9%, N=175. All proportions are at the 95% confidence level given a sample size of 1033 diagnostic sherds across

all house groups). Five house groups do provide sufficient depositional information to identify chronological periods in which organic-tempered ceramics were deposited.

Organic-tempered ceramic materials were deposited during Site 76's Early and Middle Classic occupations, but not during the (much lighter) Late Classic occupation. Site 79 includes a single instance of organic-tempered ceramic material during its Late Classic occupation, and Site 94 has no evidence of organic-tempered ceramic material during its Early Classic occupation, though such materials are present for the remainder of the sequence. Organic-tempered ceramics were recovered from analytical units spanning the Middle, Late, and Postclassic occupational sequence at Site 122, and from Early and Late Classic contexts (though not the much more sparsely occupied Middle Classic contexts) at Site 129. Though insufficient data is available to discuss potters' selection of organic tempers over time, we can say with confidence that either organic tempers were employed in the construction of pottery in multiple house groups in each neighborhood throughout the occupational sequence or that the inhabitants of multiple house groups in each neighborhood throughout the occupational sequence were obtaining finished pottery from specialized producers who themselves were employing organic tempers. This material is widely available throughout the region and was likely employed opportunistically by potters.

6.1.3 Calcite Tempers

Calcite-tempered ceramics were present in seven out of 10 house groups: Sites 78, 79, and 125 contained no evidence of ceramic production using calcite temper, though as a result of small samples of diagnostic sherds (Site 78 contains N=15 diagnostic sherds; Site 125 contained N=1 diagnostic sherd) this absence may be due to the vagaries of chance and so we cannot report

absence with a high degree of statistical confidence. Of the remaining house groups, Sites 123, 128, and 149 were so stratigraphically mixed that it cannot be determined at which point in the occupation calcite-tempered ceramics were deposited. Four house groups do provide sufficient depositional information to identify chronological periods in which calcite-tempered ceramics were deposited.

Calcite-tempered ceramic materials are in evidence in Early and Middle Classic depositions recovered from Site 76. Late Classic deposits from this site did not contain a sufficiently large sample size to reliably report absence of calcite-tempered ceramics. Site 94 evidences calcite-tempered ceramics throughout the occupational sequence, from the Early through the Late Classic. Calcite-tempered ceramics were recovered from analytical units spanning Site 122's Middle, Late, and Postclassic occupational sequence, and from Early, Middle, and Late Classic contexts at Site 129.

Due to the sparsity of diagnostic ceramics, sample sizes are sufficient to allow us to compare Areas A and Areas B only during their Middle and Late Classic occupations. During these two periods, use of calcite tempers is statistically indistinguishable between the two neighborhoods (Table 6.1). As was the case with organic tempers, either calcite tempers were employed in the construction of pottery in multiple house groups in each neighborhood throughout the occupational sequence or that the inhabitants of multiple house groups in each neighborhood throughout the occupational sequence were obtaining finished pottery from specialized producers who themselves were employing calcite tempers. This material is widely available throughout the region and was likely employed opportunistically by potters.

Table 6.1: Calcite-tempered ceramics as a proportion of diagnostic sherds (N=1033) at the 95% confidence level

	Middle Classic	**Late Classic**
Area A	16.9% ± 6.5%	5.9% ± 2.9%
Area B	17.3% ± 6.6%	5.4% ± 2.8%
χ^2	χ^2(2, N=129)=2.459, p=.329, V=0.128	χ^2(1, N=259)=4.315, p=.073, V=0.047

6.1.4 Paste Traditions

Regional utilitarian wares are overwhelmingly constructed from Buff Brown and Red Brown paste types throughout the Early, Middle, and Late Classic (Rands 2007). Paste class was identified through visual assessment with the aid of Munsell color charts. A large sample of recovered ceramics were available for assessment of paste class, an unusual luxury on a project where crumbling ceramics posed a major barrier to virtually all other dimensions of analysis. Early Classic materials recovered in the course of the present research conform to expectations. The assemblage reflects a preference for Buff Brown pastes over Red Brown pastes. This preference became more pronounced over the course of the Middle and Late Classic before rebounding slightly during the Postclassic (Table 6.2). Different neighborhoods participated differentially in this trend: Area A and Area B did not consistently select these paste classes at the same rates (Figures 6.1 and 6.2).

Table 6.2: Buff Brown and Red Brown pastes as a proportion of non-diagnostic ceramic remains which could be assessed by period (N=9.26kg), at the 95% confidence level

	Early Classic	**Middle Classic**	**Late Classic**	**Postclassic**
Red Brown	30.00% ±0%	29.58% ± 0%	22.84% ± 0%	27.49% ± 0%
Buff Brown	58.36% ± 0%	63.39% ± 0%	70.30% ± 0%	66.86% ± 0%
N	1.38kg	3.36kg	4.14kg	0.38kg

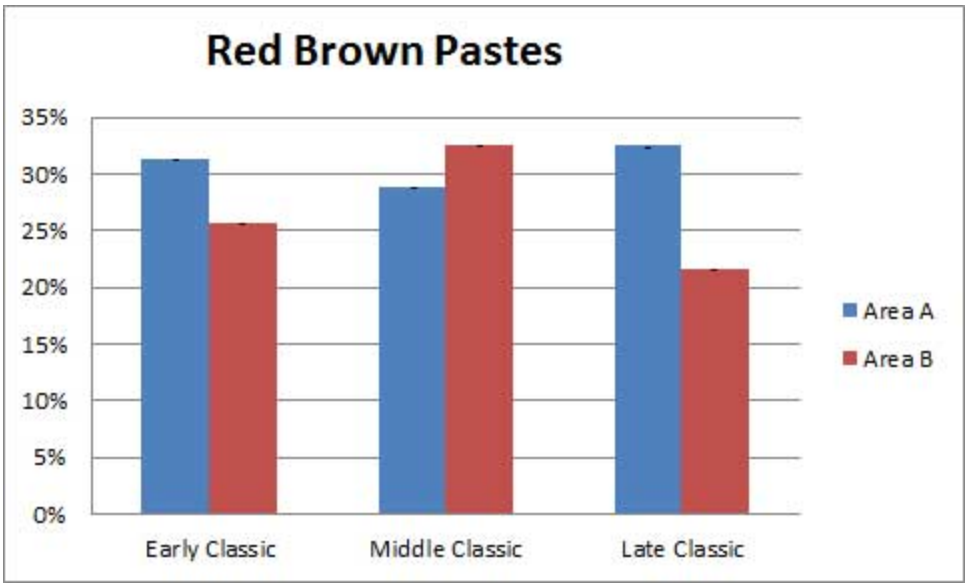

Figure 6.1 Red Brown pastes by neighborhood as a proportion of non-diagnostic ceramic remains which could be assessed by period (N=9.26kg), at the 95% confidence level

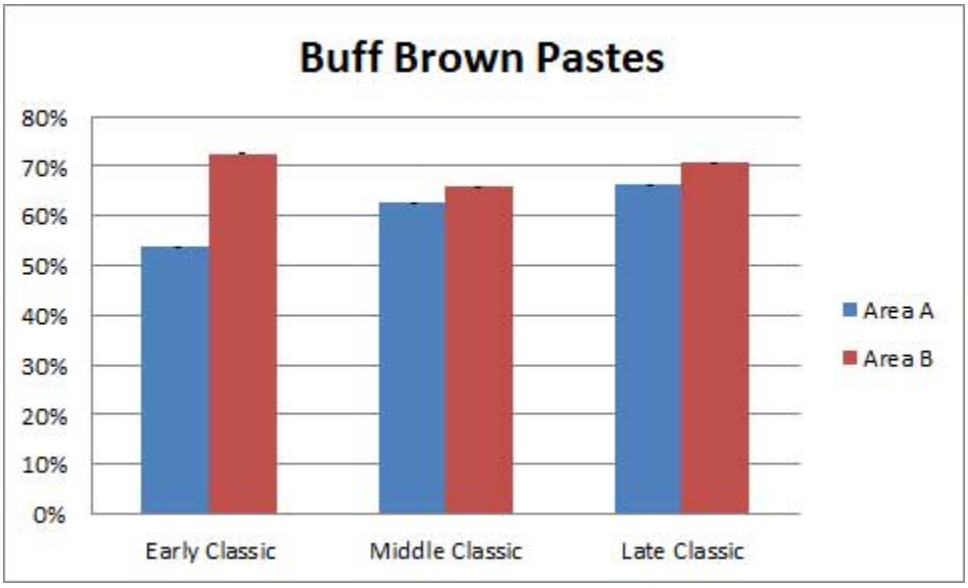

Figure 6.2 Buff Brown pastes by neighborhood as a proportion of non-diagnostic ceramic remains which could be assessed by period (N=9.26kg), at the 95% confidence level

Within and in addition to these larger paste traditions, a wide variety of paste types were utilized in ceramic production. Diagnostic ceramics were analyzed for paste type, and insufficient data is available to discuss potters' use of specific recipes between house groups or

over time. We can say, however, that either a wide variety of ceramic recipes were employed in multiple house groups in each neighborhood throughout the occupational sequence or that inhabitants of house groups in each neighborhood were procuring finished ceramics from potters who employed a multiplicity of paste and temper recipes.

If we compare geographic areas, Area A (Geographic Area 1) and Area B differ notably (χ^2(18, N=1029)=55.059, p<.001, V=.231). Thirteen different paste classes are represented in Area A utility wares and 15 in Area B utility wares (Table 6.3). While some paste classes are common in comparable proportions in both neighborhoods, some pastes are more prevalent in one than they are in the other (Figures 6.3 and 6.4).

Table 6.3 Paste and temper as a proportion of all diagnostic ceramics by chronological period, of all diagnostic ceramics which were assessed for both paste and period information (N=466), at the 95% confidence level

Paste	**Red Brown**					**Buff Brown**			
Temper	**Quartz, ash**	**Organic, ash**	**Calcite**	**Quartz**	**Quartz, sand**	**Quartz, ash**	**Quartz, ash, calcite**	**Quartz**	**Quartz, sand**
Area A N=86	31.3% ± 8.1%	8.6% ± 4.9%	**0.8% ± 1.6%**	5.5% ± 4.0%	5.5% ± 4.0%	**10.2% ± 5.3%**	5.5% ± 4.0%	10.2% ±5.3 %	**3.1% ± 3.0%**
Area B N=173	24.0% ± 2.8%	4.0% ± 1.3%	**18.1% ±2.5 %**	7.5% ± 1.7%	6.7% ± 1.6%	**18.1% ± 2.5%**	3.6% ± 1.2%	17.3% ± 2.5%	**8.2% ± 1.8%**

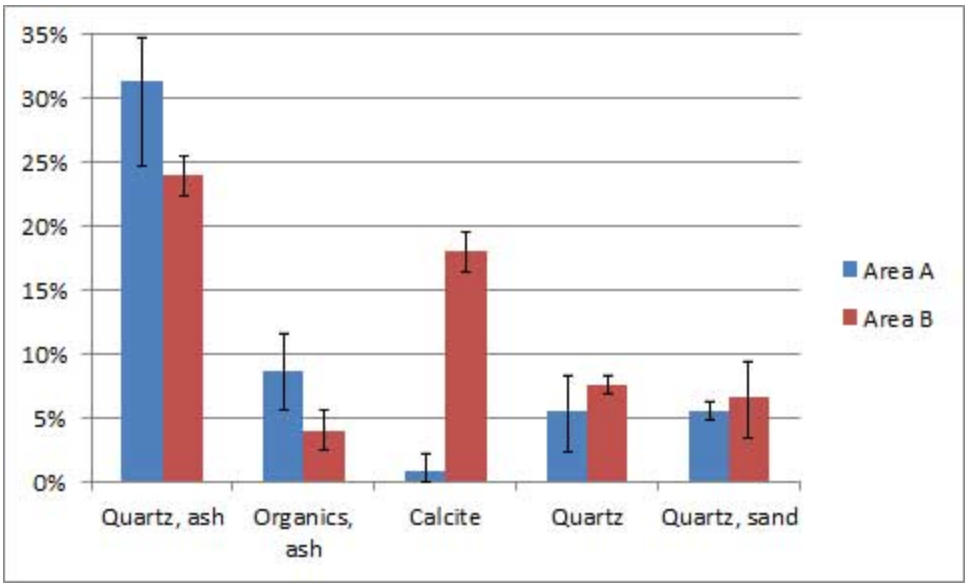

Figure 6.3 Proportions of red brown paste classes by neighborhood as a proportion of non-diagnostic ceramic remains which could be assessed by period (N=9.26kg), at the 95% confidence level.

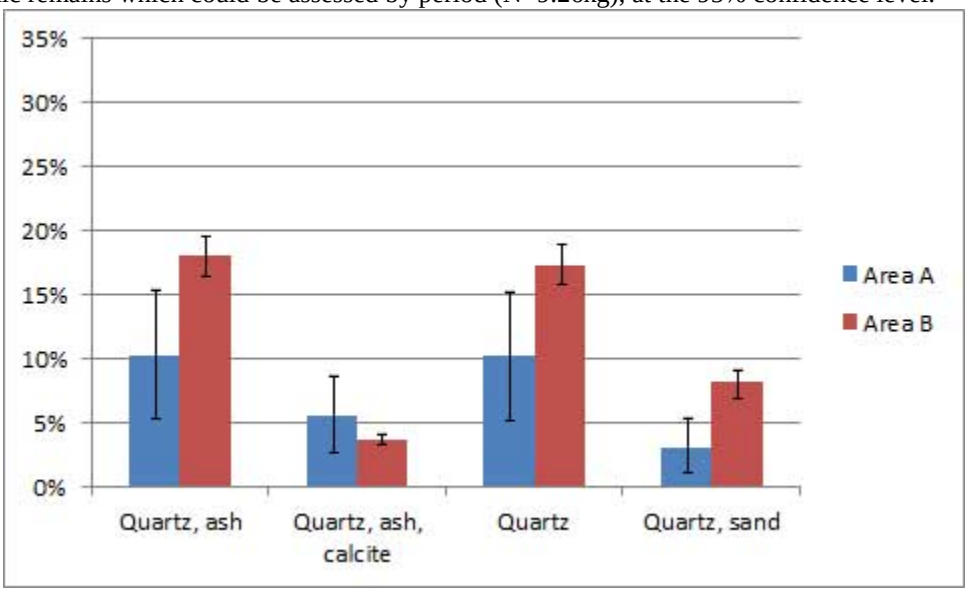

Figure 6.4 Proportions of buff brown paste classes by neighborhood as a proportion of non-diagnostic ceramic remains which could be assessed by period (N=9.26kg), at the 95% confidence level.

There may be differences in the chronological utilization of various pastes over time, as well, though sample sizes are insufficient to make diachronic comparisons between the two with a high degree of statistical confidence.

Potters around the region clearly availed themselves of a wide variety of materials to create the disparate recipes used in pottery construction. It's likely that individuals living in various households across the region made different choices about ceramic paste and temper preferences. These differences are evidenced in the wildly varied pastes we find in the house groups explored in the course of the current research. The vast majority of materials used to temper pottery, and the base clays which lend our paste classes their hue, were widely available throughout the region and were likely employed opportunistically by potters.

6.1.5 Reduction Firing

The ceramic remains recovered in the course of the current investigation and examined here were subjected to reduction firing. By analyzing patterns in the oxidation or reduction of interior and exterior surfaces in relation to that of ceramic cores, we can gain information about the firing conditions of utility wares. Variation in core reduction over time could indicate an increase in the firing time or temperature over the course of the sequence: here, firing ratio indicates a ratio of oxidized core width to vessel wall width. Firing ratios of individual house groups do not appear to differ from one another in statistically meaningful ways, and neighborhoods are also statistically indistinguishable at the 95% confidence level: The mean firing ratio for Area A is 0.586 (across the sequence, ±0.05 at the 95% confidence level, N=117 diagnostic sherds) while the mean firing ratio for Area B is 0.572 (across the sequence, ±0.02 at the 95% confidence level, N=848 diagnostic sherds).

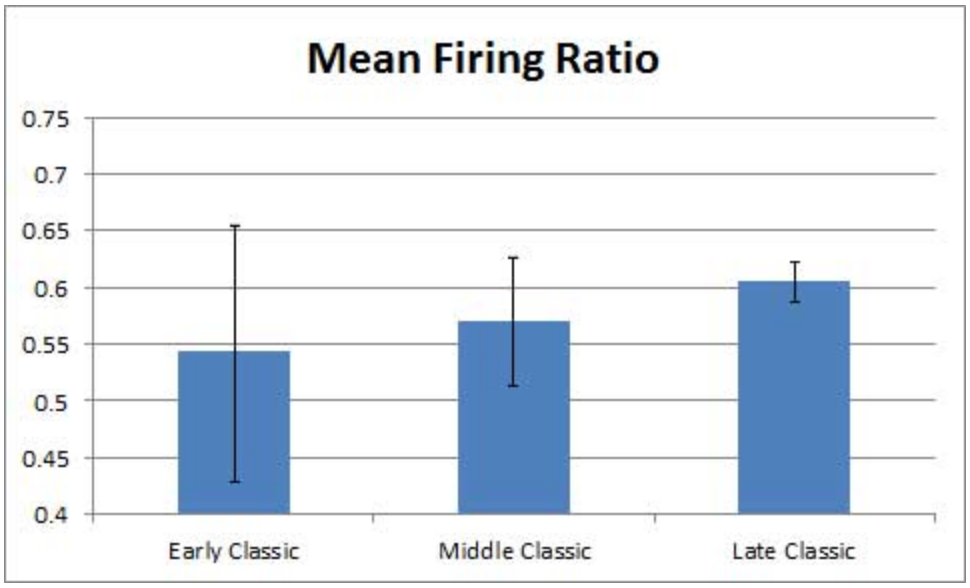

Figure 6.5 Mean firing ratio of diagnostic ceramics (N=1033) which could be assessed by period. Error bars represent the 95% confidence level.

While across the region, the mean firing ratio does steadily rise over the course of the occupational sequence from 0.5447 (±0.12 at the 95% confidence level, N=22 diagnostic sherds) during the Early Classic, to 0.570 during the Middle Classic (±0.06 at the 95% confidence level) to 0.6064 (±0.03 at the 95% confidence level, N=38 diagnostic sherds) during the Late Classic, suggesting an increase in firing temperature over time (Figure 6.5), the differences between these means is not statistically significant at the 95% confidence level [F(4, 960)=1.63, p=165].

6.1.6 Formal Variation

While ceramics vary across the two neighborhoods in a number of ways already detailed in this chapter, distinct, coherent ceramic variants are not apparent. This unpatterned variation holds true for stylistic variation, as well. Multiple stylistic variations on a single formal theme were produced contemporaneously in the region, and a number of researchers have attempted to make sense of these with varying degrees of success. Rands expended nearly half a century compiling

a great trove of ceramic data, relying on a combination of stratigraphy and seriation in the face of both depositional and stylistic complexity to produce the clearest and most comprehensive ceramic typology of the region now available to us (Rands 2007). In this scheme, ceramic complexes are distinguished primarily on the basis of formal attributes such as height to width ratio and degree of rim eversion. With these factors in mind, the current research set out to examine a number of dimensions of microformal variation in the hopes of finding patterned variation which could provide some insight on the organization of ceramic production in the region.

Close examination of 31,864.78g of ceramic material, including 1033 diagnostic sherds, we were forced to conclude that house groups cannot be unified nor distinguished from one another on the basis of ceramic style or formal characteristics evident in the ceramic assemblage examined in the current study. This can be attributed to poor conditions of preservation which resulted in an extremely small proportion of ceramic sherds which could be examined for surface treatment or measured for microformal characteristics. The vast majority of ceramics were degraded to the point of being uncountable, as they would fragment at a light touch. As a result, ceramics were examined for paste information and quantified by weight: of 31,864.78g of ceramic material, only 7,249.5g (22.75%) in the form of 1033 diagnostic sherds were examined for form (shape), and similar characteristics.

A tradition of jars evidenced in Palenque's central precincts (Rands and Bishop 2003) manifests across the region, throughout the sequence: all house groups with large enough samples to meaningfully discuss proportions of ceramic vessels by form include vasos as a significant proportion of the assemblage (between 7.1% ±5.1% at Site 128 and 26.3% ±6.4% at Site 29, at the 95% confidence level), though the prominence of this proportion varies from

house group to house group. In fact, the prevalence of vasos in the house group ceramic assemblage is the most variable of all forms: proportions of ollas, cuencos, and cajetes vary much less across house groups (Figure 6.6, Table 6.4).

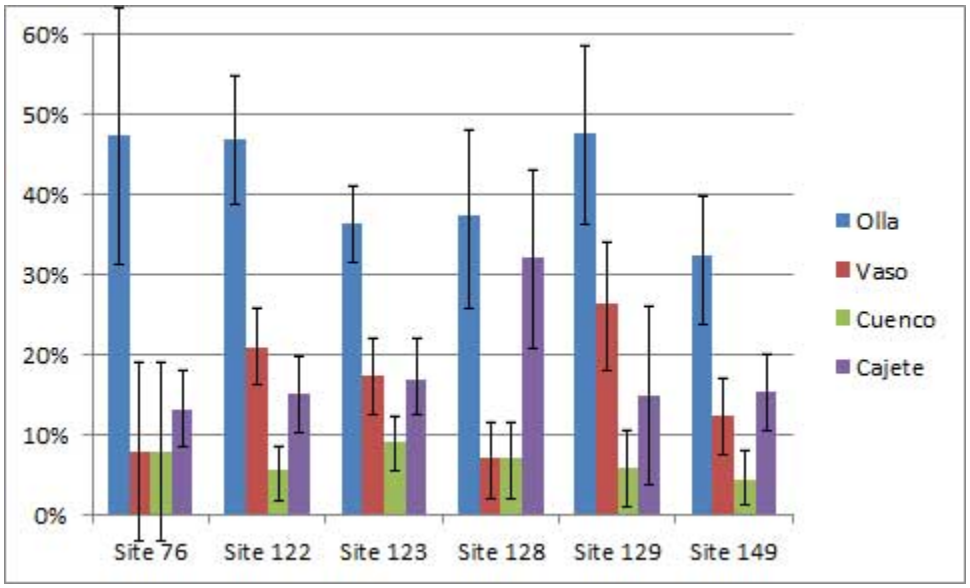

Figure 6.6 Ceramic form by site as a proportion of diagnostic ceramics (N=1033) which could be assessed for shape. Error bars represent the 95% confidence level.

Table 6.4 Within-site proportions of ceramic forms over the course of the sequence (N=1033) at the 95% confidence level

Site	N	Olla	Vaso	Cuenco	Cajete
76	38	47.4% ±16%	7.9% ±8.7%	7.9% ±8.7%	13.2% ±5.1%
78	10	60% ±30.7%	0	0	0
79	11	27.3% ±26.6%	18.2% ±23%	9.1% +/17.2%-	9.1% +/17.2%-
94	30	4.3% ±7.3%	16.7% ±13.5%	0	6.7% ±9%
122	192	46.9% ±7.1%	20.8% ±5.8%	5.7% ±3.3%	15.1% ±5.1%
123	206	36.4% ±6.6%	17.5% ±5.2%	9.2% ±3.9%	17% ±5.1%
128	99	37.4% ±9.6%	**7.1% ±5.1%**	7.1% ±5.1%	32.3% ±9.3%
129	67	47.8% ±12.1%	**26.3% ±6.4%**	6% ±5.7%	14.9% ±8.6%
149	136	32.4% ±7.9%	12.5% ±5.6%	4.4% ±3.4%	15.4% ±6.1%

There are few house groups from Area A in which enough diagnostic ceramics were recovered to discuss relative proportions of ceramic vessel types with a high degree of statistical confidence. It is possible that future investigations which result in larger or better preserved ceramic assemblages will indicate differentiation between house groups or neighborhoods in the proportions of various vessel forms, or in distinct chronological trends across house groups or areas which resulted in similarly proportioned assemblages. At the neighborhood level, synchronic frequencies of vessel form are similarly statistically indistinguishable (Tables 6.5 and 6.6).

Table 6.5 Within-neighborhood proportions of ceramic forms over the course of the sequence for vessels which could be identified by form (N=790) at the 95% confidence level.

	N	Olla	Vaso	Cuenco
Area A	89	44.9% ±10.4%	11.2% ±6.6%	4.5% ±4.4%
Area B	701	42.2% ±3.7%	15.0% ±2.7%	6.7% ±1.9%

Table 6.6 Within-neighborhood proportions of ceramic forms over the course of the sequence for vessels which could be identified by form (N=790) at the 95% confidence level.

	N	Cajete	Plato	Cazuela
Area A	89	9.0% ±6.0%	2.2% ±3.1%	4.5% ±4.4%
Area B	701	18.1% ±2.9%	0.6% ±0.6%	2.0% ±1.0%

Microformal measurements were taken in the course of ceramic analysis (Figures 6.7, 6.8, 6.9, 6.10, 6.11, and 6.12). These were intended for use in the identification of stylistic variation in ceramic assemblages and include between three and seven measurements per ceramic form for each of the six most common shapes of ceramic vessels: olla, vaso, plato, cuenco, cazuela, and high-necked olla (olla con cuella vertical). This population of diagnostic

sherds included 159 ollas, 64 vasos, two platos, 42 cuencos, 12 cazuelas, and 94 cajetes for which at least one measurement could be collected.

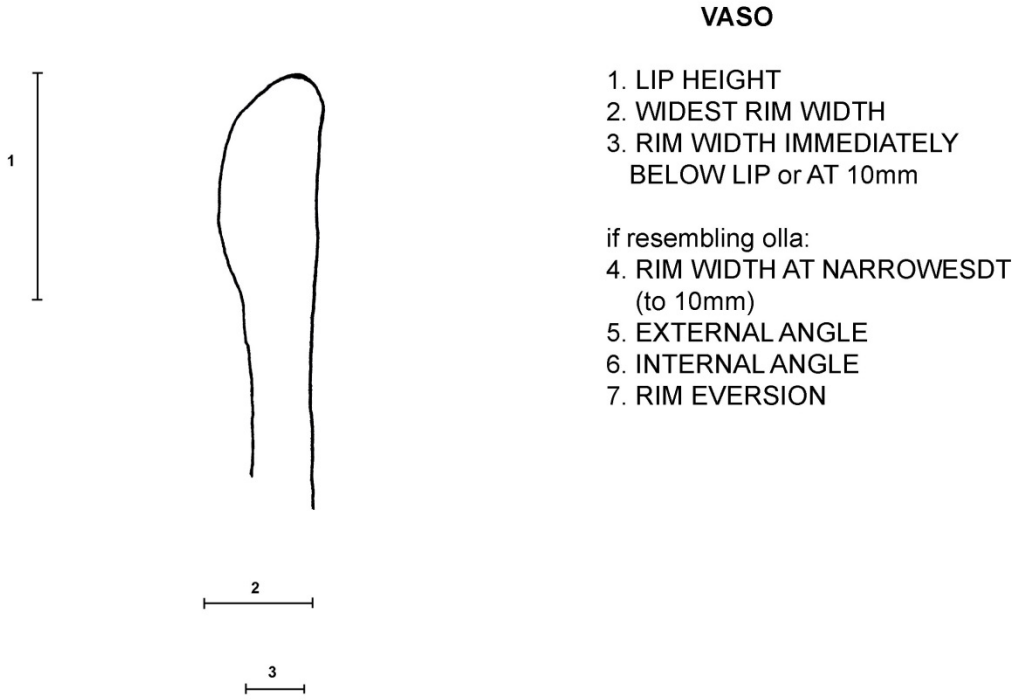

Figure 6.7: Microformal measurements taken for all *vaso* class ceramics with sufficient structural integrity

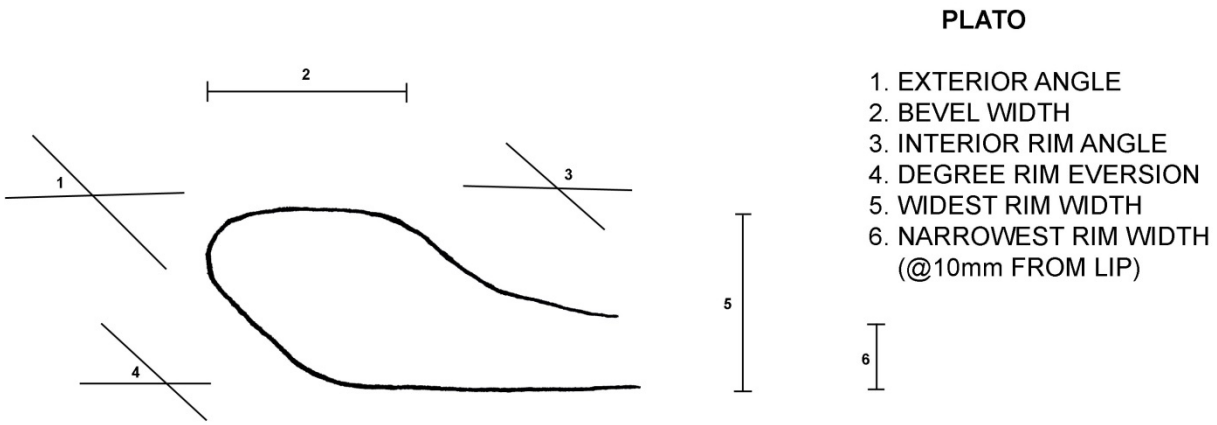

Figure 6.8: Microformal measurements taken for all *plato* class ceramics with sufficient structural integrity

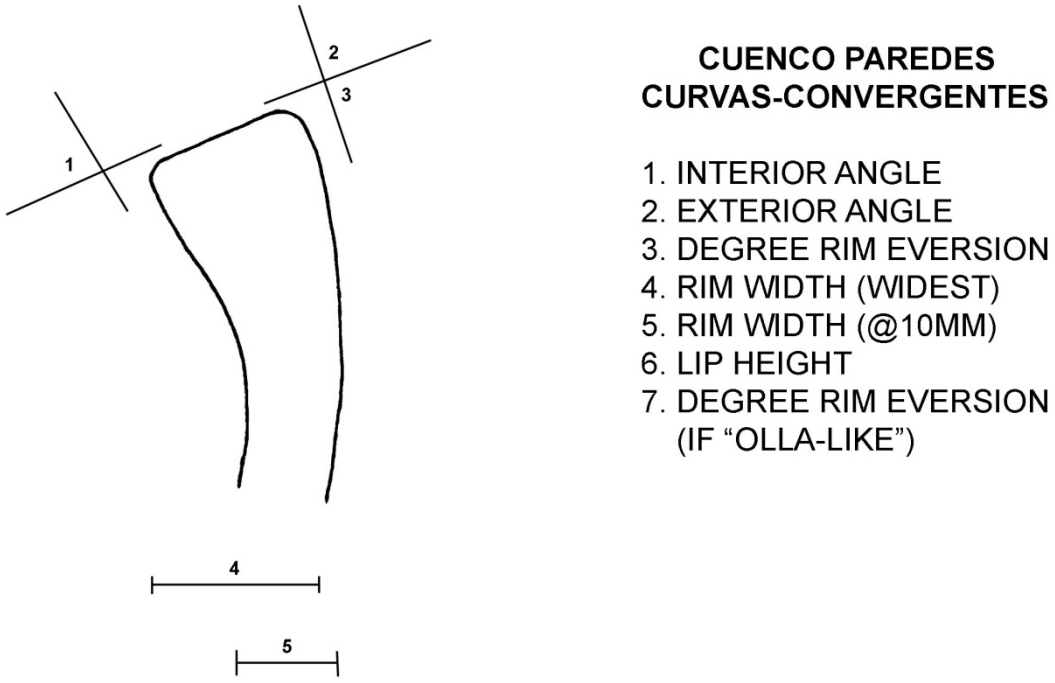

Figure 6.9: Microformal measurements taken for all *cuenco* class ceramics with sufficient structural integrity

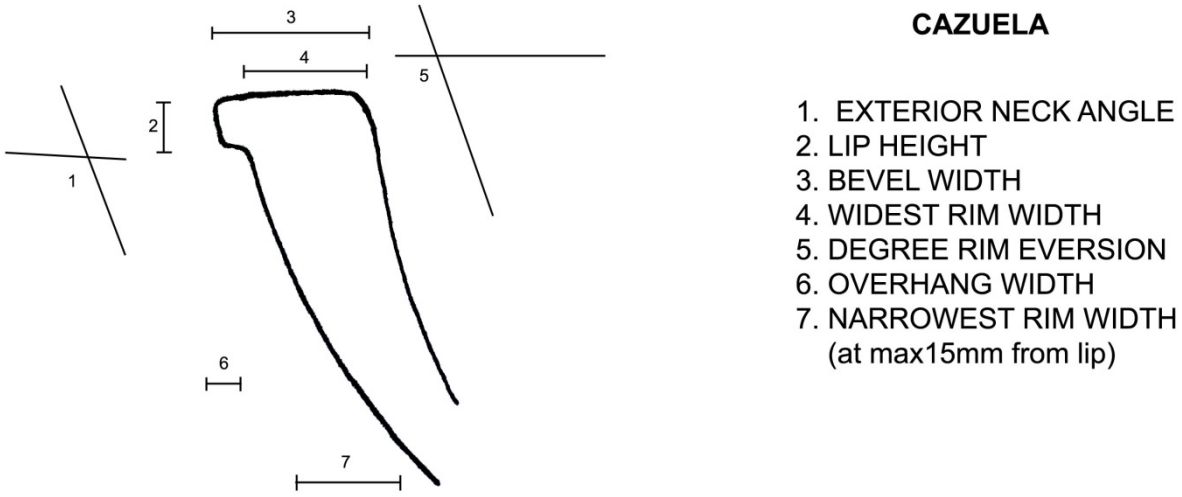

Figure 6.10: Microformal measurements taken for all *cazuela* class ceramics with sufficient structural integrity

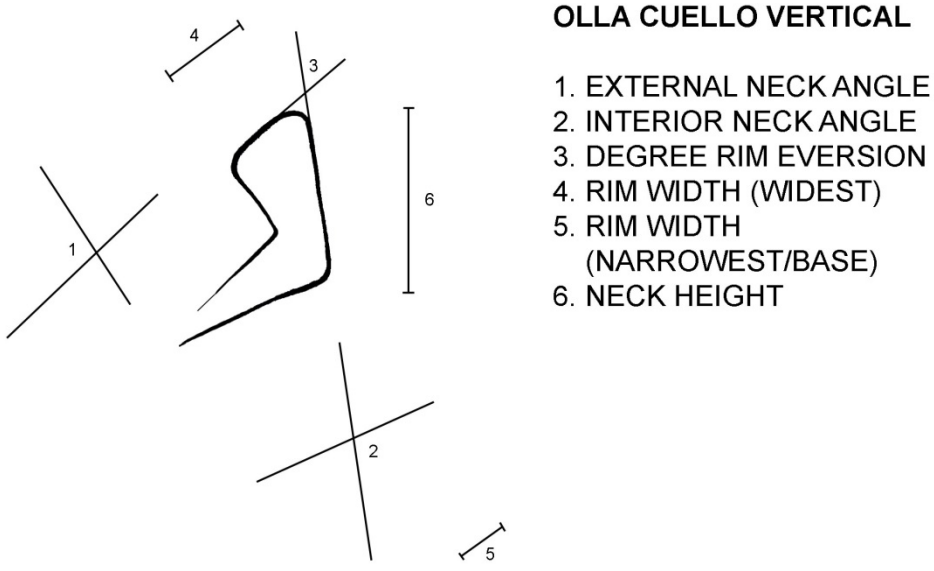

Figure 6.11: Microformal measurements taken for all *olla cuello vertical* class ceramics with sufficient structural integrity

The only population which was sufficiently large and diachronically distributed to discuss stylistic changes over time with a high degree of statistical significance was that of ollas. Olla rims became steadily less everted as time went on: a measurement of the degree of rim eversion (measurement 3 in Figure 6.12) shrank over time (Figure 6.13), as did the maximum rim width (Figure 40).

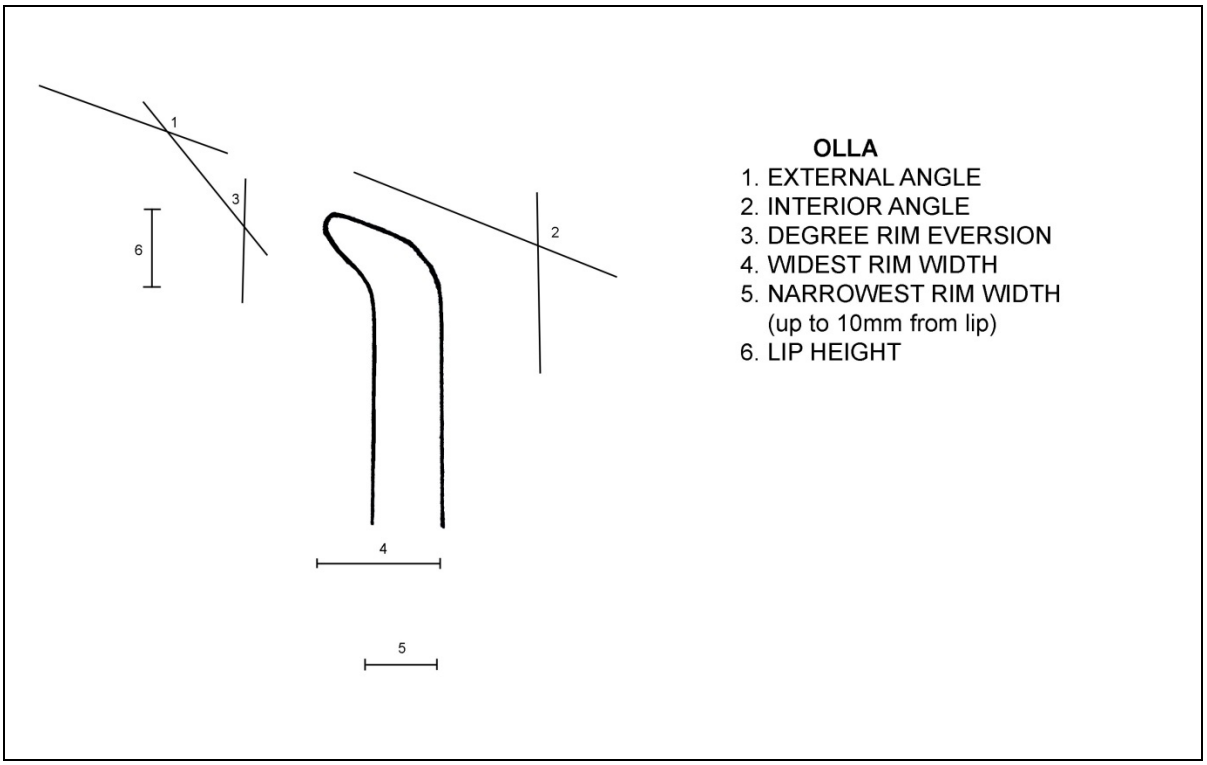

Figure 6.12: Microformal measurements taken for all *olla* class ceramics with sufficient structural integrity

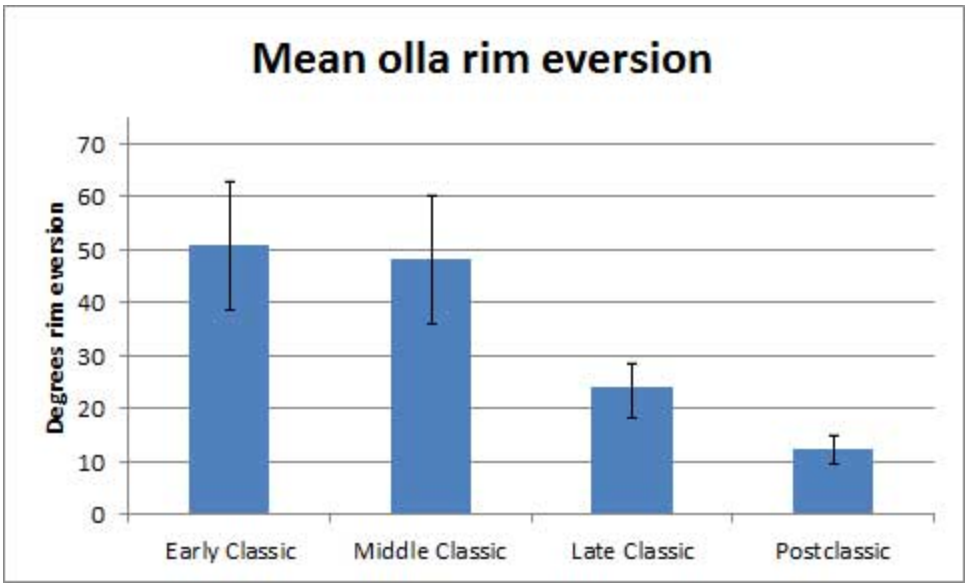

Figure 6.13: Mean degree of rim eversion of ollas with sufficient structural integrity across the sequence, N=338. Error bars indicate range at the 95% confidence level

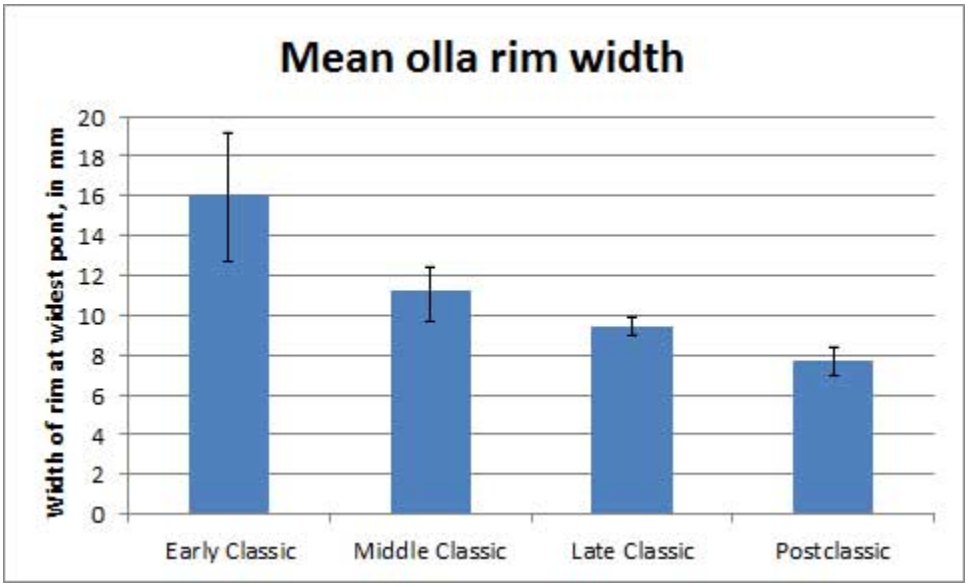

Figure 6.14: Mean rim width of ollas with sufficient structural integrity across the sequence, N=338. Measurement taken at widest point in mm. Error bars indicate range at the 95% confidence level

Table 6.7 Microformal characteristics of ollas with sufficient structural integrity across the sequence, N=338. Error bars indicate range at the 95% confidence level

	Early Classic	**Middle Classic**	**Late Classic**	**Postclassic**
Mean rim eversion @95% cl	51° ±13.81°	48.09° ±12.36°	23.9° ±5.02°	12.5° ±3.02°
Rim width	16.07mm ±3.47mm	11.2mm ±1.55mm	9.44mm ±0.66mm	7.73mm ±0.90mm

Which is to say, the outer edge of the flared lip of ollas became less rounded, more severe, and at the same time, the total width from the interior wall to the outer edge of these everted lips narrowed (Table 6.7. So we can identify a trend over time of the Early Classic's flamboyantly flared olla rims steadily diminishing over time. This is a particularly interesting trend considering the exceptionally wide everted rim identified by Rands as the defining characteristic of the extensively albeit briefly used Otolum Late Classic ceramic complex, in evidence from approximately 600 to 700 BCE in the urban center of Palenque (2007).

The sample of vasos which could be dated to specific chronological periods is unfortunately too small to form the basis of a comparative analysis: Only one dates to the Early Classic, five to the Middle Classic, and four to the Postclassic. Similarly inadequate samples of platos, cuencos, cazuelas, and cajetes make chronological changes impossible to identify.

Considering ceramics recovered from throughout the sequence as a whole, some stylistic differences between vessels deposited in Area A and Area B do emerge. Vasos, platos, cazuelas, cuencos, and cajetes from Area A are stylistically indistinguishable from those recovered in Area B. Ollas, however, do differ in two statistically significant ways: The flared rims of ollas in Area A extended farther than those of Area B: that is, while mean angles of eversion, wall thickness,

and height of rims were very similar between the two neighborhoods, the widest measurement of a vessel's interior wall to the farthest extension of those everted lips were notably larger in Area A (with a mean width of 12.35 ±1.51mm) than in Area B (where there was a mean width of 10.17 ±0.48mm) (Figure 6.15).

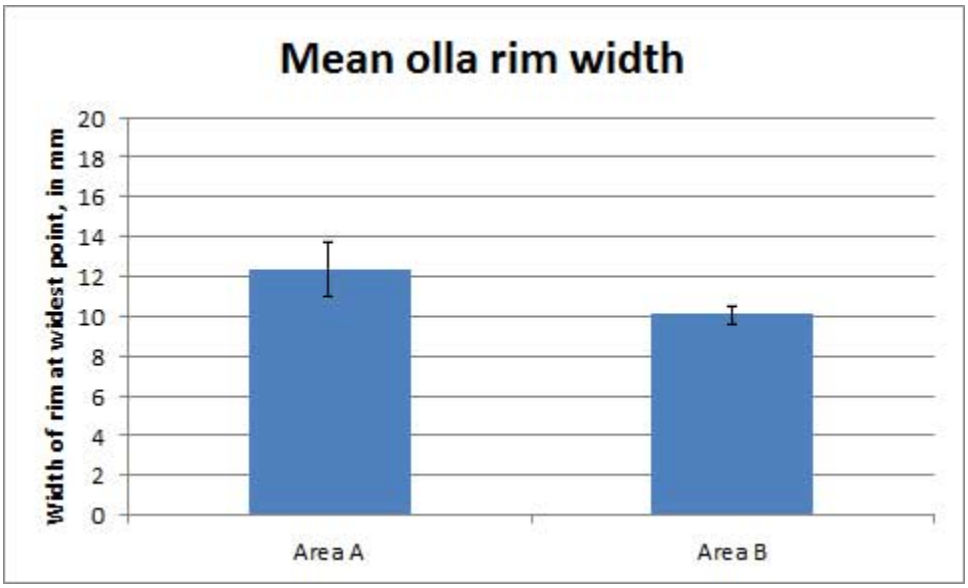

Figure 6.15 Mean degree of rim eversion of ollas with sufficient structural integrity in each neighborhood, N=338. Error bars indicate range at the 95% confidence level

This difference could be an artifact of the relatively late occupation of Area B as compared to Area A, or of the relative popularity of Otolum complex ceramics in Area A as composed to Area B, though sample sizes are not sufficient to disentangle chronological from spatial trends in this case.

6.1.7 Production of Ceramics in the Neighborhoods

Each house group explored in the course of the current research appears to follow its own pattern of local procurement and production of ceramic vessels, to exercise different choices regarding paste recipe and form, and to differentially participate in regional trends including

paste choice and stylistic embellishment. It appears that the production of ceramics was a household-level affair, and that choices made by individuals which shaped temper and paste types and that firing technology was relatively stable across the region and over time. Some trends in stylistic difference can be identified at the neighborhood level, however; notably, ollas produced in Area A and Area B exhibited different degrees of rim eversion and different rim widths. Further investigation will be required to determine whether these differences are the result of variable participation in chronological trends, such as a momentary adoption of flared rims in Area A while Area B rims remained more modestly everted. This difference could be an artifact of the relatively late robust occupation of Area B as compared to Area A, or of the relative popularity of Otolum complex ceramics in Area A as composed to Area B, though preservation of materials and resultant sample sizes are not sufficient to disentangle chronological from spatial trends in this case.

6.2 PRISMATIC BLADE PRODUCTION

Three hundred and ten obsidian artifacts were recovered from Early, Middle, Late, and Postclassic contexts across eight out of 10 house groups. Seven of these eight house group assemblages included obsidian debitage, though one house group stands out from these: Site 122 contains a much greater quantity of obsidian production debris (including expended microcores, core rejuvenation flakes, failed blades, split core fragments, shatter, bipolar flakes, platform rejuvenation flakes, plunging blade fragments, blade removal flakes, end stage core platforms, blades broken in manufacturing, and debitage) as a proportion of all stone artifacts within the site

assemblage as compared to other house groups (Figure 6.16), with production debris comprising 21.1% (± 1.9% at the 95% confidence level).

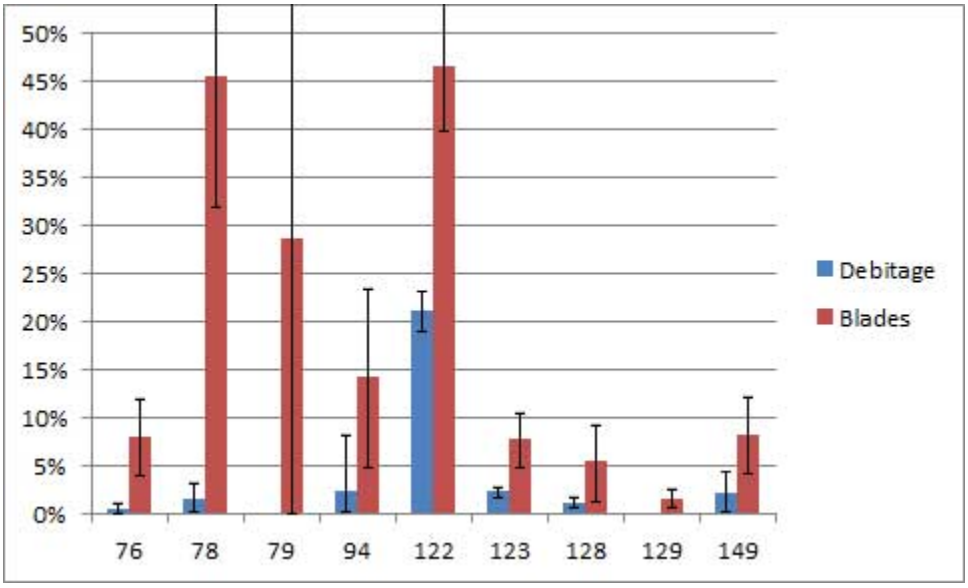

Figure 6.16 Prismatic blade and production debris proportions by house group out of all chipped stone artifacts (N=1701). Error bars indicate the 95% confidence level.

Table 6.8 Production debris as a proportion of all chipped stone artifacts (N=1701) recovered from a given house group at the 95% confidence level

Site	N	Blade production-related artifacts	Prismatic Blades
76	222	0.5% ± 0.9%	8.1% ± 3.6%
78	66	1.5% ± 3.0%	45.5% ± 12.1%
79	7	0	28.6% ± 33.8%
94	42	2.4% ± 4.8%	14.3% ± 10.7%
122	270	**21.1% ± 4.9%**	**46.7% ± 6.0%**
123	355	2.5% ± 1.6%	7.9% ± 2.8%
125	99	0	0
128	181	1.1% ± 1.5%	5.5% ± 3.3%
129	329	0	1.5% ± 1.3%
149	134	2.2% ± 2.5%	8.2% ± 4.7%

Obsidian blades comprise a majority of the obsidian artifacts recovered from all house groups from which obsidian artifacts were recovered, and a statistically significant majority (at the 95% confidence level) at Sites 76, 78, 122, 123, and 129 (Table 6.8). First series flakes and late stage blades were identified in three house groups (Sites 76, 122, and 129), though these only comprised a significant proportion of the assemblage at Site 122: At Site 122, first series flakes comprise 4.4% (± 1.0% at the 95% confidence level) and late stage blades comprise 5.2% (±1.1% at the 95% confidence level) of all chipped stone materials (N=1701) recovered from the house group. A population of exceptionally regular, long (mean length of 20.05mm ±2.99mm at the 95% confidence level, as opposed to a mean length of 14.56mm ±0.92mm at the 95% confidence level), prismatic blades stands out as expertly made, 35% of which (± 2.3% at the

95% confidence level) date to the Middle Classic (Figure 6.18). These mark a sharp contrast with made prismatic blades found elsewhere throughout the current sample of house groups.

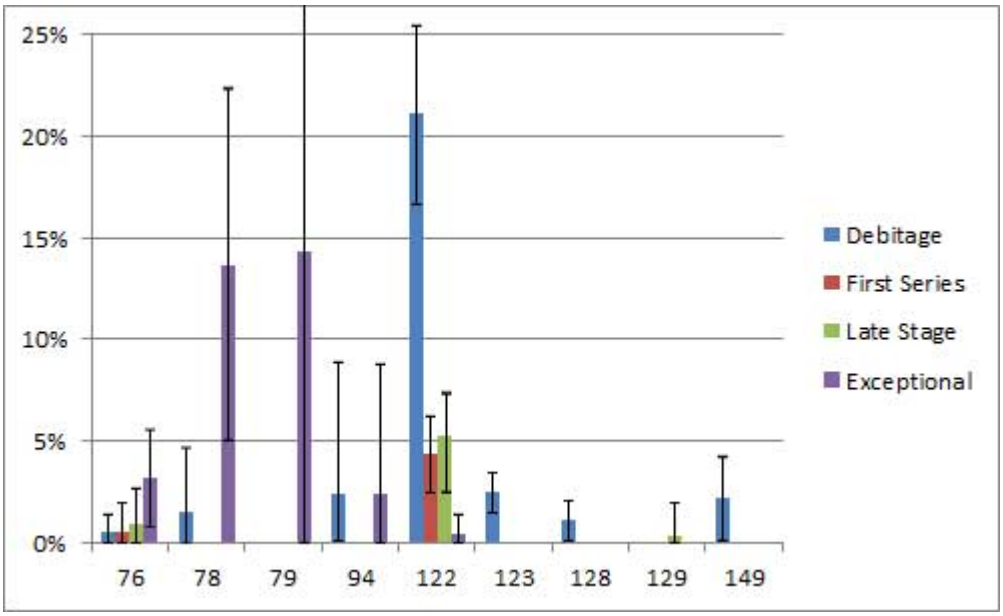

Figure 6.17: Obsidian artifacts as a proportion of all chipped stone artifacts (N=1701) by house group. Error bars indicate the 95% confidence level.

Table 6.9 Obsidian artifacts as a proportion of all chipped stone artifacts (N=1701) at the 95% confidence level

Site	N	Production Debris	First Series	Late Stage	Exceptional	All Other Prismatic Blades
76	222	0.5% ± 0.9%	0.5% ± 0.9%	0.9% ± 1.3%	**3.2% ± 2.3%**	3.6% ± 2.5%
78	66	1.5% ± 2.9%	0	0	**13.6% ± 8.4%**	31.8% ± 11.4%
79	7	0	0	0	**14.3% ± 26.2%**	14.3% ± 26.2%
94	42	2.4% ± 4.7%	0	0	**2.4% ± 4.7%**	11.9% ± 9.9%
122	270	**21.1% ± 4.9%**	**4.4% ± 2.5%**	**5.2% ± 2.7%**	0.7% ± 1.0%	36.3% ± 5.8%
123	355	2.5% ± 1.6%	0	0	0	7.9% ± 2.8%
125	99	0	0	0	0	0
128	181	1.1% ± 1.5%	0	0	0	5.5% ± 3.4%
129	329	0	0	0.3% ± 2.0%	0	1.2% ± 4.0%
149	134	2.2% ± 2.5%	0	0	0	8.2% ± 4.7%

These exceptional blades are found at Sites 76 (where they comprise 3.2% ± 2.3% at the 95% confidence level of the house group's assemblage of stone tools), 78 (where they comprise 13.6% ± 8.35% at the 95% confidence level of the house group's assemblage of stone tools), 79 (where they comprise 14.3% ± 26.2% at the 95% confidence level of the house group's assemblage of stone tools), 94 (where they comprise 2.4% ± 4.7% at the 95% confidence level of the house group's assemblage of stone tools), and 122 (where they comprise a relatively smaller 0.7% ± 1.0% at the 95% confidence level of the house group's assemblage of chipped stone tools). That is to say, exceptional blades are found overwhelmingly in Area A (Table 6.9).

6.2.1 Production of Obsidian Blades in the Neighborhoods

Three house groups, Sites 123, 128, and 149, were so stratigraphically mixed that it cannot be determined at which point in the occupation obsidian was included in the assemblage. 7.9% (± 1.3% at the 95% confidence level) of all chipped stone artifacts at Site 123 were obsidian blades and 2.5% (± 0.7% at the 95% confidence level) were obsidian production debris. 5.5% (± 1.1% at the 95% confidence level) of all chipped stone artifacts at Site 128 were obsidian blades and 1.1% (± 0.5% at the 95% confidence level) were obsidian production debris. 8.2% (± 1.3% at the 95% confidence level) of all chipped stone artifacts at Site 149 were obsidian blades and 2.2% (± 0.7% at the 95% confidence level) were obsidian production debris.

Platform preparation techniques for obsidian blade production included abrasion and pecking. A minority of obsidian blade platforms were pecked (0.23% ± 0.22% of all worked stone artifacts recovered); the majority were abraded (3.79% ± 0.9% of all worked stone artifacts recovered). All pecked platforms dated to the Middle or Late Classic, and all were recovered in the course of excavations at Site 122. Site 122 is clearly a special case in obsidian production: An extremely high proportion of production debris (Figure 6.17), the presence of expended microcores (Figure 6.19), a high proportion of both first series and late series blades, production techniques employing a variety of methods of platform preparation, and production events across multiple periods, including the Middle Classic, Late Classic, and Postclassic identify Site 122 as an obsidian workshop (Figure 6.20).

While obsidian production is not in evidence during the site's Early Classic occupation, production debris and first series flakes are evident and appear to have increased in proportion to other obsidian artifacts recovered from the site from the Middle Classic through the Late Classic

and into the Postclassic (Table 6.10, Figure 6.18), though this relationship is weak and not statistically significant at the 95% confidence level (χ^2(10, N=270)=19.402, p<.05, V=0.190).

Table 6.10 Site 122 obsidian artifacts as proportions of all obsidian artifacts (N=270) at the 95% confidence level

	N	Prismatic Blades	Debitage	First Series	Late Stage	Exceptional
Middle Classic	32	46.9% ± 17.5%	15.6% ± 12.7%	9.4% ± 10.2%	3.1% ± 6.1%	0
Late Classic	128	37.5% ± 8.5%	15.6% ± 6.4%	3.9% ± 3.4%	2.3% ± 2.6%	0.8% ± 1.6%
Post-classic	110	31.8% ± 8.8%	29.1% ± 8.6%	3.6% ± 3.5%	9.1% ± 5.4%	0.9% ± 1.8%

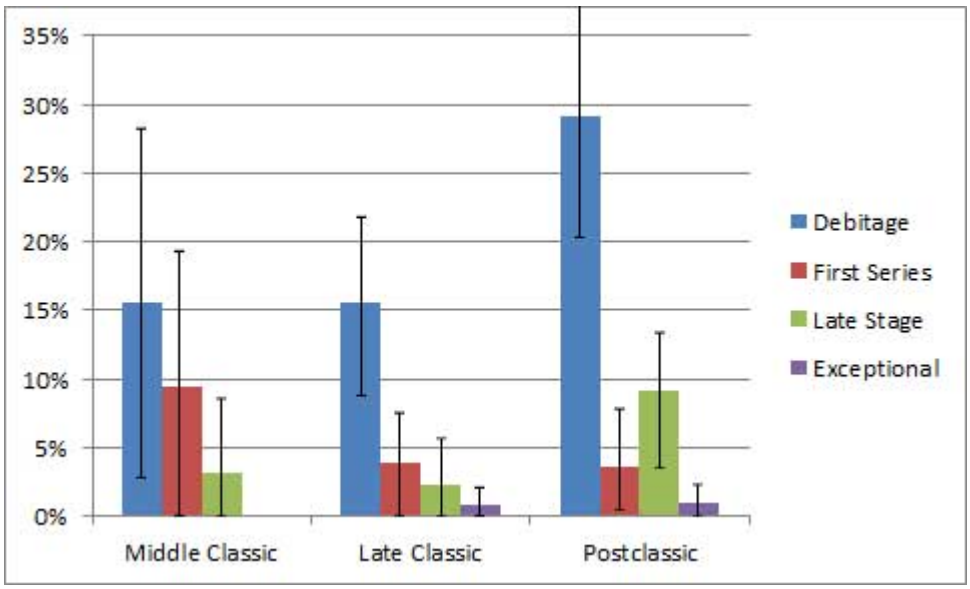

Figure 6.18: Site 122 obsidian artifacts as proportions of all obsidian artifacts (N=270). Error bars indicate the 95% confidence level.

Figure 6.19: Microcore fragments recovered from Site 122

Figure 6.20: A selection of obsidian artifacts recovered from Site 122

The people living in other house groups in our sample participated at different times and to (much lesser but) varying degrees in obsidian blade production, and had differential access to exceptional obsidian blades, throughout the sequence. This variation suggests the existence of part-time specialists in house groups around the area, in both neighborhoods, but waits for further research (and larger sample sizes) for more information.

At the level of the neighborhood, differences make for stark contrasts. While obsidian becomes more prominent in the chipped stone assemblage across the region over time (more on this below), production debris as compared to obsidian blades rise in prominence differently in each of our two neighborhoods. In Area A, obsidian production debris makes up a consistently low proportion of chipped stone artifacts throughout the sequence. In Area B, production debris makes up a proportion of chipped stone artifacts which rises from low proportions in the Early and Middle classic to rival the prominence of obsidian blades by the Postclassic (Table 6.11).

Table 6.11 Obsidian artifacts as a proportion of all chipped stone artifacts (N=1701) for a given period, within a given area. Differences between the trajectories of the two neighborhoods are significant at the 99% confidence level (χ^2(80, N=1701)=381.187, p<.001, V=0.335).

		Area A (N=333)		**Area B (N=1368)**	
	N	**Prismatic Blades**	**Production Debris**	**Prismatic Blades**	**Production Debris**
Early Classic	92	10.5% ± 7.0% (76)	0	6.3% ± 12.0% (16)	0
Middle Classic	225	16.7% ± 6.2% (144)	2.1% ± 2.4%	23.5% ± 9.3% (81)	6.2% ± 5.3%
Late Classic	309	21.4% ± 21.7% (14)	0	20.3% ± 4.6% (295)	6.8% ± 2.9%
Post-classic	118	87.5% ± 23.2% (8)	0	45.5% ± 9.4% (110)	29.1% ± 8.6%

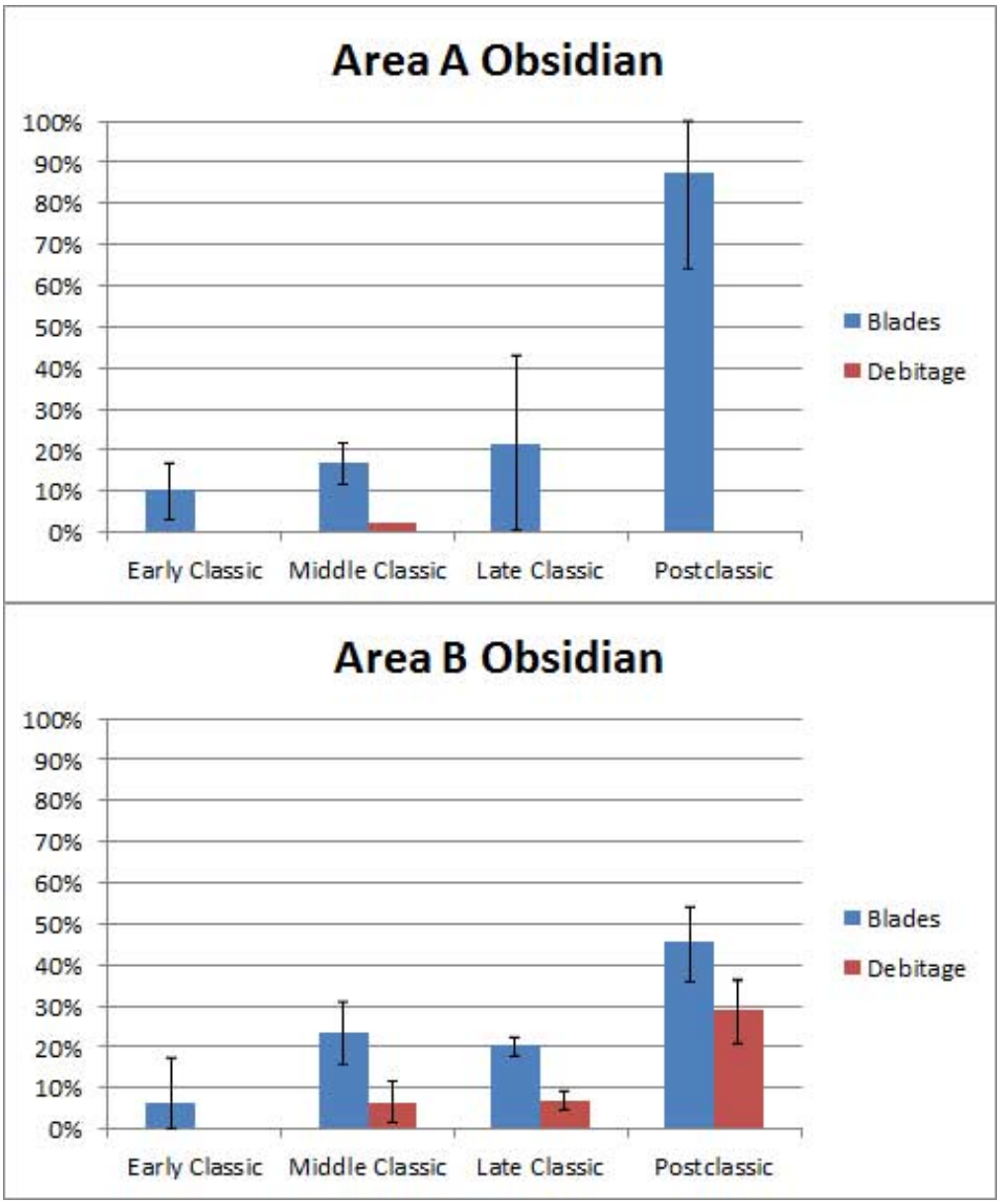

Figure 6.21: Obsidian artifacts as a proportion of all chipped stone artifacts (N=1701) by period, within each neighborhood. Differences between the trajectories of the two neighborhoods are significant at the 99% confidence level (χ^2(80, N=1701)=381.187, p<.001, V=0.335).

In Area B, obsidian makes up a smaller proportion of the chipped stone assemblage than in Area A. Area B was more engaged in obsidian production than Area A, particularly in the Postclassic (Figure 6.21).

6.3 LITHIC PRODUCTION

A variety of materials were used to create cutting and scraping tools used in house groups throughout the region, and an overwhelming majority of these tools were constructed from either obsidian or chert.

Obsidian became more common over the course of the occupational sequence, comprising 9.8% (± 6.1% at the 95% confidence level) of worked stone artifacts (N=1739) dating to the Early Classic, 22.7% (± 5.5% at the 95% confidence level) of worked stone artifacts dating to the Middle Classic, 26.9% (± 5.0% at the 95% confidence level) of worked stone artifacts dating to the Late Classic, and 75.4% (± 7.9% at the 95% confidence level) of worked stone artifacts dating to the Postclassic. Chert artifacts become steadily more prevalent through the Late Classic, after which they droped dramatically from a high of 67% (± 5.3% at the 95% confidence level) of worked stone artifacts during the Late Classic to 22.9% (± 7.7% at the 95% confidence level) of worked stone artifacts during the Postclassic (Figure 6.22). The greatest diversity of materials employed by regional craftspersons appears during the Early Classic, after which occupation intensifies and both obsidian and chert tools become more common.

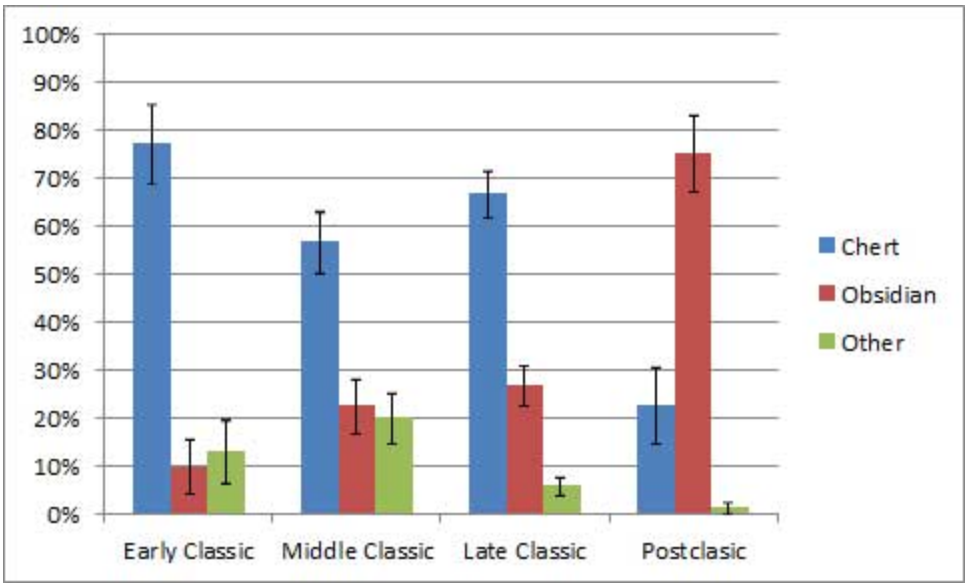

Figure 6.22: Obsidian and chert worked stone artifacts as proportions of all worked stone artifacts (N=1739). Error bars indicate the 95% confidence level

While obsidian began to replace chert over the course of the sequence (χ^2(40, N=1701)=474.5, p<.001, V=0.264), different house groups both differentially utilized various materials for construction of stone tools, and may also have participated in this chronological trend differentially (Table 6.12, Figure 6.23). Some sites, such as 94, took advantage of other materials (in the case of Site 94, primarily coquina and limestone) to a greater extent than others.

Table 6.12 Obsidian and chert worked stone artifacts as proportions of all worked stone artifacts (N=1739) by house group at the 95% confidence level

Site	N	Obsidian	Chert	Other
76	222	8.6% ± 3.7%	70.7% ± 6.0%	20.7% ± 5.4%
78	66	47.0% ± 12.2%	45.5% ± 12.1%	13.8% ± 8.4%
79	7	28.6% ± 33.8%	57.1% ± 37.0%	14.3% ± 26.2%
94	42	16.7% ± 11.4%	42.9% ± 15.1%	40.4% ± 15.0%
122	270	67.8% ± 5.6%	29.6% ± 5.5%	2.6% ± 1.9%
123	355	10.4% ± 3.2%	79.2% ± 4.3%	10.4% ± 3.2%
125	99	0	91.9% ± 5.4%	8.1% ± 5.4%
128	181	6.6% ± 3.7%	89.0% ± 4.6%	4.4% ± 3.0%
129	329	1.5% ± 1.3%	91.8% ± 3.0%	6.7% ± 2.7%
149	134	10.4% ± 5.2%	64.9% ± 8.2%	24.7% ± 7.4%

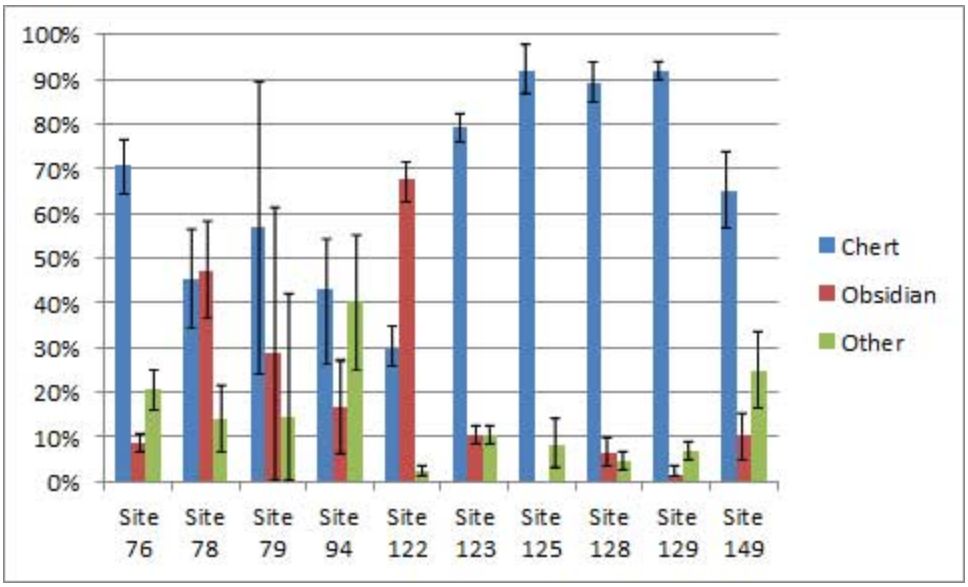

Figure 6.23: Obsidian and chert worked stone artifacts as proportions of all worked stone artifacts (N=1739) by house group. Error bars represent the 95% confidence level.

At the level of the neighborhood, a relationship emerges: In Area B, at least 90% of the worked stone assemblage is composed of either obsidian or chert (Table 6.13, Figure 6.24). In

Area A, however, other materials were more likely to be utilized in the construction of worked stone tools.

Table 6.13 Obsidian and chert by neighborhood as a proportion of all worked stone artifacts (N=1739) at 95% cl

	N	Obsidian	Chert	Other
Area A	337	17.5% ± 4.1%	62.0% ± 5.2%	20.5% ± 4.4%
Area B	1402	17.9% ± 2.1%	73.6% ± 2.3%	8.5% ± 1.5%

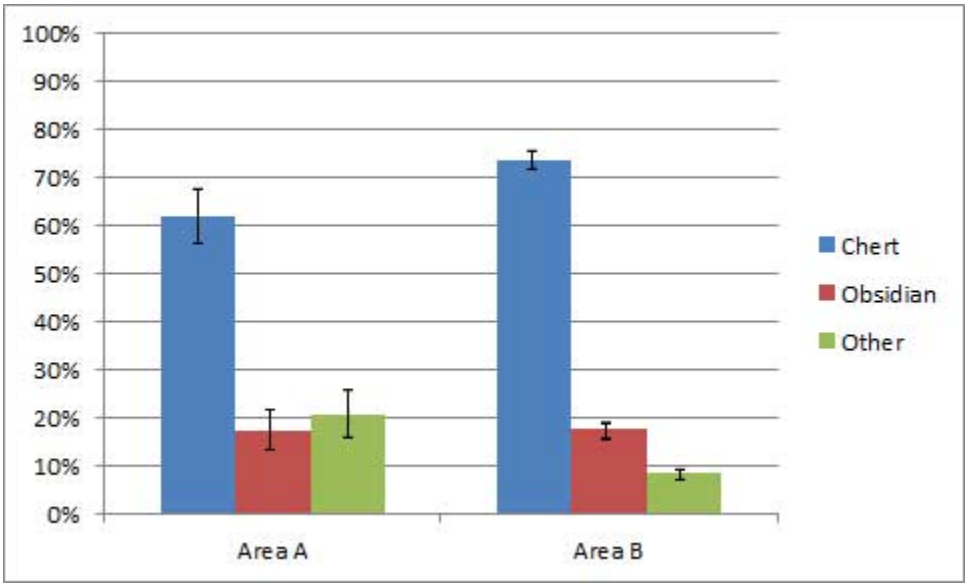

Figure 6.24 Obsidian and chert by neighborhood as a proportion of all worked stone artifacts (N=1739). Error bars indicate the 95% confidence level.

As time goes on, obsidian became more prevalent and chert became less so in both Area A and Area B. Throughout the sequence, people living in Area A (Table 6.14, Figure 6.25) house groups are generally more likely to utilize other materials for worked stone tools than people living in Area B house groups (Table 6.15, Figure 6.26), something which can be at least partially attributed to a difference in geological context.

Table 6.14 Obsidian and chert artifacts as a proportion of all worked stone artifacts in Area A (N=333) by period at the 95% confidence level.

Area A	Obsidian	Chert	Other
Early Classic	10.5% ±7.0%	75.0% ±9.8%	14.5% ±8.0%
Middle Classic	18.8% ±3.7%	50.7% ±4.7%	30.5% ±4.3%
Late Classic	21.4% ±21.7%	50.0% ±26.5%	28.6% ±23.9%
Post-classic	87.5% ±23.2%	12.5% ±23.2%	0

Table 6.15 Obsidian and chert artifacts as a proportion of all worked stone artifacts in Area B (N=1368) by period at the 95% confidence level.

	Obsidian	Chert	Other
Early Classic	6.3% ±12.0%	87.5% ±16.4%	6.2% ±11.9%
Middle Classic	29.6% ±10.0%	67.9% ±10.2%	2.5% ±3.4%
Late Classic	27.1% ±5.1%	67.8% ±5.4%	5.1% ±2.5%
Post-classic	74.5% ±8.2%	23.6% ±8.0%	1.9% ±2.6%

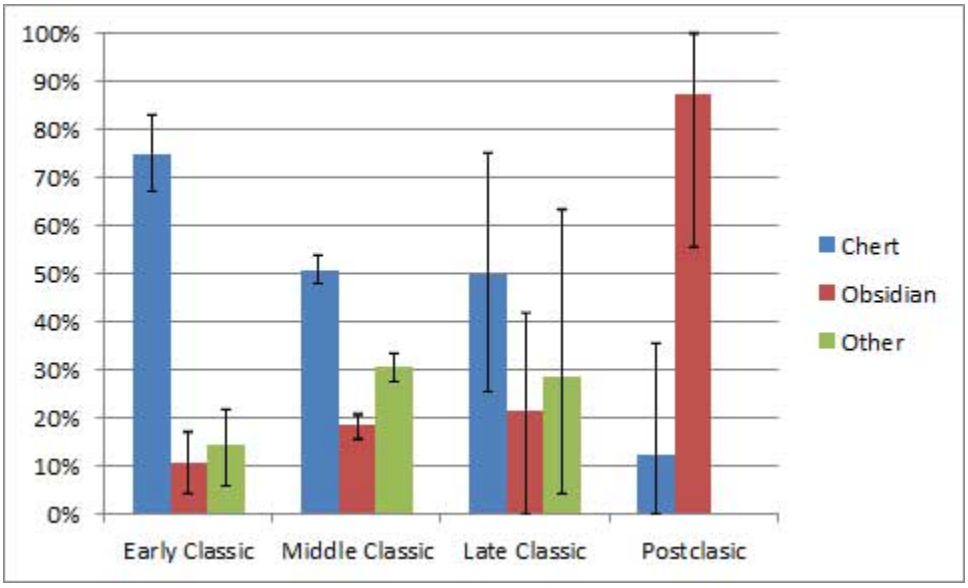

Figure 6.25 Obsidian and chert artifacts as a proportion of all worked stone artifacts in Area A (N=333) by period at the 95% confidence level.

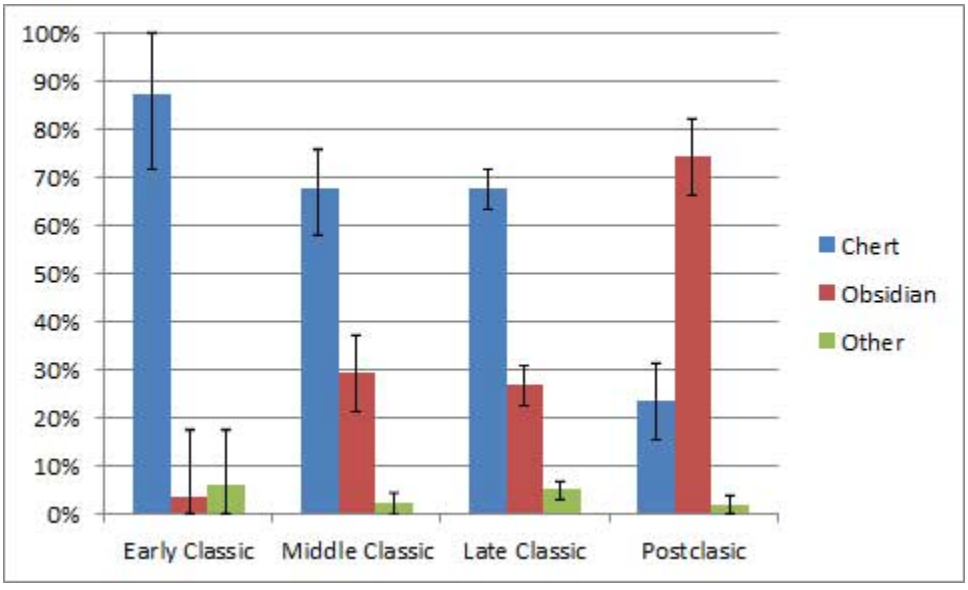

Figure 6.26 Obsidian and chert artifacts as a proportion of all worked stone artifacts in Area B (N=1368) by period at the 95% confidence level.

6.3.1 Production of Chert Flake Tools in the Neighborhoods

Chert artifacts were recovered from every house group explored in the context of the current investigation, and every house group contained evidence, at some point in its occupational sequence, of the production of chipped stone tools. Evidence of chert knapping includes preforms, blanks, cores, shatter, blade gravers, thinning flakes, rejuvenation flakes, and angular fragments. Chert tools include unimarginal tools, bimarginal tools, flake tools, and utilized flakes. Prevalence of production materials varies by house group (Figure 6.27, Table 6.16).

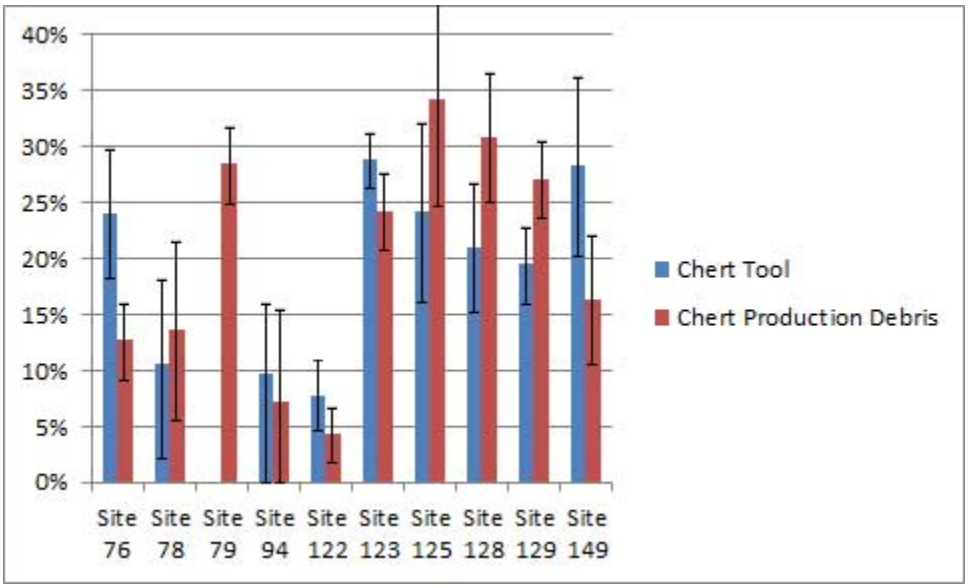

Figure 6.27 Chert tools and production debris by site as a proportion of all worked stone artifacts (N=1739) at a given site, at the 95% confidence level.

Table 6.16 Chert tools and production debris by site as a proportion of all worked stone artifacts (N=1739), at the 95% confidence level

Site	N	Chert tools	Chert production debris	Other
76	222	24.0% ± 5.7%	12.7% ± 4.4%	63.3% ± 6.4%
78	66	10.6% ± 7.5%	13.6% ± 8.4%	75.8% ± 10.4%
79	7	0	28.6% ± 3.4%	71.4% ± 33.8%
94	42	9.8% ± 9.1%	7.3% ± 7.9%	82.9% ± 11.5%
122	270	7.8% ± 3.2%	4.4% ± 2.5%	87.8% ± 3.9%
123	355	28.8% ± 4.8%	24.3% ± 4.5%	46.9% ± 5.2%
125	99	24.2% ± 8.5%	34.3% ± 9.4%	41.4% ± 9.8%
128	181	21.0% ± 6.0%	30.9% ± 6.8%	48.1% ± 7.4%
129	329	19.5% ± 4.3%	27.1% ± 4.9%	53.5% ± 5.4%
149	134	28.4% ± 7.7%	16.4% ± 6.3%	55.2% ± 8.5%

In both Area A and Area B, chert tools comprise approximately one fifth of all worked stone artifacts recovered (Figure 6.28). Chert production debris, however, makes up a significantly smaller proportion of artifacts relative to chert tools in Area A than in Area B (χ^2(2, N=1736)=19.681, p<.001, V=0.106).

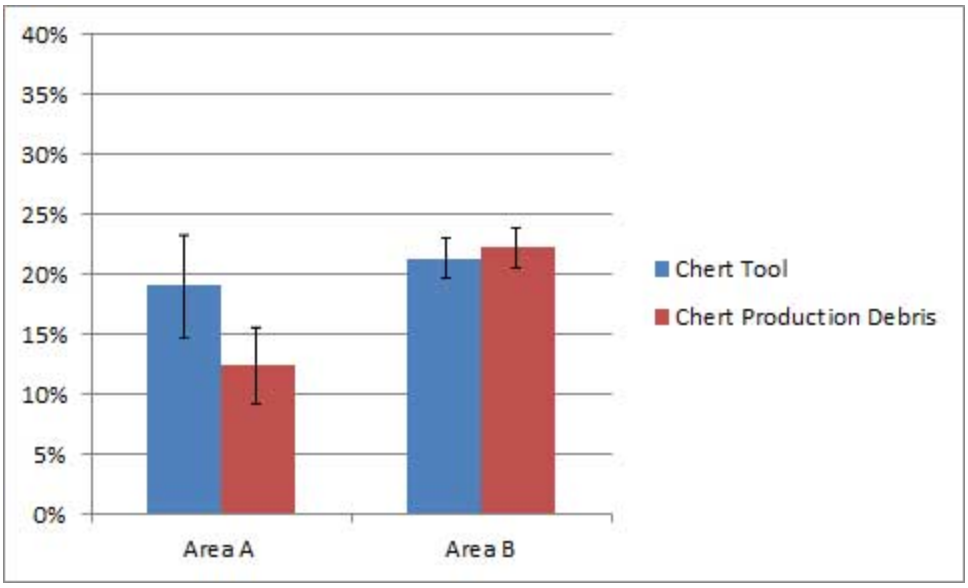

Figure 6.28 Chert production debris by neighborhood as a proportion of all worked stone artifacts (N=1739), by neighborhood. Error bars indicate the 95% confidence level

Table 6.17 Chert production debris by neighborhood as a proportion of all worked stone artifacts (N=1739), by neighborhood at the 95% confidence level

	N	Chert tools	Chert production debris	Other
Area A	335	19.1% ± 4.3%	12.5% ± 3.6%	68.4% ± 5.0%
Area B	791	21.3% ± 2.9%	22.3% ± 2.9%	56.5% ± 3.5%

This difference suggests that production of chert tools was more widespread Area B than in Area A (Table 6.17), likely by a number of part-time specialists who produced chert tools for daily use. This finding dovetails neatly with our finding of relatively greater use of obsidian cutting implements in Area B as compared to Area A.

Chert artifacts recovered from house groups in our sample are more likely to be early stage as the sequence progresses: Proportionally more Early Classic chert tools have no cortex present (76.6% ± 9.6% of chert tools identified in Early Classic contexts, at the 95% confidence level) as compared to primary or secondary flakes (23.4% ± 9.6% of chert tools identified in

Early Classic contexts, at the 95% confidence level) than those recovered in Middle Classic contexts (57.3% ± 8.2% and 42.7% ± 8.2% of chert tools identified in Middle Classic contexts, respectively, at the 95% confidence level) and Late Classic (49.8% ± 6.8% and 50.2% ± 6.8% at the 95% confidence level) contexts (Figure 6.29). In the Postclassic, proportions may return to earlier levels, though a small sample size leaves us without statistical support for this conjecture (57.1% ± 18.5% and 42.9% ±18.5% at the 95% confidence level).

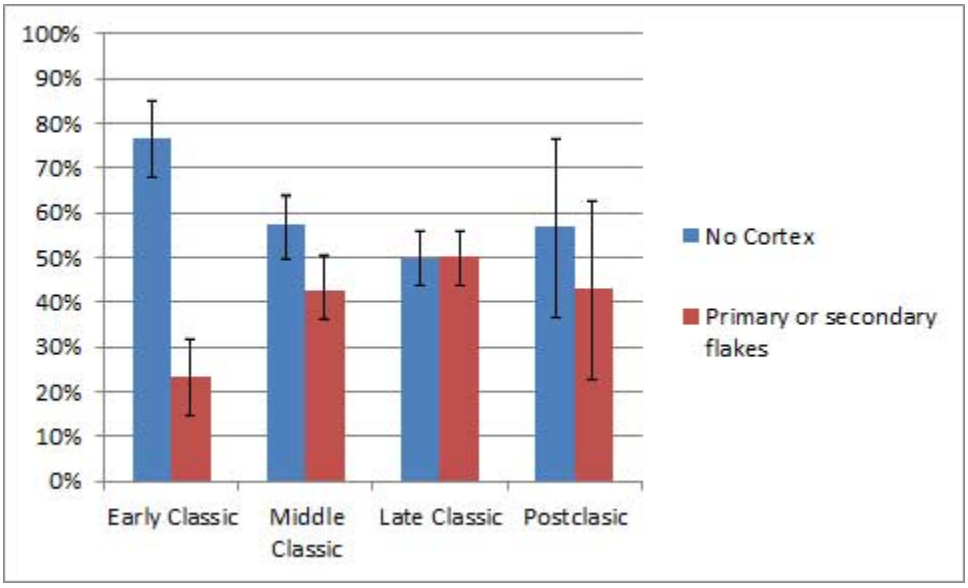

Figure 6.29 Chert flake type as determined by cortex presence. Proportions by period of all worked stone artifacts (N=1739). Error bars indicate the 95% confidence level

Both tertiary flakes and primary or secondary flakes were recovered from nine out of 10 house groups (Table 6.18). Tertiary flakes outnumber primary and secondary flakes in some house groups, including Sites 76, 94, 123, and 149. A higher proportion of primary and secondary flakes than tertiary flakes were recovered at only one site, Site 128, at 69.7% ± 7.1% of flakes recovered from the site at the 95% confidence level (Figure 6.30).

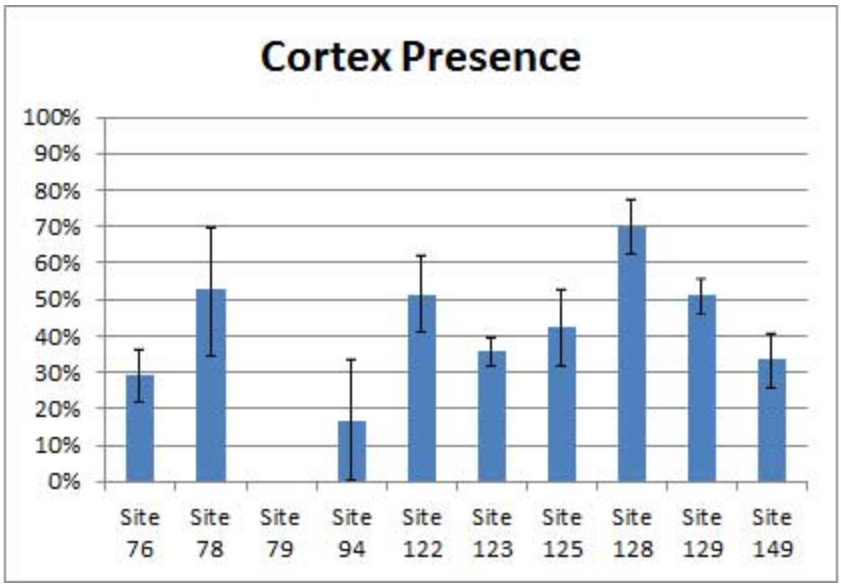

Figure 6.30 Proportion of chert flakes (N=1348) with cortex present a surface, by house group. Error bars represent the 95% confidence level.

Table 6.18 Chert tools by house group as a proportion of all worked stone artifacts (N=1731) at the 95% cl

Site	N	No Cortex Present	<50% Cortical Coverage	>50% Cortical Coverage	100% of Dorsal Surface
76	220	**57.3% ± 6.6%**	11.8% ± 4.3%	4.5% ± 2.8%	7.3% ± 3.5%
78	64	23.4% ± 10.4%	12.5% ± 8.2%	7.8% ± 6.6%	6.3% ± 6.0%
79	7	57.1% ± 37.0%	0	0	0
94	40	37.5% ± 15.2%	5.0% ± 6.8%	2.5% ± 4.9%	0
122	270	14.8% ± 4.3%	8.1% ± 3.3%	5.9% ± 2.8%	1.5% ± 1.5%
123	355	54.1% ± 5.2%	18.0% ± 4.0%	6.2% ± 2.5%	5.6% ± 2.4%
125	99	57.6% ± 9.8%	29.3% ± 9.1%	6.1% ± 4.8%	7.1% ± 5.1%
128	179	**57.9% ± 7.3%**	40.8% ± 7.3%	11.2% ±4.7 %	12.3% ±4.9 %
129	329	47.1% ± 5.4%	29.8% ± 5.0%	11.6% ±3.5 %	8.5% ± 3.0%
149	134	**59.0% ± 8.4%**	14.2% ± 6.0%	7.5% ± 4.5%	8.2% ± 4.7%

At the neighborhood level, it is apparent that a much greater proportion of the Area B worked stone assemblage comprises chert production debris, whereas chert artifacts in Area A are more likely to be tertiary flakes (Table 6.19, Figure 6.31).

Table 6.19 Chert tools by neighborhood as a proportion of all worked stone artifacts (N=1731) at the 95% c1

	N	No Cortex Present	<50% Cortical Coverage	>50% Cortical Coverage	100% of Dorsal Surface
Area A	331	48.3% ± 5.4%	10.9% ± 3.4%	4.8% ± 2.3%	6.0% ± 2.6%
Area B	1400	42.4% ± 2.6%	0	**22.3% ± 2.2%**	8.2% ± 1.5%

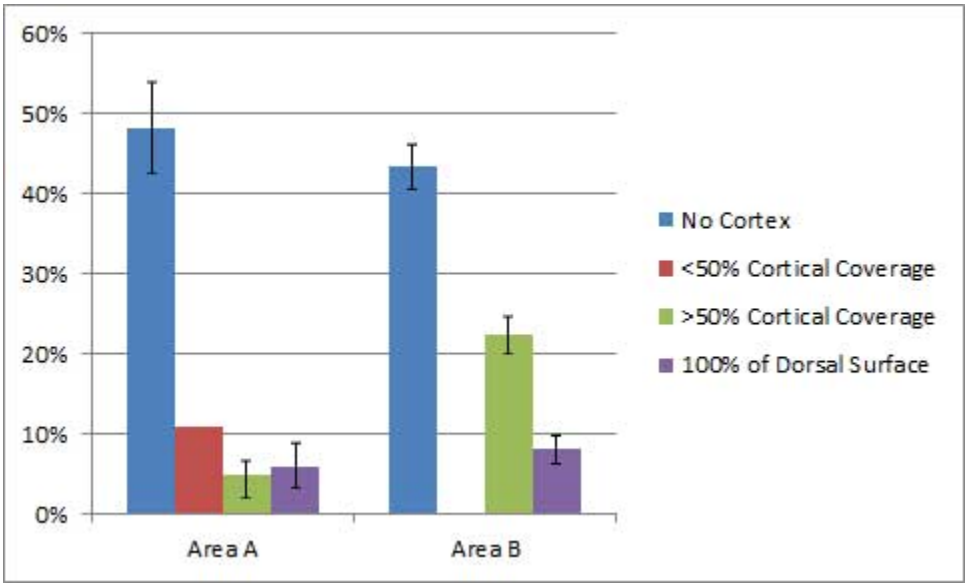

Figure 6.31 Proportion of chert primary, secondary, and tertiary flakes (N=1348), by neighborhood. Error bars represent the 95% confidence level.

That is to say, more production of chert tools took place in Area B than in Area A, in the context of chert consumed. People living in Area A were more commonly acquiring complete chert tools than people living in Area B, where local part-time specialists created a greater proportion of chert flake tools.

Chronologically, the distribution of flake type as determined by cortical coverage is difficult to describe with confidence due to uneven sample sizes (Table 6.20, 6.21).

Table 6.20 Chert cortical coverage as a proportion of all worked stone artifacts (N=1739) for a given period, for Area A (N=232), at the 95% confidence level.

Period	No Cortex	<50%	>50%	100% Dorsal
Early Classic	68.0% ±10.7%	8.0% ±6.2%	4.0% ±4.4%	2.7% ±3.7%
Middle Classic	41.5% ±8.2%	10.6% ±5.1%	3.5% ±3.1%	6.3% ±4.0%
Late Classic	46.2% ±27.4%	0	0	0
Postclassic	0	0	12.5% ±23.2%	0

Table 6.21 Chert cortical coverage as a proportion of all worked stone artifacts (N=1739) for a given period, for Area B (N=1116), at the 95% confidence level.

Period	No Cortex	<50%	>50%	100% Dorsal
Early Classic	50.0% ±24.8%	37.5% ±24.0%	0	6.3% ±12.0%
Middle Classic	28.4% ±9.9%	24.7% ±9.5%	7.4% ±5.8%	7.4% ±5.8%
Late Classic	34.2% ±5.5%	19.3% ±4.5%	11.5% ±3.7%	5.8% ±2.7%
Postclassic	14.5% ±6.6%	7.3% ±4.9%	1.8% ±2.5%	0.9% ±1.8%

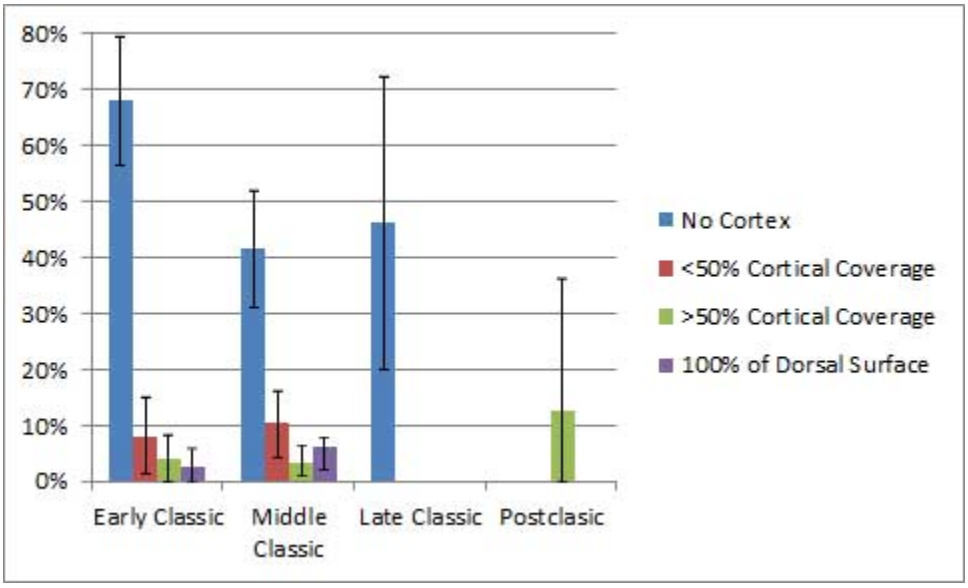

Figure 6.32: Chert cortical coverage as a proportion of all worked stone artifacts (N=1739) for a given period, for Area A (N=232), at the 95% confidence level.

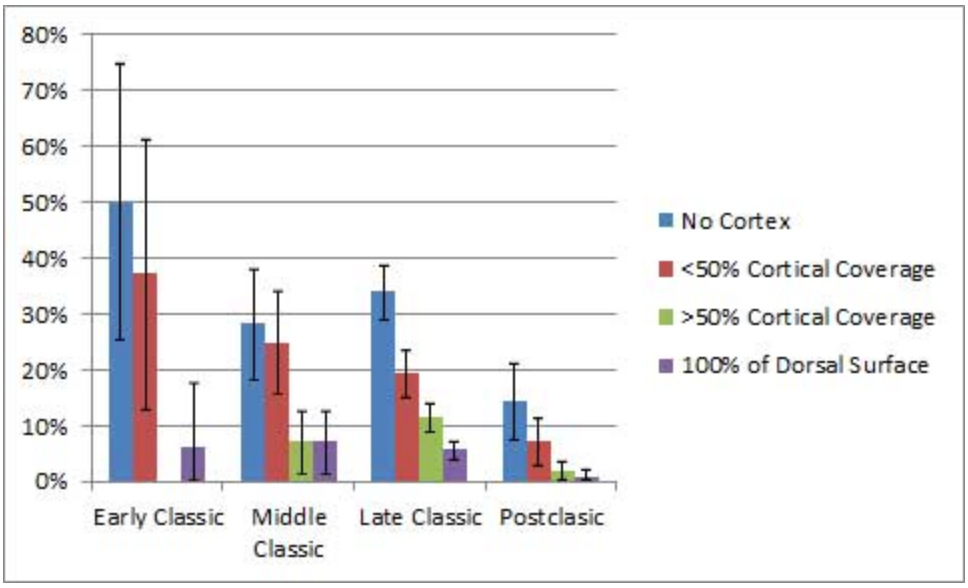

Figure 6.33 Chert cortical coverage as a proportion of all worked stone artifacts (N=1739) for a given period, for Area B (N=1116), at the 95% confidence level.

We can note that in Area A (Figure 6.32) cortex-free flakes decrease as a proportion of chert artifacts from a very high (68.0% ± 10.7% at the 95% cl) in the Early Classic to less than half of chert artifacts (41.5% ± 8.2% at the 95% cl) in the Middle Classic, and that in Area B (Figure 6.33) does not at any point in the sequence present an assemblage which is above 50% tertiary flakes at the 95% confidence level. Chert tools were being produced in Area B more often and in more households than were produced in Area A, where finished tools were received from outside producers.

Platform preparation techniques for chert flake production included abrasion and pecking. A minority of secondary and tertiary platforms were pecked (0.23% ± 0.22% of all stone artifacts recovered); the majority of prepared, non-cortical platforms were abraded (5.4% ± 1.0% of all stone artifacts recovered). All pecked platforms (N=4) dated to the Middle or Late Classic, and all were recovered in the course of excavations in Area B (N=893)—in fact, all four were recovered at Site 122 (N=61 chert artifacts with intact platforms). No chert tools with intact platforms in Area A (N=182 chert artifacts with intact platforms) had pecked platform

preparation. This suggests that multiple producers worked in this Area B workshop, some perhaps visiting from, or after receiving with training from, outside the region.

House groups varied widely across the sequence in the number and nature of chert sources which were utilized for tool production. Though the current research did not undertake to identify the origins of specific sources of chert, chert was both widely available in the region and traded at a distance: a wide variety of chert sources fed the region over the course of its occupation (Johnson 1976; Hirth 2003). As many as twelve different sources of chert are represented in individual household assemblages during a given occupational period (as in the case of Late Classic Site 129), or as few as one. Small sample sizes make diachronic comparison of chert source access for individual house groups or neighborhoods unreliable, but the availability of chert sources for the region as a whole can be examined across the Classic period occupation (Table 6.22, Figure 6.34).

Table 6.22 Chert artifact source as a percentage of all chipped stone artifacts (N=1701) within a given chronological period at the 95% confidence level

Source	N	Early Classic	Middle Classic	Late Classic	Postclassic
A	21	8.7% ± 5.8%	3.1% ± 2.3%	0.6% ± 0.9%	0
B	12	0	1.8% ± 1.8%	1.0% ± 1.1%	0
C	31	2.2% ± 3.0%	0.9% ± 1.2%	2.6% ± 1.8%	0.8% ± 1.6%
D	94	2.2% ± 3.0%	4.4% ± 2.7%	3.6% ± 2.1%	2.5% ± 2.8%
E	306	**17.4% ± 7.8%**	**12.9% ± 4.4%**	9.4% ± 3.3%	**15.3% ± 6.6%**
F	400	**33.7% ± 9.8%**	**21.8% ± 5.5%**	**27.2% ± 5.0%**	1.7% ± 2.4%
G	26	1.1% ± 2.2%	1.3% ± 1.5%	3.6% ± 2.1%	0
H	29	0	0.9% ± 1.2%	1.3% ± 1.3%	0.8% ± 1.6%
I	13	0	0	1.9% ± 1.5%	0
J	114	8.7% ± 5.8%	4.4% ± 2.7%	4.5% ± 2.3%	0
K	76	2.2% ± 3.0%	3.6% ± 2.5%	2.3% ± 1.7%	0.8% ± 1.6%
L	123	5.4% ± 4.7%	0.9% ± 1.2%	7.1% ± 2.9%	1.7% ± 2.4%
Other	450	18.5% ± 1.9%	44.0% ± 2.4%	35.0% ± 2.3%	76.3% ± 2.0%

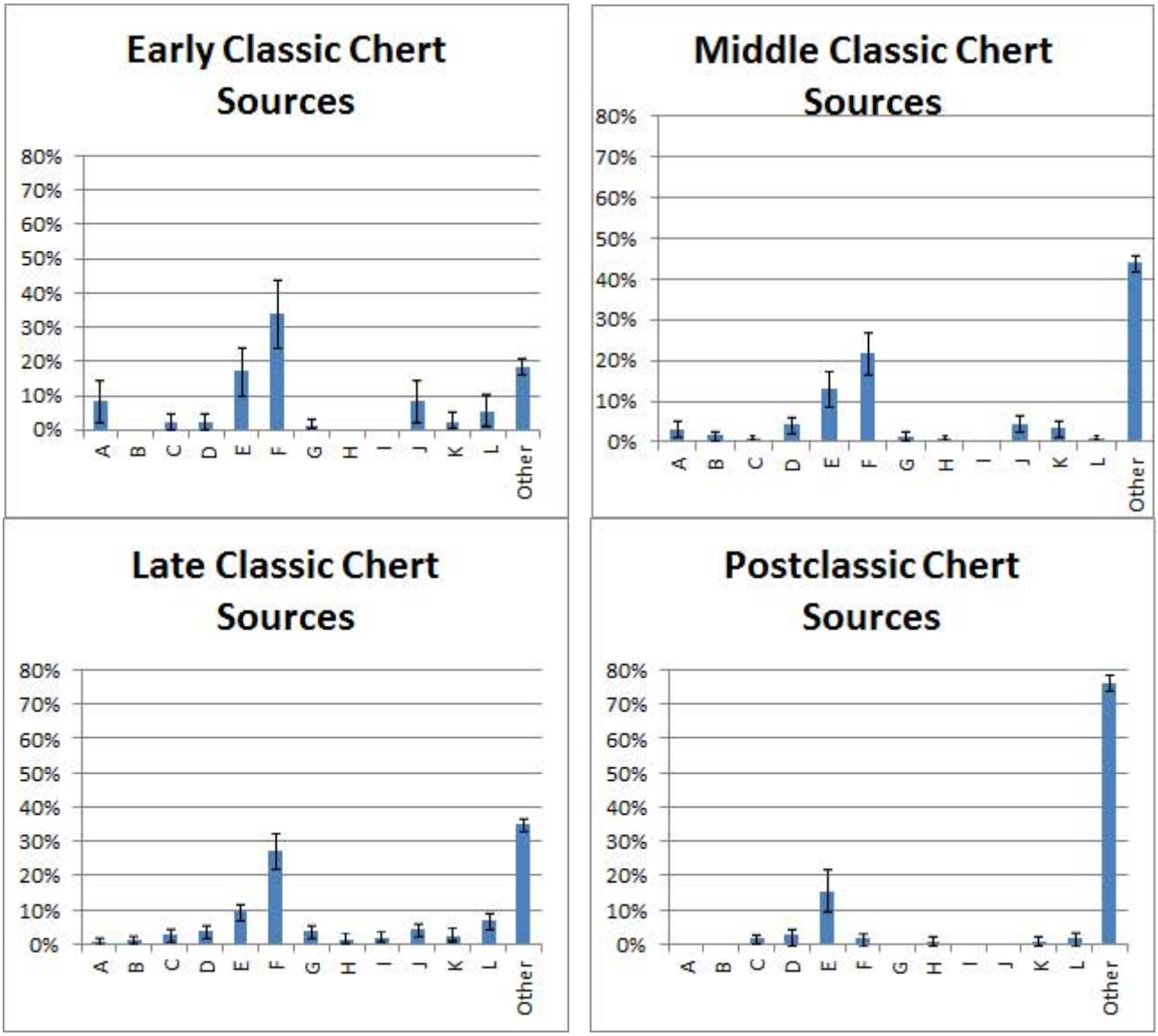

Figure 6.34 Chert source by period as a proportion of all chipped stone artifacts (N=1701). Error bars indicate the 95% confidence level

Despite apparent variation at the household level, small sample size does not allow a statistically sound diachronic comparison across house groups.

6.4 PRODUCTION AND THE NEIGHBORHOOD

Ceramic production in the region took place at the level of the household, with individual households making different choices as to paste and temper preference. Locally available clays and temper materials were used throughout the region, and while reduction firing, a brown paste tradition, and preference for sand temper unify the region, individual house groups often utilized other locally available materials or incorporated exotic volcanic temper material. Ceramic production, therefore, took place consistently across the region and the current research indicates that people in households across Areas A and B were making different choices about paste recipes, the inclusion of various tempering agents, vessel forms, and style. These characteristics do not vary at the level of the neighborhood.

Trends in style do differ at the level of the neighborhood with regard to other characteristics: ollas produced in Area A and Area B exhibited different use of volcanic ash as a tempering agent, different degrees of rim eversion, and different rim widths. These differences may be the result of variable participation in chronological trends or an artifact of the relatively late robust occupation of Area B as compared to Area A. Alternatively, inhabitants of Area A may have engaged more with the stylistic trends best exemplified in dynastic capital which had less of an appeal to the people living in Area B.

The production of chipped stone tools tells the story of a complex political economy. Obsidian became more prominent as a proportion of worked stone artifacts in each house group over time and in each neighborhood over time. In Area A, obsidian production debris makes up a consistently low proportion of worked stone artifacts throughout the sequence. Exceptionally made (longer and evenly proportioned) blades are much more prevalent in this area. In Area B, on the other hand, obsidian production debris is much more common, and becomes increasingly

common over the course of the occupational sequence. This indicates local production of obsidian prismatic blades in Area B, while households in Area A were receiving expertly finished prismatic blades, likely from a full-time specialist.

While obsidian tools became more prevalent over the course of the occupational sequence and chert tools less so, chert tools did remain a consistent component of household assemblages across the region and throughout the occupational sequence. The same major sources of chert supplied households throughout the region, but in Area A, chert tools were more likely to have been received complete, whereas people living in Area B house groups were more likely to produce chert tools themselves.

Use of chert intensifies over time from the Early through the Late Classic as a proportion of the household assemblage. As both obsidian and chert became more widely used, obsidian blades were favored over chert tools, and chert tools were more likely to be expeditious products of part-time specialists arising from moments of need. This was particularly the case in Area B, where chert was more widely used.

6.5 PRODUCTION AND EXCHANGE

In light of unifying regional traditions, differences between Area A and Area B in household-level production and in participation in long distance exchange networks are striking. Across both neighborhoods, exotic obsidian for the production of prismatic blades, igneous ground stone tools, fine ceramic wares, and volcanic ash used to temper ceramics made their way into commoner households. As obsidian became more readily available over the occupational sequence, people around the region relied less heavily on chert and consumed more obsidian

prismatic blades. Ceramic producers around the region participated in a trend of decreasing incorporation of volcanic ash into ceramic temper. A brown paste tradition, preference for sand temper, and firing techniques were common to all, as individual house groups participated in a shared practice of ceramic production.

Different neighborhoods, however, had different places in regional and long distance trade networks. Inhabitants of both neighborhoods enjoyed similar access to volcanic ash, fine wares, and ground stone tools made from volcanic minerals. Inhabitants of Area A, five km from the city center, appear to have had greater access to obsidian, and especially to expertly finished obsidian blades, than inhabitants of Area B. This obsidian originated from different sources than that which underwrote the trade relationships of elites in nearby primary and secondary centers, and chemical analysis may one day tell us whether the volcanic ash, fine wares, and ground stone tools similarly represent a distinct set of trade relationships in the hinterland.

During the first part of the Early Classic, elites in exporting areas likely exercised more control over obsidian exchange, while in the latter part of the Early Classic, elites in importing areas exercised more control over obsidian exchange. (Clark and Lee 2007) Obsidian blade producers local to the region procured quantities of material from Guatemala, primarily El Chayal during the Early Classic and then from El Chayal and San Martín Jilotepeque through the Middle and Late Classic periods. This is consistent with what we currently know about Kaminaljuyú control and commercial trade of material from these two sources during the Early Classic.

In Area A, production of obsidian blades took place at a regional center or specialized workshop: obsidian blades appear to be expertly made, and there is little evidence of production on the level of the household throughout the sequence. Obsidian blades procured for household

use were regular, consistently made, and lightly utilized for a wide variety of tasks. Sites in Area B, on the other hand, relied heavily on local, decentralized production of prismatic blades. With raw material originating from the same obsidian distribution and procurement system as blades consumed in Area A, the pattern of procurement in Area B mirrors that evidenced in Area A but lags by some period of time. Introduction of exotic material from central Mexico, for example, does not take place until the Late Classic in Area B, though it occurs during the Middle Classic in Area A. Multiple local workshops or expedient producers in individual house groups, in all probability part-time specialists, produced a steady supply of lesser prismatic blades (irregular, more variable in size, and inefficiently made with usable less edge per volume blade) for household use or local distribution. Expended microcores, failed blades, flakes, and similar debitage show evidence of extensive usewear, which suggests a more restricted access to new blades and cores as well as an expanded access to production debris.

Exotic temper is similarly represented across the region, but is in wider use in Area A and was adopted later in the sequence in Area B. Long distance trade relationships which provided volcanic ash to the region's hinterland predate the founding of a Maya dynasty at Palenque and were maintained well into the Classic period. This is despite a lack of concurrent parity of practice by potters who supplied the nearby dynastic center. These trade relationships were evidently maintained throughout the Classic period, as evidenced by the continuing use of volcanic ash to temper ceramics. Though the frequency of such use declines over time, the presence of this resource speaks to the maintenance of trade relationships; perhaps the same relationships which provided access to obsidian in the same neighborhoods.

Ceramic production in the region took place at the level of the household, with individual households making different choices as to paste and temper. Locally available clays and temper

materials were used throughout the region, and while reduction firing, a brown paste tradition, and preference for sand temper unify the region, individual house groups often utilized other locally available materials or incorporated exotic volcanic temper material.

A local tradition of tempering ceramics with imported volcanic ash both preceded the founding of a Maya dynasty at Palenque and was maintained in the face of rising power in the region. In both hinterland neighborhoods, ash tempered ceramics remain common even after they have fallen out of use in Palenque's area of densest settlement. A resurgence in the popularity of this tempering agent in the Late Classic dynastic capital is not accompanied by similar renewed emphasis in the hinterland.

Different neighborhoods exhibit distinct trends in ceramic style. Potters of Area A appear to have been influenced somewhat more than those of Area B by the ceramic trends prevailing in central Palenque. While ash was used to temper ceramics in Area A, this practice declines dramatically beginning in the Early Classic, and by late in the Classic period it has dropped to levels similar to those seen in Palenque's core. This suggests participation in the social and political economies dominated by dynastic interests to a greater extent than enjoyed by inhabitants of Area B. Ollas produced in Area A and Area B also exhibit different degrees of rim eversion and different rim widths. These differences may also be the result of variable participation in the stylistic trends of the center; inhabitants of Area A may have engaged more with the stylistic trends best exemplified in the Otulum complex which enjoyed a brief fluorescence in the dynastic capital during the Late Classic than did Area B potters. Further investigation is warranted.

The changing practices of potters which supplied the dynastic core may have influenced potters in some outlying neighborhoods, such as Area A, where use of volcanic ash in ceramic

temper, degree of rim eversion, and rim width more closely resembles practice of those potters. The presence of volcanic ash, grinding stones, obsidian, and imported fine wares in the hinterland support a picture of long distance trade relationships which existed outside of the control of dynastic elites. Rural commoners in neighborhoods around the region were able to negotiate their own economic relationships with far-flung producing territories, likely through intermediaries such as traders who frequented local markets. With less access to expertly made obsidian blades, inhabitants of Area B produced more obsidian and chert tools expeditiously or in local workshops staffed by part-time specialists.

By the Middle Classic, as the population of the city core of Palenque was reaching its peak density, the demands placed on the immediate hinterlands in order to meet the subsistence needs of a dense urban center must have been extensive. Prevalence of exotic goods in greater and more consistent quantities, earlier and over longer portions of the occupational sequence, in Area A, closer to Palenque's core, suggests an elite control of Palenque's hinterland economy which shaped the importation of exotic goods and the distribution of locally produced ceramic and worked stone products. Further, this integration was much more pronounced in house groups closer to the core than in house groups farther from the core: in Area B, the economic practices of neighboring house groups had a greater impact on the procurement of exotic goods, production of ceramics and chipped stone tools, and the consumption of these materials than did the practices of elite central Palenque. This resulted in more household-level production of goods such as obsidian blades and chert tools.

Elite-controlled networks of production and distribution played a lesser role in Area B than in Area A, and this lack of economic integration was met with a parallel lack of stylistic integration. Choices evident in ceramic production, including rim eversion, rim width, and the

use of volcanic ash as a tempering agent, reflect a continuation of local trends which diverge from those of Palenque's core more widely in Area B households than they do in Area A households.

7.0 DOMESTIC RITUAL

The primary aim of the current research was to identify variation in practice as well as political and economic engagement at the household level in the hinterland of Palenque, and to determine whether distinct patterns of affiliation or practice unified some households while distinguishing them from others. To this end, an examination of household attributes related to domestic ritual, including feasting behavior and the cultural use of fossils, can provide additional lines of evidence.

Palenque's monumental core contains an abundance of symbolic sweatbaths, in addition to the two functional sweatbaths that have been identified to date (Child 2007). These were an integral part of Palenque's monumental evocation of caves and water, and in concert with hieroglyphic texts reveal a special focus at Palenque on transformation rites and movement between life's stages (Child 2007). Recently, researchers have discovered the incorporation of fossils into architecture and sacred spaces (Cuevas García and Alvarado Ortega 2012) and explored the diversity and symbolic import of springs and watercourses (Child 2007; French 2007; French, Stuart, and Morales 2006). López Bravo's examination of burials, censers, and figurines appears to be the only in-depth examination of commoner domestic ritual.

7.1 CULTURAL USE OF FOSSILS

Fossils make up a significant proportion of the inclusions in the local soils of northern Chiapas, and unmodified fossils are routinely discarded without examination when they are uncovered in the course of excavations in the region. The natural geological deposition of fossil-bearing soils have been investigated primarily by private interests such as PEMEX, but some information about likely provenience is being gathered by researchers at UNAM and elsewhere (Riquelme et al. 2012). Situated as they were along the last foothills of the sierras, the residents of Palenque had access to materials from a wide range of geological contexts.

Identifiable microfossils, visible to the naked eye as a component of plaster, have been noted during the restoration of various structures in the monumental core of Palenque over the course of the past three decades, primarily in restricted locales such as Pakal's Tomb. These fossils are generally present in the form of lime dust and microaggregates, likely added to plaster to improve strength and adhesion to the composite material. Cuevas García asserts that fossil-bearing materials were intentionally selected and then burned and crushed, and that low temperatures can allow fossils to preserve their recognizable morphological features (Riquelme et al. 2012).

Marine fossils were utilized in a variety of cultural contexts in the area surrounding Palenque during the Classic period. These included metates and other ground stone tools made of fossil-bearing coquina; pendants made from Miocene shells; and sharks' teeth from a variety of species which frequently show signs of usewear (as in Figure 7.1), as in the case of the tooth recovered from Middle Classic contexts at Site 79 and pictured below.

Figure 7.1: Utilized shark's tooth recovered from Site 76

Additionally, unmodified fossils, removed from their original geological provenience, were associated with figurines and ofrendas and in other cultural contexts. The majority of these marine fossils were once shells and shark's teeth, though two instances of fossilized wood were identified across house groups included in the sample.

House groups in both Area A and Area B contained tools made of fossil-bearing coquina. Six house groups presented evidence of the intentional collection of marine fossils, in the form of

individual, well-preserved fossils located in cultural contexts (ecofacts), such as the fossilized shell (Figure 7.2) collected with household debris in Late Classic contexts at Site 76.

Figure 7.2 Unmodified fossil recovered from Late Classic cultural context in Area A

Every descolador (a tool for preparing the riverine jute snail for consumption*;* N=11), as well as half of metates (N=6) recovered across the region were made of coquina. Coquina tools including descoladores (such as the descolador in Figures 7.3 and 7.4, recovered from Site 123) were located in house groups in both neighborhoods.

Figure 7.3 Coquina descolador, top view

Figure 7.4 Coquina descolador, side view

Other ground stone tools in both areas were overwhelmingly made of other materials (76.39% ±11% at the 95% confidence level of worked stone tools which were not descoladores

or metates were made from materials other than coquina); a majority of coquina tools were descoladores, manos, or metates. (Twenty-two tools made of coquina included 14 descoladores or metates, such as the metate in Figure 7.5, recovered from Site 76.)

Figure 7.5 Coquina metate fragment, recovered from a Late Classic ofrenda

Eight additional ground stone tools were made of coquina while an additional 50 ground stone tools were made from limestone, quartzite, imported volcanics, or modified stalagtites.) While other grinding and cutting tools were employed in food processing, individuals in Classic Maya commoner house groups around the region chose fossil-bearing material for preparing shellfish (100% of descoladores) and for grinding corn (50% of metates).

Figure 7.6 Drilled fossil pendants

These include drilled fossilized shell pendants (as in Figure 7.6) in two of the four house groups, sharks teeth in each house group (all with usewear), and sharks teeth and several fossils in an ofrenda (Figure 7.8) which also contained a shell bead (Figure 7.7), broken metate, and figurine fragments located in Late Classic strata at Site 76.

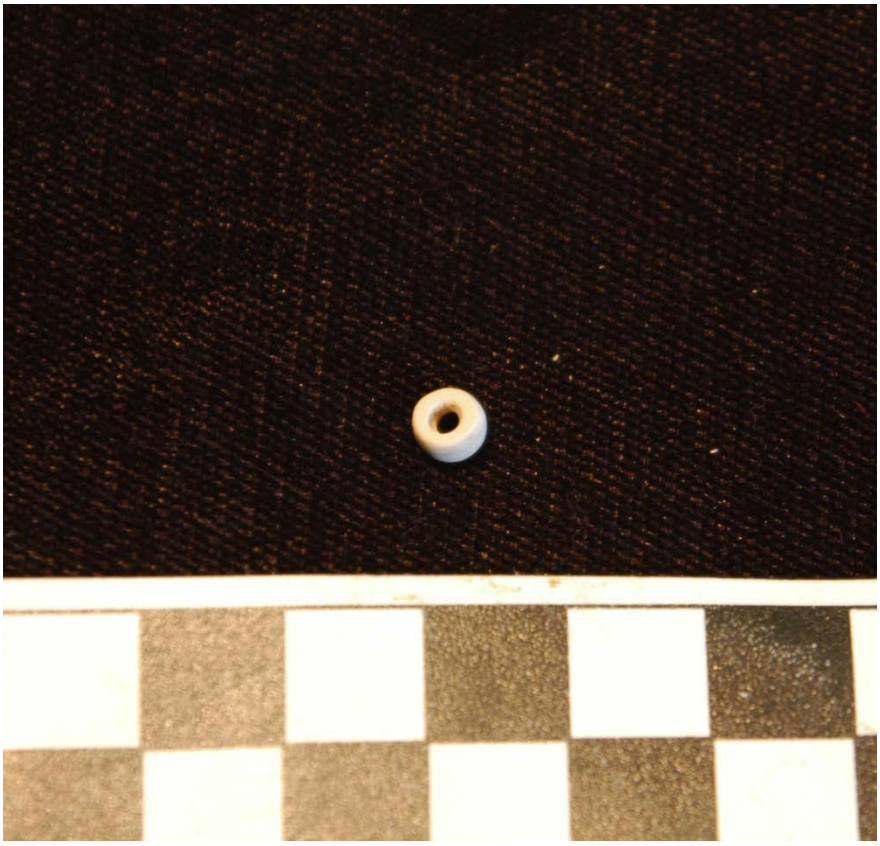

Figure 7.7 Shell bead recovered from a Late Classic ofrenda

This ofrenda contained a broken figurine, a broken metate made of fossil-bearing coquina, fossilized wood (Figures 7.9 and 7.10), and a shark's tooth.

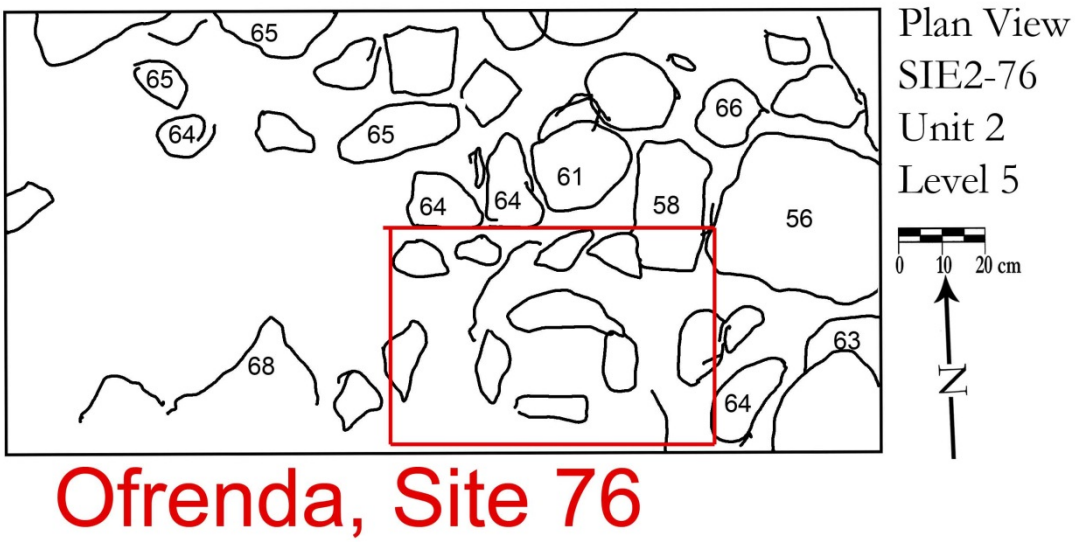

Figure 7.8 Context for a Late Classic ofrenda, located in an E-group patio

Figure 7.9 Fossilized wood, recovered from a Late Classic ofrenda

Figure 7.10 Fossilized wood recovered from a Late Classic ofrenda

In two Area A house groups, unmodified fossilized shells were found in association with figurines. Metates made of coquina were identified in two of the four house groups, and descoladores made of coquina in all four. In Area B, unmodified fossilized shells were found in two house groups. Coquina descoladores were located in three of five house groups and a coquina metate in one.

Utilized fossils and worked coquina were recovered in a wider variety of Area A contexts than those recovered in Area B, particularly during the later part of the Late Classic. One house group in Area A was expanded during the Middle Classic to include a structure on an artificially leveled hilltop, located immediately northwest of previously extant structures. The platform for

this new construction was prepared with the extensive use of fossilized mollusks. The feature contained only one morphological type, *Crassostrea* (Figure 7.11), and seemed to generally constitute large, relatively complete specimens with no evidence of cultural modification: the fossils were intentionally selected and transported to this location.

Figure 7.11: *Crassostrea* fill recovered from Middle Classic platform construction

The *Crassostrea* were not part of a native fossil bed but had rather been spatially displaced. Their distribution indicated that they had been used to level the hillside and expand the area suitable for construction, forming a platform packed on all sides with a thin layer of tightly packed dirt and covered with a plaster floor. A structure was maintained on this platform throughout the Middle and Late Classic.

7.1.1 Neighborhoods and the Meaning of Fossils

In Area A, marine fossils were located in a wide variety of domestic contexts. Every house group presented instances of marine fossils, and in each house group these fossils were found in different contexts. Some were used for personal adornment (e.g. drilled fossilized shell pendants), others located in ritual contexts (e.g. a shark's tooth in an ofrenda), and even in architectural elements (e.g. as platform fill). In Area A, fossils are not found in contexts which suggest daily or utilitarian use of fossils, but rather deposition as part of a single event or use in special contexts. In Area B marine fossils were located in a majority of house groups as well, but in strikingly different contexts. People living in Area B chose to incorporate fossils or fossil-bearing stone into utilitarian contexts and daily practice, as best evidenced by the coquina metates and other food processing equipment recovered from this neighborhood.

7.2 JUTE SNAIL CONSUMPTION

All house groups were located within 1.5km of the Chacamax River, which today is a source of the river snails locally known as *xute* and consumed seasonally with gusto. *Pachychilus indiorum*

are generally found in river shallows and arroyos with moderate to rapid currents. Historically, 5,055 examples of these snails have been recovered from archaeological contexts, 500 of which were recovered from Palenque (Velázquez Castro and Lowe 2007). Jute snail shells were recovered from cultural contexts in six out of ten house groups: Sites 76, 78, 79, 94, 122, and 123. The majority of jute snail remains, at 2,207 shell fragments (MNI 2,203) of a total 3,196 (MNI 3,098) were recovered from contexts which could not be associated with a specific chronological period (Table 7.1). No jute shell fragments were recovered from any Area B house group's Early Classic contexts, though 117 shell bodies (as in Figure 7.12), 36 points (as in Figure 7.13), and 24 unmodified (complete) jute shells were recovered from Area A Early Classic contexts. Middle classic contexts return shells from both areas, though Area A appears to be consuming the snails in greater quantities than Area B. During the Late Classic, Area B overtakes Area A in jute snail consumption, and only Area B Postclassic contexts returned any jute shell remains at all.

Table 7.1 Jute snail MNI, in contexts which could be fixed to chronological periods.

		Points (N)	**Bodies (N)**	**Complete (N)**	**MNI**
Early Classic	Area A	36	117	24	141
	Area B	0	0	0	0
Middle Classic	Area A	57	299	81	380
	Area B	1	173	9	182
Late Classic	Area A	0	19	3	22
	Area B	0	135	7	142
Postclassic	Area A	0	0	0	0
	Area B	0	16	0	16

The deposition of jute shells, however, differs somewhat from one area to the other. In Area A, shells are rarely contained in a single cache; these remains are scattered throughout the

depositional context with other recovered artifacts. Points are found as well as bodies in all four house groups (Sites 76, 78, 79 and 94). In Area B, however, shell bodies are deposited separately from points; in fact, points were rarely found in the course of excavation, even in the case of a single deposit of over 1000 individuals, only ten points were in evidence. Shell bodies were also much more likely to be deposited in large quantities in Area B than in Area A, where the largest single deposition of snail shells represents a MNI of 156 (Table 7.2).

Table 7.2 Jute snail variance in deposition between neighborhoods.

	N Jute Snail Features	5% Trimmed Mean MNI per deposition	Variance in MNI per deposition	Standard Deviation of MNI per deposition	Proportion of points (out of all jute artifacts at the 95% cl)
Area A	107	4.51	31.24	5.59	20.89% ±3.5%
Area B	58	40.84	2,496.70	49.97	0.2% ±0.2%

Figure 7.12 Jute snail shell bodies after processing

Figure 7.13 Jute snail shell points after processing

These disparities indicate a very different pattern of jute snail consumption in each of the two neighborhoods. In Area A, consumption was a more casual affair, with preparation and consumption taking place near one another and smaller quantities of snails consumed more frequently than in Area B, where large quantities were infrequently prepared and then transported for consumption.

The difference here suggests that Area A had more in common with secondary centers such as El Lacandón, where feasting did not take place to a great extent in commoner households, but that the residents of Area B, farther removed not only from the administrative center of Palenque but also the administrative eye of the secondary center, appropriated these rituals and reimagined them in the domestic context with their own spin. These were not (or, at least, not only) the delicacies associated with elite feasts in El Lacandón such as deer and tamales, but the humble jute snail which could be collected from nearby watercourses.

It is worth noting that snails were used as a food, but that their shells were also used in both nixtamalization and the production of plaster in other Classic Maya contexts. Future research examining plaster recovered from house group floors as well as metate residue would be instructive. Finally, a recent survey of all snail remains recovered in the process of regional archaeological study identified only 500 instances of *Pachychilus indorium* in Palenque's archaeological record (Velázquez Castro and Lowe 2007), all from the city center. The current study recovered more than six times that quantity in a relatively constrained programme of excavation. The question of whether the jute snail constitutes a food resource consumed primarily by commoners and eschewed by the elite, or whether shells of consumed snails were repurposed or disposed of differently in elite contexts than they were in commoner contexts, additionally warrants further investigation.

7.3 CULTURAL VARIATION AND THE NEIGHBORHOOD

People living in house groups on the outskirts of Palenque, both near to and far from the city center, collected, transported, and utilized fossils and fossil-bearing materials available in the region. These same people collected, processed, and ate shellfish. Both sets of practices vary notably from Area A to Area B.

Palenque was defined and designed in relation to its water: its springs and streams, sweatbaths and caves, aqueducts and streams, channeled fields and floodplains. Palenque met the challenges of settlement on a spring-covered mountainside with incredible ingenuity, building an extensive system of subterranean aqueducts and reservoirs, a pressurized water system, and a number of sophisticated water management systems which, as Kirk French (2007) points out, are still intact and functioning after more than 1200 rainy seasons.

Water and waterworks were central to the structure, ritual, and identity of Palenque. Watery origins and a marine underworld figure regularly in Maya cosmology (Sharer and Traxler 2006). Fossilized marine fauna and iconography are in evidence in a wide variety of architectural contexts in the core of Palenque, especially in restricted-access or completely sealed locations (Riquelme et al. 2012). The aqueduct which runs closest to the Palace famously contains an illustration of a crocodile; the great slab which makes up the altar in the Tower is a fossil-rich coquina; and the marine fossils present and visibly identifiable in plaster which lines other restricted-access, ritually significant locations such as the interior of Pakal's tomb would seem to be part of this same symbolic complex. Marine imagery had a special significance, and marine fossils fit neatly into this context.

Given the abundance of ritually significant water-related imagery in the core of Palenque in both utilitarian and ritual or restricted contexts, as well as the presence of fossils in specific

utilitarian and ritual contexts in the hinterlands, it is clear that commoners attached some special significance to marine fossils. This significance is particularly evident in the context of riverine food preparation and in domestic ritual contexts, and is particularly notable during the Late Classic, a time when marine fossils were being incorporated into monumental architecture and ritually significant contexts in the densely settled city core. People living in the region throughout the occupational sequence selected, collected, and transported fossils, using them in utilitarian as well as ritual and decorative contexts, and incorporating them into construction—for example, "submerging" them beneath structures, as in the use of *Crassostrea* in the construction of the domestic platform located at Site 79.

The utilitarian contexts in which we find fossils are particularly interesting: that sharks' teeth were used for cutting when obsidian blades and chert tools abound at these sites, that a larger percentage of manos and metates were made of coquina than other worked stone tool classes, and that virtually all descoladores, used to prepare modern shellfish for consumption, were made from the same fossil-bearing stone: these were active choices on the part of local inhabitants. No function-driven motivation for this choice of coquina over other materials for grinding corn or cutting jute shells has been identified, and it seems very likely that the material was chosen at least in part for its symbolic load. Ritually significant material was selected for use in ritually significant utilitarian contexts such preparing corn and jute. The incorporation of marine fossils was one way of embedding references to the sacred in mundane tasks which played a role in daily life.

In Palenque's city center, fossils were incorporated into the art, architecture, and religious life of the city, in ways publicly visible as well as in restricted contexts. A residue and wear analysis on the sharks' teeth recovered in the course of Proyecto Variacion Cultural in la Region

de Palenque will have to wait for future field seasons, as will submission of plaster samples from commoner house groups around the region for chemical testing with the aim of determining whether a significant proportion of the lime used in its preparation came from fossil-bearing stone or from crushed fossils. It is clear, however, that people living outside of the city center expended energy on the collection and transport of fossils and incorporated them into their daily lives, in ways that varied from one area of the city to another: people living in house groups located in closer proximity to the core or Palenque made more extensive and earlier use of fossils in ritual contexts than those living further afield.

In Area A, we not only find metates and descoladores made from coquina, we also find utilized sharks' teeth, decorative objects made from modified marine fossils, and unmodified marine fossils in ritual contexts, as well as in architectural construction. In Area B coquina tools were particularly important in the context of food production, though a small number of unmodified fossils were found in other cultural contexts as well. Fossils were used earlier in the sequence and in a wider variety of ritual contexts in Area A, closer to the city center of Palenque, than they were in Area B.

In Area B, river resources were consumed differently than they were in the city center or in Area A, as well: jute snails were consumed prepared at a distance from their locus of consumption, and consumed in quantity. This is in stark contrast to the more casual way in which the remains of preparation and consumption are located near one another, and the more numerous depositions containing smaller quantities of jute indicate less communal consumption of this resource in Area A.

Those house groups situated closest to the city's core manifest one complex of cultural characteristics, while those house groups located a few hours' walk farther from the center

manifest a distinct set of characteristics. Despite sharing a broad cultural affiliation and integration with the political, religious, and economic center of Palenque, two neighborhoods are distinguishable in the ways that they interact with regional exchange, the production and use of tools in the household, in the role of watery symbols in their homes, and in their foodways.

Areas A and B show differences in their cultural affiliation with Palenque's city core: those in Area A, closer to the economic, political, and religious center, were more tightly wound into the economic system centered there and the symbolic system manifested there. Differences between these neighborhoods can be viewed through the lens of differential involvement in a regional trade network affecting procurement and consumption of lithic, obsidian, and ground stone artifacts in commoner households along the Chacamax River, and also by differential use of marine fossils in the context of domestic ritual, food production, personal ornaments, and architecture.

8.0 CONCLUSIONS

The settlements described here sit firmly within the political territory of Palenque (Culbert 1991; Liendo Stuardo 2007; Marcus 1976, 1993), and Palenque's dense urban core was supported by settlement in outlying neighborhoods (Barnhart 2007). Neighborhoods in the hinterland of Palenque were inextricably intertwined, both with one another and with the primary and secondary centers of the region. This broader context must be considered for an understanding of life within a house group or neighborhood (Fedick 1996). Palenque's outlying neighborhoods did not represent a "homogeneous unitary sociopolitical unit responding in similar ways to strictly top-down mechanisms impinging upon them" (Liendo Stuardo 2007:100), but rather "socially discrete units" (Liendo Stuardo 2007:101) which were integrated in different ways with neighboring house groups, neighborhoods, secondary settlements, and the dynastic polity of Palenque.

Excavations in commoner house groups on the outskirts of the ancient Maya city of Palenque reveal a high degree of complex heterogeneity at the level of the neighborhood. Two clusters of house groups located approximately 15km apart were situated differently in the cultural, economic, political, environmental, urban, and ritual landscapes of the Palenque system. Upon close analysis, these neighborhoods display distinct patterns of engagement with the symbolic system prevalent in the region, stylistic and technical differences in the execution of craft production, differential integration with regional economic systems, and uneven interaction

with political elites. Mesoamerican commoners are often identified as integrated to various degrees with a locally ruling dynasty and the associated political economy and urban center. The research presented here illustrates that such integration may not be as much a matter of degree but of kind, and serves to add a valuable case study to the primary data on ancient urbanism (Marcus and Sabloff 2008), commoners (Lhose and Valdez 2004), and Mesoamerican neighborhoods with which to better reconstruct the ways in which local groups "related to their larger political, economic, and religious contexts" (Smith, Arnauld, and Manzanilla 2012).

While material preservation was insufficient for a discussion of household-level similarities and differences in the context of most artifact classes, the two geographical clusters or neighborhoods within which they were selected do in fact display distinct patterns of craft production and differential engagement with regional economic, political, and symbolic systems. A set of unifying cultural and economic trends which span the region and encompass both neighborhoods played different roles in the lives of people living in Area A than they did in Area B. Some distinctions, such as differences in chipped stone tool production, consumption and exchange, ceramic production and exchange, and the kinds of imported resources used in hinterland households, point to different roles in the political economy of Palenque for the inhabitants of Area A and Area B.

Other distinctions between neighborhoods exemplify selective engagement with larger trends. These differences are visible in the context of domestic ritual, particularly in the use of fossils and fossil-bearing materials and in the processing and consumption of riverine shellfish; in the kinds and quality of imported resources used in these homes; and in the technostylistic choices made by potters whose wares we find in Area A and in Area B.

8.1 DOMESTIC RITUAL IN THE NEIGHBORHOODS

The symbolic importance of water at Palenque cannot be overstated. Watery origins and a marine underworld figure regularly in Maya cosmology (Sharer and Traxler 2006). Fossilized marine fauna and iconography are in evidence in a wide variety of architectural contexts in the core of Palenque, especially in restricted-access or completely sealed locations (Riquelme et al. 2012). Palenque was home to extensive waterworks (French 2002) and an extraordinary number of sweatbaths, often located over natural springs (Child 2007), on an escarpment sculpted by waterfalls and crosscut by rivers and streams. This escarpment faces seasonal flooding and erosion which pose challenges even today. Water and waterworks were central to the structure, ritual, and identity of Palenque.

Given the abundance of ritually significant water-related imagery in the core of Palenque in both utilitarian and ritual or restricted contexts, the Palenque community clearly attached some special significance to marine fossils. In commoner house groups in the hinterland, this significance is particularly evident in the context of the preparation of riverine resources for consumption and in domestic ritual contexts, and is particularly notable during the Late Classic, a time when marine fossils were being incorporated into monumental architecture and ritually significant contexts in the densely settled city core. People living in the region throughout the occupational sequence selected, collected, and transported fossils, using them in utilitarian as well as ritual and decorative contexts, and incorporating them into construction—for example, "submerging" them beneath structures, as in the use of *Crassostrea* in the construction of the domestic platform located at Site 79.

People living in house groups on the outskirts of Palenque, both near to and far from the city center, collected, transported, and utilized fossils and fossil-bearing materials available in

the region. These same people collected, processed, and ate shellfish. Both sets of practices vary notably from Area A to Area B.

In Area A, we find metates and descoladores made from coquina, indicating the use of fossil-bearing stone in the everyday processing of maize and shellfish processing. Fossils were also used in a wide variety of ritual contexts in Area A: we find utilized sharks' teeth, decorative objects made from modified marine fossils, and unmodified marine fossils in ritual contexts as well as in architectural construction throughout the occupational sequence, uses and contexts of these materials which are largely comparable to those in which fossils are found in the ceremonial center of contemporaneous Palenque.

In Area B, coquina tools were primarily created and utilized in the context of food production. Though a small number of unmodified fossils were found in other cultural contexts, the people living in this neighborhood made considerably less use of fossils as ritual objects than did their neighbors to the west. In Area B, river resources were also consumed differently than they were either in the city center or in Area A: Jute snails were prepared in quantity and at a distance from their locus of consumption, and consumed in large numbers. This suggests a level of communal consumption or feasting which is not in evidence in either Area A, where patterns of preparation and consumption suggest a more casual engagement with jute snails. People living in Area A prepared jute snails in small quantities and discarded post-consumption remains near the locus of production. The more numerous depositions containing smaller quantities of jute indicate less communal or ritual consumption of this resource in Area A.

The ritual complex described here implies a symbology shared amongst people living in households in two outlying neighborhoods of Palenque, as well with as their neighbors who lived high above amongst Palenque's elite ceremonial center, most impressive monumental

architecture, and densest settlement. The import of water in the lives and cosmology of the Maya is well-described in the literature. Farmers living along the alluvial banks of a major river and administrators living amongst the sources of dozens of mountain streams shared both a practical need for the control and provisioning of water and an appreciation of water as a symbolic link to the supernatural.

In the urban heart of Palenque, water was controlled through carefully constructed sweatbaths, aqueducts submerged beneath plazas, pools, and extensive hydrology throughout the built landscape. Water-related images were depicted on the walls of monumental architecture and on painted pottery, and were carved into the stone used to build water-related structures. Monumental architecture and ceremonial spaces were built using coquina and other fossils in their construction.

In Area A, a few kilometers to the east, many of these same practices were undertaken by people living in modest commoner households. Marine fossils were gathered and transported to create a watery layer below the foundation of a household. Unmodified fossils were located in domestic caches and sharks' teeth were collected and utilized in a wide variety of contexts. A variety of modified fossils were used for adornment and other purposes. Fossil-bearing stone was utilized in the construction of tools for daily use, such as metates, and for preparation of riverine resources. This ritual complex was in apparent use from the earliest settlement throughout the occupation of the neighborhood.

Farther to the east, in Area B, the use of watery artifacts was more limited. No evidence of fossils incorporated into architecture or caches were recovered, and modified fossils were not in evidence. Unmodified fossils had been transported as ecofacts to the area, but were otherwise absent from the kinds of ritual contexts apparent in both Palenque's core and in Area A. In this

neighborhood, however, ritual use of fossils and fossil-bearing stone is apparent in the context of food production: All metates and descoladores recovered from the area, and all but one mano de metate, were composed of the fossil-bearing stone while other ground stone tools were frequently made from other materials. These were complemented by another water-related practice which diverges widely from anything seen in the urban core or in Area A: the ritual preparation and communal consumption of jute snails. The grinding of maize with fossil-bearing tools represents a daily interaction with the watery supernatural, and the processing of jute snails for communal feasts with fossil-bearing tools places these contemporaneous riverine resources in juxtaposition with their fossilized counterparts.

Despite a shared symbology and cosmology, ritual use of water-related materials varied across this landscape. In the sacred spaces reserved for elite performance in plazas and temples high above the plains, fossilized water flora and fauna were incorporated into materials for construction, water creatures were depicted in art and iconography, and water itself was controlled in ways both practical and deeply symbolic. In the hinterland, both neighborhoods studied here made use of riverine resources for consumption of mollusks in addition to agricultural production, but to different extents and in different manners: Commoners living in the Area A neighborhood consumed jute snails casually and irregularly, while commoners living in Area B consumed the same resource in periodic feasts. People living in each neighborhood interacted differently with the symbolic load of marine fossils, but to different extents and in different manners: Commoners living in Area A used marine fossils in a variety of ways which closely resemble those exhibited in the city center: in construction, in ritual caches, in adornment. Commoners living in Area B used marine fossils in fewer ways and in ways which were not set apart for special practice: in this neighborhood, unmodified ecofacts join marine

fossils which were incorporated into the ritual consumption of riverine resources and the daily production and consumption of maize. The watery supernatural was ever-present not in the built environment, but rather in the natural environment and the nourishment of human bodies.

There are two broad avenues by which inhabitants of Area B could have arrived at their distinctive complex of cuisine and domestic ritual around consumption of water creatures in the household. In one, commoners in these hinterland households saw the great tradition of the center. The water creatures in imagery and dedication caches, in construction of monumental architecture, and in elite adornment made an impression on hinterland commoners, who did not mirror those rituals but instead selectively appropriated elements such as the use of fossil-bearing stone. These were incorporated into new rituals, meaningful to these hinterland innovators in new ways, differently altered and incorporated into the practice of each of our two hinterland neighborhoods. While the people of Area A utilized fossils in ways which were more aligned with the ritual of the center, the people of Area B either did not have as clear a vantage point from which to imitate or they chose different ways in which to incorporate these symbols into their daily practice.

The other path is not one of appropriation and innovation, but rather of conservative practice. The use of riverine resources including snails in feasting, as well as the use of fossil-bearing stone in the processing of corn and snails, may be practices that extend backwards in Area B to a time before the use of fossil-bearing stone was used by elites in the urban heart of Palenque. These could be local practices which were later appropriated and altered for elite consumption in the construction and dedication of monumental architecture and ritual, while simultaneously being maintained to varying degrees by the inhabitants of hinterland house groups.

If we consider the possibility that these practices predate or otherwise exist independently of the Maya dynasty at Palenque, we recognize that they might also be practices which originated with people living far from Palenque, introduced by immigrants or visitors to the region's hinterland neighborhoods and adopted locally.

8.2 DOMESTIC RITUAL IN CONTEXT

Domestic ritual is nuanced and complex; commoners in the hinterlands did not merely perform a "diminutive replica of the great dramas that unfolded on the pyramids" (McAnany 2002:117). Domestic practices can be viewed as active ritual performances, which can illuminate cosmology as a facet of household studies. The rituals described here incorporated a symbolic lexicon in the form of fossils and riverine fauna, and literally consumed them in the context of daily life. Marine fossils were used in the construction of domestic spaces (as in the foundation on which a house platform sits) and in the most pedestrian of daily chores (such as the preparation of maize for consumption), lending elements of the sacred to these profane tasks. These are not the typical repetitive performances set apart from daily quotidian activities, but instead are embedded in deeply quotidian experience: these spaces and activities were as fundamental to daily life in the Classic period Palenque hinterland as sweeping was in conquest-era Tenochtitlan. Focusing on domestic ritual as an active performance of relationships— to both the watery sacred and to the urban heart of Palenque—provides us with a new view of commoner identity, and a new class of materials with which to interrogate these relationships. People living in the nearby hinterlands used symbols parallel to those of elites in the monumental center, both in constructing and dedicating their homes and also in adornment. People living in the far-flung

hinterlands used symbols parallel to those of elites in the monumental center in their daily life and the most common of everyday activities. In this way, commoners in the hinterland of Palenque simultaneously performed their affiliation with the city and with the sacred, and elites in the center performed their affiliation with the people of the broader region in the most sacred of contexts.

8.3 PRODUCTION AND EXCHANGE IN CONTEXT

In the Classic Maya world, production of goods often took place at the level of the household. Surpluses were sometimes produced which were then exchanged locally for other goods, usually in the context of heterarchical interactions with other local households or with specialized vendors in local markets. Household production of this sort usually implied part-time specialization which was secondary to household subsistence activities. Beginning in the Late Preclassic in some locales, workshops staffed by full-time specialists manufactured larger quantities of specific goods. These were often associated with domestic residences, as well, and specialists exchanged the products of their labor in heterarchical and hierarchical interactions locally and across great distances (Sharer and Traxler 2006). Prestige goods are generally thought to have been distributed as part of the political economy, while the utilitarian goods commonly found in domestic settings were thought to have been produced locally and distributed outside of elite control, though (as in the case of obsidian for lowland Maya) they might be crafted from materials which were distributed under elite control. (Sharer and Traxler 2006).

The current research deals with craft production primarily in the context of chipped stone tools and pottery produced by men and women living in commoner households on the outskirts of Palenque. The people living in these neighborhoods also utilized raw materials and finished goods which had been transported across distances large and small, from the jute snails collected along nearby riverbanks to obsidian imported from what is now central Mexico and highland Guatemala.

8.4 PRODUCTION AND EXCHANGE IN THE NEIGHBORHOODS

In house groups across both neighborhoods, obsidian came from the same sources and obsidian blades were used to the same ends. Different households and neighborhoods participated differentially in the exchange network which supplied these materials. Regional elites received obsidian from one set of political allies through a set of long distance relationships (Johnson 1976; López Bravo 2013) and commoner households of Area B received obsidian from another. Area A accessed both networks, and patterns of consumption suggest a deeper involvement with the long distance trade network of elites in regional centers. Both neighborhoods had access to volcanics for ground stone tools, both neighborhoods had access to fine wares, and both participated in a trend of decreasing incorporation of volcanic ash into ceramic temper, a trend in the hinterland which was not shared by the central precincts of Palenque and which was more fully realized in Area B than in Area A.

Locally available clays and temper materials were used throughout the region, and while reduction firing, a brown paste tradition, and preference for sand temper unify the region, local producers utilized other locally available materials or incorporated exotic volcanic temper

material without reference to larger regional trends, with the exception of a stylistic preference for widely flared rims which gradually reduced over time. Both neighborhoods participated in this trend, though Area B again participated to a lesser extent than did Area A.

As obsidian tools became more prevalent over the course of the occupational sequence and chert tools less so, chert tools did remain a consistent component of household assemblages across the region and throughout the occupational sequence. In Area A chert tools were more likely to have been received complete, whereas part-time specialists living in Area B house groups were more likely to produce chert tools themselves.

Production of obsidian blades utilized by people in Area A took place at a regional center or specialized workshop: obsidian blades appear to be expertly made, and there is little evidence of production on the level of the household throughout the sequence. Obsidian blades procured for household use were regular, consistently made, and lightly utilized for a wide variety of tasks. Commoners living in Area B, on the other hand, appear to have relied heavily on local, decentralized production of prismatic blades. Multiple local workshops or expedient producers in individual house groups, in all probability part-time specialists, produced a steady supply of lesser prismatic blades (irregular, more variable in size, and inefficiently made with usable less edge per volume blade) for household use or local distribution. Expended microcores, failed blades, flakes, and similar debitage show evidence of extensive usewear, which suggests a more restricted access to new blades and cores as well as an expanded access to production debris, the result of local production. The pattern evident in Area A more closely matches expectations set forth by López Bravo based on excavations in El Lacandón (2013), in which less elite control of obsidian exchange and production is exerted than was in the city core.

While the same (likely coastal) trade routes were in place throughout the Classic period, they were accessed by people who lived in and around Palenque in widely divergent ways. While elites in primary and secondary centers dominated consumption of obsidian from one source, rural commoners received greater quantities of obsidian from other sources. The presence of material from sources in Areas A and B which are not similarly represented in Palenque and El Lacandón does not support a model in which rural, commoner house groups represent the last station for a long chain, nor a model in which a single specialist was producing obsidian for the area (as in Clark and Lee 2007), nor a system of central place redistribution (as in Johnson 1976).

Previous research had suggested that Late Classic blade production was undertaken by elites at primary centers such as Palenque's core and by elites in some nearby secondary centers, which again distributed obsidian to nearby communities and commoner households. In Late Classic El Lacandón, elite and commoner house groups were making their own chert tools (López Bravo 2013), while the ruling family likely acquired finished tools. Prismatic blade production appears to have been preferentially carried out by elite households, which "organized as household-scale production for their own specific needs" and reserved a proportion of blades for local exchange (López Bravo 2013). It has been assumed that blades produced by El Lacandón elite families "circulated to commoner families in the community and immediate surroundings" (López Bravo 2013:89).

Given this context, we would expect to see little evidence of production in the commoner households in either of the neighborhoods explored in the current study: according to the models put forth by previous research, the people living in these households would have procured blades produced by local elites, either in central Palenque or in secondary centers such as El Lacandón

or Nututún. As a result of restricted availability, we would additionally expect to see fewer blades per household, and for these blades to exhibit signs of extensive use and retouching. The current research presents a different picture of obsidian blade production and use in the hinterland.

House groups in Area A conform to the pattern of distribution predicted by earlier models, in that a dearth of production debris and the presence of regular, consistently made blades indicate production in a specialized workshop and distribution to these house groups. The blades are numerous and lightly utilized for a wide variety of tasks, however, indicating a ready access to these finished goods.

In Area B, a starkly different picture emerges. Production took place in some commoner house groups, apparently undertaken by part-time specialists who distributed surplus goods locally. These blades were not as expertly produced as those in evidence in Area A or in the heart of Palenque, likely a result of the poorer material from which they were crafted, but they were abundant and lightly utilized, indicating ready access to the resource. The data suggest that distribution and production of obsidian blades were not restricted by elites in primary and secondary centers. Elites, particularly in more densely settled areas, may have received better materials or had relationships with traders or merchants which allowed them earlier access to new materials and sources. The production and distribution of blades, however, was organized among commoner house groups in the hinterland just as it was among elite households in the center.

People were procuring obsidian from a variety of locales across Mesoamerica, and these sources are represented across the region. However, commoners in different neighborhoods

engaged with the trade networks which brought obsidian to the region at in different ways from one another, and this engagement changed over the course of the Classic period.

Prevalence of exotic goods in consistent quantities over the course of the occupational sequence in both Area A and Area B suggest that commoners in these hinterland neighborhoods existed at least in some ways outside of the political economy of the Palencano elites who in other contexts restricted access to these exotic goods. Elite machinations did not shape the importation of fine wares or volcanic grinding stones differently in Area A than in Area B. The ready and extensive consumption of obsidian, especially from sources which were not prized by dynastic and other elites in nearby primary and secondary centers, demonstrates a different avenue of acquisition and primary access to exotic goods on the part of hinterland households through markets and traders.

The economic integration of hinterland households into the regional economy evident in Palenque's elite core was much more pronounced in Area A house groups than in Area B house groups. Area A house groups had access to obsidian and other materials from some of the same sources as those living in the central precincts. The people living in Area A similarly had access to finished products such as chert and obsidian blades, and likely to finished pottery as well, through the systems centered in and around the densely settled escarpment. In Area B, however, the economic practices of neighboring house groups had a greater impact on the procurement of exotic goods, production of ceramics and chipped stone tools, and the consumption of these materials than did the practices of central Palenque. This resulted in more household-level production of goods such as obsidian blades and chert tools, as well as more varied methods of production, as evidenced by the adoption by some knappers of pecked and others of abraded platforms for prismatic blade production in Area B. This different relationship also resulted in a

delayed adoption of practices which were evidenced much earlier in Area A households than they were in Area B, including the reduced use of volcanic ash as a tempering agent. Stylistic trends of the core, such as rim width and degree of eversion, held more sway in Area A than in Area B, and the inhabitants of each neighborhood produced or procured pottery appropriate to their differing tastes.

8.5 LIFE IN COMMONER HINTERLAND NEIGHBORHOODS

Life in two commoner neighborhoods in the hinterland of Palenque differed in their integration with cultural, economic, political, environmental, urban, and ritual landscapes. The inhabitants of Area A had greater access to goods produced by full time specialists, more readily utilized resources controlled by elites in the dynastic capital, participated in a ritual system congruent to that exhibited in the urban core of Palenque, and shared stylistic trends with the potters of the center. The inhabitants of Area B engaged in a distinct complex of domestic ritual, engaged differently with the symbolic system of the region, produced chipped stone tools in local workshops and expeditiously instead of relying on outside producers, and had more limited access to resources which were fundamental to elite political economy, such as obsidian. Area B was slower to engage with stylistic trends such as the everted rim, and when the trend was adopted it was not embraced as fully as it was in Area A. The people living in Area B were less affected than those in Area A by practices in the core, and people living in Area A appear to have been less affected by practices in the core than were people living in regional secondary centers such as El Lacandón. Finally, both hinterland neighborhoods had access to a political and social economy which was not obviated by the growing power of the dynasty in Palenque's

monumental center. Though a growing population in the city center has been cited as a catalyst for increasingly hierarchical control over agricultural production in the hinterland (e.g. Liendo Stuardo 2002b), such hierarchical control is not evident in the local production and exchange of chipped stone tools nor in the production and exchange of pottery.

Area A lies in a crook of the Chacamax River, literally in the shadow of Don Juan Mountain, along the banks of the Chacamax as it rushes through the mountain pass onto the northern plains. Near to the beating heart of the city, occasional drums and shouts from the site center would have been audible in the fields and households of Area A, and the light and from fires in central plazas would have been clearly visible high above at night. Nearer still, the elites and monumental architecture of Nututún were within a kilometer of these commoner households, dwarfing the single patio constructions of Area A with extensive residences and plazas. The commoners of Area A tended their fields and raised their children. They lived lives shaped by the same forces which were at work in these larger settlements: they procured materials such as clays and tempers for pottery and chert for the creation of chipped stone tools from the same sources as the people living in the city center. Their obsidian blades came from specialized workshops, and their domestic rituals closely resembled those of the nearby elites: watery markers beneath house platforms and plazas, shells and sea creatures in caches and used for personal adornment. These were special event (deposition of a cache) or one-time expressions (construction of a platform) of the sacred nature of these materials, and materials themselves (fossils and fossil-bearing stone) were extremely similar or were identical to those chosen for similar use in monumental architecture in the city core. They may have taken a bit longer to adopt the styles current in the central precinct or to access exotic materials, but the practices of people living in Area A mirrored those of the people living in the city center.

The people living in Area B tended their fields and raised their children, as well; they procured materials which flowed to the region from the very same sources with which to make their pottery and chipped stone tools. Part-time specialists produced and obsidian blades and pottery for local distribution. People living in these households took longer still to adopt the styles current in the central precinct a couple of hours' walk away; they lived less in the shadow of the Palencano elites, both literally and figuratively. In Area B, people could not hear the sounds or see the smoke and fires of the center, though they were near to the elites and the civic-ceremonial center of El Lacandón, only a few kilometers away. To incorporate the watery sacred into their lives, the people of Area B chose a narrow set of practices, those related to food preparation and consumption, which would have been a daily and visible expression of affinity. The Chacamax River, here wide and rolling eastward between gently sloping banks, fed the channelized fields in which they grew their maize and provided the snails they ate. Both maize and snails were processed using tools shaped from fossil-bearing stone, and snails were consumed in communal feasts.

Differences between these neighborhoods can be viewed through the lens of differential involvement in a regional trade network affecting procurement and consumption of lithic, obsidian, and ground stone artifacts in commoner households along the Chacamax River. However, the fact that different neighborhoods affiliated with distinct imagined communities is visible through a displacement in time of the above commonalities, as well as distinct use of river snails and marine fossils in the context of domestic ritual, food production, personal ornaments, and architecture. This differential engagement with a symbolic system evident in both Palenque's monumental palace and in modest hinterland domestic contexts serves to exemplify the "interplay between royal or imperial ritual and domestic or community ritual"

(McAnany 1998) which contextualizes our understanding of political and economic integration and permits a glimpse of the fine-grained cultural variation which shaped the lives of commoners in ancient Maya hinterlands just as it shapes the lives of ordinary people living in suburbs around the world today. Hinterland commoners were tightly wound into the economic and political machine which was largely managed by elites in the urban core of Palenque. Different neighborhoods experienced this integration differently, yes, but variation from one neighborhood to the next was not limited to these economic and political roles, and was not merely enacted upon them by elites. Commoners living in the hinterland actively engaged in trade relationships which differed in kind and proportion from those of elites in secondary centers and in the urban core. They participated in production at the level of the household and the community, consumed exotic goods which were valued by elites in secondary centers and in the core, and selected materials and foods from their immediate environment which enabled them to actively participate in larger symbolic systems.

While elites may have controlled access to prestige goods in their own neighborhoods, this kind of management did not extend into the hinterlands, even as far as Area A and much less so in Area B. Availability of resources to hinterland communities may have been impacted by the demands of elites in primary or secondary centers, but resources such as obsidian, exotic fine wares, and volcanic materials were still available in both Area A and Area B. Models which assert hierarchical control of long distance trade and by elite households, and highly restricted access to its products in commoner households do not obtain in the Palenque hinterland. Commoners in house groups outside of Palenque had direct access to long distance trade relationships, and did access goods which elsewhere are part of a prestige economy, including

fine wares, obsidian, volcanic ash, and exotic grinding stones, likely through local or regional markets or acquired through heterarchical exchange.

The changing practices of potters which supplied the dynastic core may have influenced potters in some outlying neighborhoods, such as Area A, where use of volcanic ash in ceramic temper some characteristics of vessel form including degree of rim eversion more closely resembles patterns of use by those potters. But trends in the core did not dictate either practice or availability of this resource: volcanic ash remained available to potters in both neighborhoods, and its wide use in the tempering of ceramics represents the greater influence of a local tradition over the practices of the ruling dynasty.

This evidence taken as a whole paints a compelling picture of the existence and maintenance of local traditions and trade relationships which were maintained independent of the dynastic fortunes of Palenque's elites. It is possible that local people living in the region had in place the forerunners of these trade networks and practices before the founding of the Palenque dynasty, and maintained them over the centuries as the polity rose and fell as a major player in Maya politics. Indeed, the proliferation of ceramic styles described by Rands (1987, 2007), coalescing in a brief moment of Maya-like expression and then returning to a cacophany of types, similarly suggests a patchwork of cultural practices, briefly knit together in a flourescent moment of alignment with the Maya world.

As population in the region grew dramatically over the course of the Classic period, it is possible that the inhabitants of the region were drawn from a variety of backgrounds and brought their practices with them when they settled in the region; it is also possible that passing traders and travelers brought their practices with them and shared them with local adopters before themselves moving on. Excavation in hinterland house groups with Preclassic and Early Classic

occupations, and especially excavation in house groups with both time depth and early occupations, may tell future researchers more about the origins of these practices.

Classic Maya Palenque was a dynamic place during a dynamic time. Archaeologists have long noted an extreme proliferation of ceramic types, and we should not be surprised to find a proliferation of cultural expressions. This polity was located at the nexus of trade routes which spanned Mesoamerica, at a time when a number of complex civilizations were interacting politically and economically across long distances.

It is clear that the people in Area B were directly maintaining long-distance trade relationships, which were by definition relationships of social reciprocity. It is also clear that the inhabitants of Area A were not fully engaged with the hierarchically organized economy which emanated from Palenque's central precincts, that they too were able to access a political economy apart from that of Palenque's elites, and they did so in ways qualitatively different than those neighborhoods both in the center of the city and in far flung neighborhoods such as Area B.

Though the extents of Palenque's political territory reached far to the east and south of the city center (Berlin 1956), the economic and cultural implications of this fact for non-elites in hinterland neighborhoods must be reexamined. Trade relationships and persistent local traditions existed apart from the political economy of elite relationships, both within Palenque's central precinct and beyond. The political economy of Palenque's elite seems to have been most in evidence not closer to the core, but within (and perhaps immediately outside of) primary and secondary centers, in and around the homes of the elites, where political relationships were constantly reified through the distribution of trade goods and the centralization of production. Outside of these contexts, the incorporation of hinterland house groups in to Palenque's realm was just one of many factors which influenced access to exotic trade goods, stylistic choices in

the production of ceramic vessels, household ritual, and access to markets, traders, and finished crafts. Indeed, practices in the hinterland may have shaped practices of the elites in the center, as incorporation of fossils and fossil-bearing stones were intentionally utilized in the construction of some of the most spectacular examples of monumental and sacred architecture in Palenque's core. As a Maya dynasty rose to regional recognition at Palenque, elites in the center asserted their affiliation with the local peoples on whom they relied through the incorporation of a symbolic system with long time depth, weaving the patchwork of a "heterogeneous social landscape" (Yaeger and Robin 2004) into the trappings of a powerful Maya state.

Political and economic differences in commoner households were accompanied by differences in household ritual, in food preparation, and in stylistic choices: those aspects of culture frequently identified by archaeologists as revealing affiliation and identity. Each neighborhood context would surely have engendered a local identity and its inhabitants participated in a local social and political economy. Both neighborhoods were part of Palenque's greater urban sphere, both shaping and being shaped by the waxing and waning of dynastic power, the shape of elite political economy, and the ritual practices of the ruling elites. Despite their proximity, each neighborhood had a different developmental trajectory and was situated differently in the political organization of the Palenque polity. The social and economic situation of people living in each neighborhood allowed them to take advantage of some materials and symbols of elite dynastic culture, and to selectively engage with others. This selective engagement may have been a matter of choice, and may have been a matter of inequality, as access to luxury goods such as fine wares or exotic grinding stones does not appear to have been evenly distributed amongst house groups. The distribution of exotic goods across both neighborhoods suggests differential positioning of individual households within the community's

gifting networks that structured allegiances within the polity. Long distance trade in the hinterlands was not mediated by elites or the fashions of the core, but would have been impacted by the fluctuating demands of the many consumers in Palenque and nearby secondary centers. While foodways, domestic ritual, and stylistic choices made by people in hinterland neighborhoods may have been shaped by closely held local traditions or the influence of outsiders arriving in the area, they were also influenced by the choices of people in the urban core.

The existence of traditions and trade networks which preceded the founding of a Maya dynasty at Palenque and were maintained in the context of a Maya fluorescence is apparent. So, too, was the pull of Maya Palenque: the city, after all, was a local organizing principle, a center for political, economic, and religious spectacle. Inhabitants of hinterland neighborhoods may not have visited the bustling core often, or may have visited regularly, but the city surely loomed large on the horizon. This oversized presence was not accompanied by the restrictive economic power so commonly associated with Maya polities. People in Area A and Area B did not need to rely on urban elites for the redistribuition of exotic goods and other resources; they operated independently of that political economy to a high degree. A clear assertion of political unity (Berlin 1956) and a shared set of practices and preferences united the region, however, which surely shaped cultural identity. Given the size of the city and the close proximity of the markets and temples of its dynastic central precinct, we can assume that the presence of the city loomed large in the imagination of the hinterland population. The members of households in Area A may have had a greater interest in signaling solidarity or affiliation with Palenque's elite through domestic ritual which resembled dynastic ritual and ceramics which resembled the fashions of the day. Such an affiliation may have held more sway in the shadow of the monumental core

than it would have an afternoon's trek to the east. Members of the political and religious elite in the core surely had an interest in signaling solidarity or affiliation with the hinterland farmers on whom they relied, which they may have done through incorporation of fossils and fossil-bearing stone into the altars, plasters, and stones of their monumental architecture.

The Classic Maya city of Palenque was composed of a number of communities which had independent local trajectories. The changing political, cultural, economic, and religious practices of one community were influenced by—and, in turn, influenced—the others. The people living in neighborhoods described as Area A and Area B were influenced by potters and practitioners of rituals in the core, but also by hyperlocal traditions. The political economies of these neighborhoods were shaped by the core, and in turn shaped local cultural trends, religious practice, and economic and political relationships.

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