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Edited by John Morris, Jaime Awe, Melissa Badillo, and George Thompson

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Introduction

We sometimes move forward in a scholarly field without spending sufficient time to look back – and this is the case with Maya houses. Small mounded ruins were equated with Maya houses almost from the onset of settlement pattern work in the Yucatan lowlands. Based on the principle of abundance, the ubiquitous mounds were identified as being houses in the Northern lowlands by Edward Thompson in 1886 (Ashmore and Willey 1981:6). Haviland (1982: 121) characterized Maya residential groups (or “plazuela groups”) as follows: “the typical Classic Maya household was made up of not one but from two to five houses – single, small, isolated buildings assumed to have been residences of single nuclear or biological families (Willey 1981:388-389) – arranged around the edges of a small plaza.” Thus, each building in a residential group became equated with a nuclear family and the multiple nuclear families (or extended family) in a residential group formed the unit that is often referred to as the “household.” While the functional discrimination of distinct buildings within a residential group has been attempted (Haviland et al. 1985:79-84), the archaeological resolution is problematic – even though some Maya residential groups have been linked to Jack Goody’s (1958) domestic cycle (Haviland 1988) and some eastern structures have been interpreted as “shrines” (Becker et al. 1999:144; Coe and Haviland 1982:29).

Gordon Willey (1956a, 1956b) first used settlement archaeology in the Maya area to research how people distributed themselves over the landscape. Because of a focus on large-scale mapping and the relationships among settlements within a region (Ashmore 1981; Willey et al. 1965), settlement archaeology easily evolved into considerations of population history where the accumulated data on houses could be used to tabulate and project numbers of people that occupied a Maya site at any given point in time (Culbert and Rice 1990). Although not regional in scope, household archaeology was a logical extension of settlement archaeology and directly incorporated many of settlement archaeology’s data and definitions (Wilk and Ashmore 1988; Wilk and Rathje 1982). Settlement archaeology stressed the relationships of settlements to each other within a region, but it did not usually focus on the household unit itself or on the function of individual structures within residential groups. Household archaeology focused on a Maya residential group (and its multiple structures) as the individual household of a large extended family. In contrast, settlement archaeology centered on the structure itself and viewed all mounds as potential houses, only rarely considering the actual functions of buildings within each residential group. While a certain percentage of remains were always removed from a mapped sample as being “non-residential” or in state of “disuse” for reconstructions of population history (e.g., Rice and Culbert 1990:15-16), this was generally based on a standardized percentage calculation rather than on a detailed consideration of the function of specific buildings or structural forms.
While both fields used the term “house” to mean a formally constructed residence, household archaeology analyzed social context while settlement archaeology was more likely to analyze structure count and density. A “household” was defined as a social unit that “performed some kinds of basic domestic functions” and that was not necessarily based on specific kinship or family units – although these are often assumed; households engaged in “production, consumption, pooling of resources, reproduction, co-residence, and shared ownership,” thus exhibiting “common residence, economic cooperation, and socialization of children” (Ashmore and Wilk 1988:2-3,6). Wilk (1988:138-139, 142) pointed out that both multiple-family households and extended domestic family households commonly occur in modern Yucatec towns and, after looking at archaeological, ethnographic, and ethnohistoric data, he argued that the “non-unilineal multiple-family household seems the best candidate for the normative household of the ancient Maya.”

Thus, both settlement archaeology and household archaeology were focused on the unit of residence in Maya archaeology, but at different scales. Settlement archaeology viewed structures as individual features. Household archaeology focused on structure groups as being an agglomeration of co-located people. To a large degree, then, households were the assumed occupants of residential groups and residential groups were assumed to be composed of a series of houses. But, the formal structural composition of Maya residential groups was never fully tested or defined.

Past archaeological research has demonstrated that Maya residential groups usually contain multiple structures, that they often contain deeply stratified histories, and that they frequently are associated with trash, burials, and other ritual deposits (Becker et al. 1999; Haviland 1981, 1988; Haviland et al. 1985). However, how the structures within these ancient residential groups functioned and were organized is not well understood. Yet, residential groups form one of the primary building blocks for the archaeological interpretation of ancient Maya society and our understanding of these groups is predicated both on general social theory concerning Maya family structure (Haviland 1968; Wilk 1988) and on the archaeological recognition of Maya houses (Haviland 1966; Smith 1962; Wauchoppe 1934).

**Maya Households**

In the Maya area, the household was readily adapted to archaeologically identifiable structural units that were believed to have functioned as residential groups (e.g., Becker 1982:114-115). Yet, determining exactly how many individuals actually lived in an ancient Maya residential group remains difficult, if not impossible, to determine. Each residential group normally contains a series of structures set at roughly the cardinal points around a rectilinear plaza. The number of structures placed around a single plaza varies from one to dozens, and the number of these structures is believed to be indicative of numerical differences in residential group occupants. It has been suggested that larger residential units were occupied by extended families (Willey 1981:388-389) with relatives, offspring, and different generations in the same family unit residing together. Variant archaeological categorizations of these residential groups have focused on their astronomical orientations (Sprajc 2009), their composition and structure emphasis (Ashmore 1981), and on easily visible group alignments (Becker 1982, 2003).

As mapping of Maya sites continued (Carr and Hazard 1961; A. Chase and D. Chase 1987; Folan et al. 2001; Folan et al. 1983; Stuart et al. 1979; Tourtellot 1988), the individual structures that were recorded became the focus for estimating ancient Maya populations. Ethnographic research was used to suggest that the average size of an ancient Maya nuclear family was approximately 5 persons (Haviland 1972) with a normal range of 4 to 10 persons (Rice and Culbert 1990:17-18). A certain proportion of structures were assumed to be abandoned or to have had other functions (for Tikal, Guatemala this was 16% - see Haviland 1970), but the majority of structures were assumed to serve primarily single as family residences with the assumption being that each building represented the residence of a nuclear family (Haviland 1988; Willey 1981). Thus, simple math could be used to develop Maya
population histories for various sites (Culbert and Rice 1990).

Because much of the focus in Maya settlement archaeology was on obtaining sizes and population estimates for ancient Maya sites (for a Caracol example, see A. Chase and D. Chase 1994a), exactly how the residential group was composed and how it functioned were not the foci for most archaeological research efforts. And, when archaeological excavations were undertaken in these residential groups, they yielded several disconcerting elements. First, the plans of residential groups varied and were not fully standardized. Second, activity areas, such as kitchens, were hard to identify. Robin (2003:314) has pointed out that it is also difficult to find debris from activity areas to use in the “spatial, social, and economic analyses” of households because “ancient people often swept floors clean or removed activity debris from buildings” and “outside areas” when residential groups were being abandoned, something the Caracol research confirms. Archaeological data also demonstrated that some buildings in residential groups manifested a clearly ritual function (Becker et al. 1999) and that cosmological principles were sometimes reflected in residential groups (Ashmore 1991).

While attempts were made to correlate Maya residential groups with ethnographically defined domestic cycles (Haviland 1988, following Goody 1958), this exercise revealed other issues. Although ethnographic records described house abandonment after burial (Tozzer 1941:129-131), many ancient structures were not associated with interments and the interments that were recovered in residential units tended to be largely associated with a single building. Additionally, even the recovered burials from extensively excavated residential groups could not possibly have denoted all the inhabitants who had once lived within these groups; at most 10-20% of these ancient inhabitants were represented (D. Chase 1997; D. Chase and A. Chase 2004:140). Thus, while variability could be identified within and among residential groups, what this meant in terms of the organization of broader social units within Maya society remained largely unknown.

### Caracol Archaeological Data

In order to attempt to gain a better understanding of Maya residential groups – and by extension their households – a series of residential groups have been extensively excavated at Caracol. In fact, residential groups (Figure 1) have been one of the focal points for excavation since research began at the site by the Caracol Archaeological Project in 1985. As with other large Maya centers, an initial focus was simply on recording these residential groups and then on gaining some idea of their dating. Toward this end, early research was carried out within the southeastern sector of the site. Residential groups were systematically tested between the site epicenter and the Conchita and Ramonal Termini and along the Conchita Causeway (Jaeger 1987, 1991, 1994). These archaeological data initially served to demonstrate both the importance of eastern mortuary structures within Caracol residential groups (A. Chase and D. Chase 1994b) and their widespread appearance in the Caracol landscape after the successful Tikal star-war in A.D. 562 (A. Chase and D. Chase 1989). Over the course of the Caracol Archaeological Project, excavations within residential groups have continued in the northeast and southwest sectors of the site as well as in varied locations around the site epicenter. Most recently, it has been possible to demonstrate that not only the burials (D. Chase and A. Chase 2004), but also the face caches, found in these residential groups were associated with cyclically-timed rituals carried out by the broader household unit (A. Chase and D. Chase 2013).

Mapping efforts by the Caracol Archaeological Project have physically recorded some 988 residential groups on the ground. LiDAR has revealed the existence of 4,732
elevated residential plazas (A. Chase et al. 2011), consistent with there being some 9,000 residential groups (elevated and non-elevated) within the site of Caracol (A. Chase and D. Chase 1994a). Some 118 of Caracol’s residential groups have had at least minimal below-ground archaeological data recorded for them. In some cases, this data is based on cleaning up after looters inside buildings; in other cases, it may be only the excavation of a single test-pit in a residential group. However, in many cases, a residential group has had one or more of its buildings and plaza areas extensively investigated. Most recently, the project has focused on intensively investigating a series of co-located residential groups in order to ascertain temporal and spatial relationships throughout a Maya neighborhood.

Of the 118 residential groups at Caracol that have seen at least minimal archaeological investigation, approximately 29 of these have had enough archaeological investigation undertaken so that the building forms that occur within these groups can be categorized (Table 1). An additional 6 residential groups, located in the site epicenter and presumably representing very high status occupation, can also have their buildings classified. Thus, comparative statements may be made at Caracol about the physical structure of some 35 residential groups across a broad range of social statuses. These same groups have also produced a wide variety of artifactual remains and special deposits. The spatial and temporal dimensions of these data highlight the great diversity found in Caracol’s households. Developmental reconstructions of idealized physical residential group changes over time are not simple to ascertain: structures were frequently remodeled or removed; platforms were enlarged and raised; and, even the axes and orientations of residential groups could change over time. Thus, the emphasis in the following discussion and examples is on a single time period – the Late Classic Period.

**Epicentral High Status Residential Group: Northeast Acropolis**

The Northeast Acropolis is a high-status architectural complex located immediately east of Caana (Figure 2). Its buildings are placed atop a platform that rises over 4 meters above adjacent plaza areas. Excavations undertaken in 2009 and 2010 demonstrated that there was no formal entry to the latest version of this residential group along its logical southern expanse; instead entry to the complex was made from its southeast and southwest corners. The Northeast Acropolis enjoyed two major periods of occupation, the first during the Early Classic and the second during the Terminal Classic Period. A centrally placed plaza interment showed that the Early Classic residents of this group had ties to the site of Teotihuacan (A. Chase and D. Chase 2011). However, the buildings atop the Northeast Acropolis date almost entirely to the Terminal Classic Period and, with the exception of the northern and eastern structures, rest upon 2.3 m of hard-packed fill that contains Terminal Classic refuse. While burials were placed within the eastern temple during the Terminal Classic Period, this structure was generally in a state of disrepair during this era and much of the substructure appears to have been stone-robbed. Two single-room range buildings with base walls and a series of “u”-shaped benches bounded the southern side of the plaza. A large raised two-tier platform that likely supported a perishable structure defined the western extent of the plaza. And an elongated, nine-room stone-walled palace, Structure B33, surmounted the earlier constructed northern substructure. All three of its central rear components and the one excavated transverse component contained raised benches, possibly sleeping areas. While the remains of a pyrite mirror were found in the rear and front rooms of Structure B33, there is no indication that any artifactual materials were manufactured in the Northeast Acropolis. There is also no indication of a kitchen in this group, although a burner or “stove” was recovered in the northern palace.

**Machete Plateau High Status Residential Group: Dos Aguadas**

Dos Aguadas is a high status residential group that anchors the northeastern side of the Machete Plateau (Figure 2). One large constructed reservoir is attached to the southeast side of the group and another smaller one is immediately to the group’s west. Dos Aguadas was mapped in 1986 and archaeologically
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investigated in 2012 as part of our efforts to examine a Maya neighborhood. All four of the mapped structures in Dos Aguadas were axially trenched to bedrock and all were found to have once supported stone buildings. The western interior of the northern building was also areally cleared, showing the structure to be a well-constructed range building with stone base-walls, three doorways, and two or three interconnected rooms containing benches. Long tandem room buildings with stone base-walls and benches were located on the western and southern substructures. The eastern building also supported a tandem room building that once may have been vaulted; the axial trench through that building revealed a series of caches, including one with a large amount of marine material, as well as a large tomb with an entryway that contained at least 10 individuals, 26 ceramic vessels, and smaller artifacts that included jadeite. An additional line-of-stone construction, located while raking the interior of the Dos Aguadas plaza, was also areally excavated and is thought to represent a potential kitchen. While all four trenches revealed evidence of earlier constructions, nothing at Dos Aguadas appears to have predated the Late Classic Period.

**Machete Plateau Middle Status Residential Group: Zumba**

Zumba was another residential group examined within the Machete Plateau neighborhood (Figure 2). Its structures were set on a 2 m high raised platform and all were relatively low except for the northern and eastern constructions. Careful clearing of the plaza revealed line-of-stone constructions on some of the low building pads, resulting in an areal excavation on the western side of the plaza that encompassed one of these constructions. These investigations showed that two extensive, but barely raised, stone structures occupied the western and southern sides of the plaza; a jumble of unused building stones had been piled between them. The northern building revealed two tiers of floorings that probably once supported a perishable building; an axial trench recovered deeply buried Late Preclassic building fills. The eastern building did not support any formal construction, but it contained a tomb and was associated with at least 10 caches, all indicative of its ritual use. The tomb contained an admixture of small artifacts including jadeite beads, human bone representing at least 8 individuals, and 40 ceramic vessels dating from the Early Classic to the Terminal Classic Periods. One of the latest vessels in the tomb, a Terminal Classic cylinder, had been placed into a bedrock hole beneath everything else, indicating that all of these materials had been placed in the tomb during the Terminal Classic Period and possibly represent the re-deposition of ritual deposits disturbed through other building efforts (during “urban renewal”). Lower range structures had been placed to either side of both the north and eastern buildings. No kitchen area could be easily located.

**Machete Plateau Low Status Residential Group: Tango**

Tango is located directly north of Zumba and west of Dos Aguadas (Figure 2). This elevated residential group represents a relatively low status household. As mapped in 1986, three low structures surmounted the edges of a broad plaza. A crude line-of-stone construction defined the small northern building. The small eastern structure, although taller, did not exhibit
finished facings. The low southern building was quite sizeable and its crude facings were evident on the surface after raking. Detailed cleaning of the plaza in 2012 also revealed another line-of-stone building in the center of the plaza; it was areally excavated and yielded Terminal Classic ceramic material; it could represent either a house pad or a kitchen (based on its location). No ritual activity was recovered that pertains to the latest occupation; however, an Early Classic burial was recovered on bedrock below the eastern structure.

Kinds of Structures within Caracol Residential Groups

In the past, almost all structures in a Maya residential group were assumed to represent domiciles (Haviland 1988; Willey 1981:388-389) and there was little differentiation of building function. Ritual buildings located within residential groups, like Structure 2G-59 at Tikal with its 12 burials, were viewed as residences; “the most important members of the household lived in this structure; in an extended family household, this would include the family head” (Haviland 1988:123; 2003:129). Even though auxiliary structures or “outbuildings” were recognized as existing (e.g. Haviland et al. 1985:101, 186; Wauchope 1938:128-138), they were rarely located on the ground and usually were not ascribed to building functions within residential groups (e.g. Haviland 1988). Rather, we have tended to view Maya residential groups as almost exclusively composed of residences. However, for Caracol, we can define a series of distinct structural types that repeatedly reoccur in the site’s residential groups: (1) non-residential mortuary or ritual buildings; (2) palaces and stone buildings usually associated with high status residence and reception; (3) range buildings, sometimes of stone, that must have been used for a variety of residence, reception, processing, and storage functions; (4) larger low buildings exhibiting multiple floor levels that presumably served as residences; (5) smaller, low single level structures that served a wide variety of residential and auxiliary functions, including (6) non-residential sweatbaths and (7) kitchens. As an aside, no formal bathrooms have been recovered.

Mortuary or Ritual Buildings

Most Caracol households – but not all – carried out rituals that were cyclically timed (A. Chase and D. Chase 2013) and that were associated with an eastern mortuary building, shrine, or temple (D. Chase and A. Chase 1998). This construction was usually the principle eastern building in a residential group. The construction is often squarish in form and one of the highest buildings in any residential group. Although in many cases no formal structure was located on this eastern mound, occasionally a vaulted stone building - or temple – was set atop this substructure. In some cases, shrine rooms were placed in the stairways of eastern buildings, usually directly above an interment. In other cases, the northern building in a Caracol residential group also functioned as a second ritual building. We do not see ritual buildings as having a residential function, except possibly for specific ceremonies and rituals.

Palaces and Tandem-Roomed Stone Buildings

Palaces are generally confined to the site epicenter and to some Caracol termini (A. Chase and D. Chase 2001). They are generally built of stone and usually had vaulted roofs. Their forms vary, but most palaces are actually comprised of more than one stone structure. Almost all palace buildings involve tandem room arrangements that are often complemented with transverse tandem end-rooms. Most palaces also contained benches that were either armed or flat; these benches served as both reception and sleeping areas. Although not common, completely stone buildings do occur within outlying residential groups and are usually reflective of the higher status of that group’s residents. Stone buildings in residential groups also have benches and are also usually tandem-roomed, but lack the transverse end-rooms found in epicentral palaces. A stone building could be located on any side of an outlying residential group.

Range and Single-Series Roomed Buildings

Range buildings consist of a single row of rooms that can be separated from each other or interconnected. There is great variability in this form. Some range buildings are entirely of stone; others exhibit base-walls; still others are constructed of perishable materials. Many range
buildings exhibit benches in one or more of their rooms. These benches sometimes show the same variability that is found in palace structures. It is suspected that range buildings served a variety of functions, ranging from residence to reception to processing to storage.

**Larger Low Buildings with Multiple Levels**

Within Caracol residential groups, large low buildings with multiple levels (as represented by floors and facings) appear to represent the most common unit of residence for a family. These structures tended to be constructed of perishable materials and are sometimes associated with benches. One or more of these buildings can appear within a single residential group. They usually do not occur on the eastern sides of plazas.

**Smaller Low Buildings**

By far the most common construction within residential groups are low, often single-level structures that are located along the sides of plazas. These usually supported perishable constructions and probably served multiple uses ranging from living and sleeping space to a wide variety of auxiliary uses. Wauchope (1938:128-138) noted that modern Maya households had constructions that functioned as “beehive shelters,” as “chicken houses,” as structures for “gardens and trees,” as “granaries,” as “kitchens,” as “ovens,” as “rock enclosures for pigs” or other animals, as areas for “sascab piles,” as “shrines,” as “storehouses,” as “sweat-bath huts,” as “tanneries,” and as “wash-bowl and wash-trough shelters.” Some of these functions may be extended to ancient Maya households.

**Kitchens**

Kitchens, when they can be identified, consist of barely raised line-of-stone building pads (Figure 3) that resemble vacant terrain structures (D. Chase 1990). What is distinctive about kitchens is that they are usually placed within plazas or at the corners of plazas in Caracol’s residential groups (see Haviland et al. 1985:183 for a potentially different situation at Tikal). Both plainware ollas and fine ware ceramics are found in association with suspected kitchens. However, they do not tend to be associated with the three hearth stones of Maya fame (e.g., Taube 1998). Some kitchens may have simply been placed beneath a thatched roof that would leave little archaeological evidence. Kitchens were probably located slightly away from residences in order to minimize the threat of fire. It appears that not all residential groups had kitchens, which implies that a single kitchen could sometimes function for multiple residential groups. This is particularly seen within the site epicenter where stable isotope analyses have indicated the existence of a shared palace diet (A. Chase et al. 2001). Within the site epicenter, there was a large “palace” kitchen located immediately west of the base of Caana (Structure B37); its southern end was investigated during the 2004 field season – and no cooking facilities exist on Caana itself. The peripheral location and building form for this epicentral kitchen strongly resemble counterparts at both Tikal, Guatemala (Harrison 2012) and at Kabah, Mexico (INAH 2011 news release). Whereas the epicentral kitchen had base-walls surrounding its extensive interior space, the non-epicentral kitchens are mostly located on smaller rectangular pads barely raised above the plaza floor levels.

**Sweatbaths**

While sweatbaths are known from a number of sites (e.g., Satterthwaite 1952), they have not often been found in association with residential groups. Two sweatbaths have been
excavated at Caracol, one associated with the C Group and one in a residential group. Neither construction was a focal plaza building and both structures exhibit similar plans (Figure 4). In the C Group, the sweatbath, Structure B59, was located on the eastern side of the plaza immediately north of a long range building adjacent to a constructed reservoir. The other identified sweatbath was an auxiliary building set northwest of its residential plaza. Initially, it appeared to be a low house pad, but excavation revealed stone base-walls and interior benches with a narrow central doorway.

Bathrooms

The lack of identifiable bathroom or outhouse structures at Caracol has been taken to mean that excrement was being collected in containers (likely ceramic) and potentially used for agricultural purposes in the fields. Sanders (1981:362) noted that this would have been an appropriate use for human waste, especially if intensive agriculture was being practiced (as it was at Caracol). An alternative would be that dogs or other animals were consuming and redistributing such waste.

The “Normative” Caracol Household in Cultural Context

Having discussed the above, we can now attempt to address the composition of a “normative” Caracol household. Most Caracol households were associated with multi-structure plazuela units and artifactual associations indicate that the buildings associated with these plazas were used for a variety of functions. Minimally 70% of Caracol residential groups contain an eastern shrine structure that was both non-residential and the focus for household ritual that incorporated cache and burial deposition. In a small portion of residential groups, a squarish northern building may have had a similar function, usually pre-dating the ritual use of an eastern building. Residential structures within Caracol groups, presumably housing a single family unit, were larger raised rectangular structures, usually with multiple floor levels. Higher status groups had stone versions of these buildings. A single residential group always contains at least one of these buildings and sometimes up to five of them. Range buildings, with one or more rooms linearly arranged, could exist as independent units within residential groups or be appended to the sides of other constructions; they had varied functions, presumably being used for storage, reception, and processing items to be used in commerce; those with benches may also have been used for sleeping. Small rectangular structures, often only line-of-stone pads of a single level, also served a wide variety of functions, being used as auxiliary buildings for storage and other purposes as well as smaller residences for parts of an extended family or even for servants or slaves (following Farriss 1984). Kitchens and sweatbaths were special purpose buildings also found in residential groups; both were placed in non-focal locations.

Translating the archaeological data from residential groups into the social realm of households is extremely difficult. Although Maya archaeologists frequently refer to commoners and elites, this dualistic division of society does not actually reflect the wide variety of other social roles, societal levels, and economic stratification that is found in ancient Maya residential groups (A. Chase and D. Chase 1992). Social status could be modified by birthright, wealth, occupation, ability, and situational contexts. There were “power” elite and “secondary” elite. There were different levels of leadership in both hierarchical and
heterarchical organizations. Occupational specialization within and among households was present; households could include crafters, merchants, and warriors, as well as farmers. At least some of these social identities were transformable. Changes in the prosperity of households are in fact visible in the archaeological record. Importantly, there also were differences in social, political, and economic structures within the various parts of the ancient Maya world. Thus, just as residential groups are not all standardized, there is no easy categorization or dichotomy of social roles or households in the archaeological past.

Caracol’s dendritic market system permitted ready access to most items that were needed by residents of plazuela groups (A. Chase et al. n.d.; D. Chase and A. Chase 2014a). These included: quotidian trade items – like ground stone, chert tools, clothing, pottery, and food and fruits – long-distance items – like obsidian, ceramics, specialized spices (including salt), and even jadeite – and ritual items like cache vessels and incensarios. Each household included individuals who produced items (often perishable) for exchange in Caracol’s market. Household participation in the site’s market system helped to spread a common Caracol identity (D. Chase and A. Chase 2004) characterized by widespread access to a variety of non-quotidian items that were eventually deposited within the archaeological records of the site’s residential groups because of specific household rituals associated with their eastern buildings (A. Chase and D. Chase 2009, 2013).

For the most part, Caracol’s residential groups were self-sufficient in terms of agricultural production. Most had intensive agricultural lands in the form of terraced fields within close proximity (A. Chase and D. Chase 1998); extensive out-fields beyond the city center were also probably part of their subsistence base. Previously, we suggested that each household controlled approximately 2.5 ha of agricultural land (D. Chase and A. Chase 2004); based on the LiDAR data from Caracol, we would now suggest that this number should be placed at 2.2 ha. Because of the greater settlement density, households closer to the Caracol epicenter probably controlled less agricultural land than households located further afield. Some households, such as those residential groups located in the immediate vicinity of the city epicenter and the causeway termini, may not have had direct access to any agricultural land; stable isotope analyses indicate that some of these individuals did not have ready access to maize (A. Chase et al. 2001), meaning that their household did not grow this crop – presumably because of their focused occupational specializations.

Besides increasing the health benefits for the general population in lessening the spread of communicable diseases (as is found in the close quarters of Teotihuacan; Storey 1992), the spacing of residential groups at the site suggests planning and agricultural self-sufficiency (e.g., Drennan 1988). Because of the dependence of family units on constructed agricultural terracing that was located in fairly close proximity to their residential groups, as the population increased, the landscape at Caracol became a locked network into which additional residential groups could not be readily added (D. Chase and A. Chase 2014b). Thus, there likely was pressure on children from large families to establish new residential groups at the site’s urban limits and to improve open agricultural areas with intensive terracing. While there may have been some continuity in family units within a single residential group, there would have been an upper household population limit that made self-sufficiency impossible and that resulted in out-migration. Thus, over time there could be increased social distance between adjacent residential units.

All of Caracol’s residential areas included a series of plazuela groups that existed in fairly close quarters to each other. The dietary differences that exist between adjacent residential groups demonstrate that the individuals living as neighbors did not always have access to the same foodstuffs (A. Chase et al. 2001; D. Chase and A. Chase 2004:142), supporting the suggestion that these neighboring households often contained non-kin-related family groups. The social distance between adjacent households within long-established neighborhoods would have reinforced the corporate nature of the household and may account for the independent domestic rituals found in many of Caracol’s residential groups.
However, it also means that something other than family ties had to be in place to control for garbage and waste disposal, noise, and the upkeep of any shared areas.

While the overall framework for administrating the city can be derived from the site’s causeways and termini, it is difficult to see the intermediate level organizational units at Caracol that are more readily visible at other Mesoamerican sites (Smith 2010). Toward this end, we have been investigating one particular “neighborhood” on the Machete Plateau to see if and how its households were integrated. These data should eventually help to better understand Maya household structure, Maya neighborhood structure (if such exists), and low density agricultural urbanism among the Maya.

While specific neighborhood organization at Caracol may not yet be clear, some commonalities are evident across the city’s populace. Analysis of archaeological materials reveals that the Classic Period Maya at Caracol maintained a distinct social identity that is identifiable within the site’s Late Classic Period residential groups (D. Chase and A. Chase 2004). The majority of these plazuela groups were occupied by a single extended family forming a household. These Late Classic households used the eastern building for the ritual placement of cyclically-placed caches and interments that used a standardized set of ceramic vessels. Through this practice, Caracol’s Late Classic Period occupants manifested a unified social identity. Complementing these ritual activities was also a focus on dental decoration; some 22% of the recovered interments in Caracol’s residential groups have produced teeth inlaid with jadeite or hematite (D. Chase and A. Chase 1996). The inlaid teeth on these individuals made statements about their social identities as individuals and as Caracolenos, especially as this practice appears to have been more restricted at other Maya sites (e.g., Becker 1973 for Tikal). Caracol’s Late Classic Period socio-economic organization was characterized by shared prosperity, especially as seen in the site-wide distribution of items such as tombs, polychrome pottery, and dental modification. The ubiquitous access to such items created a “symbolic egalitarianism” that was likely used as an integrative management strategy by the site’s elite (A. Chase and D. Chase 2009).

**Conclusion**

Both settlement archaeology and household archaeology have succeeded in moving the field of Maya Studies forward (Ashmore and Wilk 1988). Settlement archaeology has permitted us to derive population estimates for Maya sites (Culbert and Rice 1990), to examine regional socio-political structure (Ashmore 1981), and to firmly establish that the Maya had large, spatially extensive cities that were consistent with the tenets of low-density urbanism found in other tropical areas (A. Chase et al. 2012). Robin (2003:307) has cited household archaeology for leading to “(1) understanding ordinary people; (2) understanding social diversity among households;” and “(3) understanding households in articulation with the broader social universe.” Thus, household archaeology has led to a greater focus on what have been termed Maya “commoners” (e.g. Gonlin and Lohse 2007; Lohse and Valdez 2004) that complements any understanding of Maya “elites” (D. Chase and A. Chase 1992) and permits a much fuller examination of socio-economic organization among the ancient Maya. However, if household archaeology truly seeks “dynamic interpretations of heterogeneous households interacting with the broader social universe,” then, as Robin (2003:334) has noted, “household form and function are an essential part of our interpretation of people, practices, and meanings of the past.” Somehow, during the transition from settlement archaeology to household archaeology, we neglected to fully analyze how a Maya residential group was composed and to see how the various structures that made up this unit fit into a functioning household. This analysis of Caracol households provides an initial attempt to step back to undertake this exercise.

**References**

Ashmore, Wendy

Ashmore, Wendy and Richard Wilk

Ashmore, Wendy and Gordon R. Willey

Becker, Marshall J.


Becker, Marshall J., C. Jones, and J. McGinn

Carr, Robert F. and James E. Hazard

Chase, Arlen F. and Diane Z. Chase


Chase, Arlen F., Diane Z. Chase, and Christine White


Chase, Arlen F., Diane Z. Chase, Richard Terry, Jacob M. Horlacher, and Adrian S.Z. Chase

Chase, Diane Z.
1997 Southern Lowland Maya Archaeology and Human Skeletal Remains: Interpretations from Caracol (Belize), Santa Rita Corozal (Belize), and Tayasal (Guatemala). In S. Whittington and D. Reed, Eds. *Bones of the Maya: Studies of Ancient Skeletons*. pp. 15-27. Smithsonian Institution Press, Washington, D.C.

Chase, Diane Z. and Arlen F. Chase


Coe, William R. and William A. Haviland

Culbert, T. Patrick and Don S. Rice

Drennan, Robert D.

Farriss, Nancy M.

Folan, William J., Laraine A. Fletcher, Jacinto May Hau, and Linda Florey Folan

Folan, William J., Ellen R. Kintz, and Laraine A. Fletcher

González, Nancy and Jon C. Lobos

Goody, Jack

Harrison, Peter D.

Haviland, William A.


Jaeger Liepins, Susan


Lohse, Jon C. and Fred Valdez, Jr.
2004 *Eds. Ancient Maya Commoners.* University of Texas Press, Austin.

Rice, Don S. and T. Patrick Culbert

Robin, Cynthia

Sanders, William T.

Satterthwaite, Linton

Smith, Michael E.

Smith, A. Ledyard

Sprajc, Ivan

Storey, Rebecca

Stuart, George E., J.C. Scheffler, Ed B. Kurjack, and John W. Cottler
1979 *Map of the Ruins of Dzibilchaltun, Yucatan, Mexico.* MARI Publication 47. Tulane University, New Orleans.

Taube, Karl

Tourtellot, Gair
1988 *Peripheral Survey and Excavation Settlement and Community Patterns: Excavations at Seibal, Department of Peten, Guatemala.* PMAE Memoirs 16. Harvard University, Boston.

Tozzer, Alfred Marston
1941 *Landa’s Relacion de las Cosas de Yucatan.* PMAE Papers 28. Harvard University, Boston.

Wauchope, Robert


Wilk, Richard R.

Wilk, Richard R. and Wendy Ashmore

Wilk, Richard R. and William L. Rathje
Willey, Gordon R.


Willey, Gordon R., William R. Bullard, Jr., John B. Glass, and James C. Gifford
2 WHO IS LAS CUEVAS?

Mark Robinson, Holley Moyes and Laura J. Kosakowsky

The Late Classic site of Las Cuevas is located in the Chiquibul, just 14km from the site core of Caracol. Initial survey and excavations by the Las Cuevas Archaeological Reconnaissance project targeted the culture history of the site to determine the basic characteristics of the polity. Despite the expansion and regional dominance of Caracol in the Late Classic, inter-site comparison reveals a distinct identity for Las Cuevas from that of its larger neighbor. Excavations from the first three years of the project are discussed to characterize identity markers within the broader regional landscape.

Introduction

With a neighbour as large, wealthy, and politically active as Caracol, one would be forgiven for assuming that the small site of Las Cuevas was directly controlled by the nearby polity. However, three years of research by the Las Cuevas Archaeological Reconnaissance (LCAR) project (2011-2013) paints a different picture. Excavations targeting the site’s culture history and ritual practices reveal a distinct identity from that of Caracol and other polities in the region, suggesting a high level of independence for the community. This paper focuses on the surface excavations of the LCAR project to characterize Las Cuevas and offer inter-site comparisons.

Archaeology as a discipline is forever evolving and changing as new ideas and interpretations are proposed and critiqued, and technological innovation opens new avenues of questioning. At the broadest theoretical level the history of archaeological thought has been defined by phases of antiquarianism, culture-history, processual archaeology, and post processual archaeology, with each new paradigm seeking to offer greater interpretive power to the discipline (Trigger 2006). Although the theoretical and methodological developments are integral to the advancement of the discipline, the basis of all modern archaeology will always be rooted in culture-history; the what’s, where’s and when’s of the archaeological record. What is present? Where these phenomena and materials occur? When were they used? These base data provide the platform to ask the “why” questions about past human behavior.

At the core of culture historical archaeology is the identification and classification of the remains of the past and the definition of cultural groupings. As more sites are characterized, a broader dataset is constructed that allows the comparison of material remains across the landscape, determining similarities and differences amongst locations and defining the geographic extent of certain traditions (used to great effect by the genre defining scholars V. Gordon Childe in Europe, and Alfred Kidder in the USA). These basic characterizations have formed the backbone of discussions of inter-site relationships and processes of exchange. In the Maya area, two of the most notable examples of the utility of culture-historical data are in ceramic and architectural analysis. The development of type-variety ceramic analysis, and in particular the concept of ceramic sphere, is based in the identification of inter-site relationships as evidenced by the distribution of specific ceramic traits (Gifford 1976). These distribution patterns have then been used to suggest various socio-political phenomena, such as political alliances, trade routes, and technological innovation. Likewise, the presence of distinct architectural forms, for example the Teotihuacan style talud-tablero, has been used as evidence of the relationships between polities (see Braswell 2004 for discussion on the relationship amongst the Maya and Teotihuacan).

Questions of culture history were the focus for the excavation strategy at Las Cuevas in the initial years of the LCAR project as we sought to form a base knowledge of the site, determining what was present and when the site was occupied (Kosakosky et al. 2013; Moyes et al. 2012). These characterizations also allowed comparison within the broader region, and it is these descriptions and inter-site comparisons that are the basis of this paper.
Las Cuevas is located in the hills of the Chiquibul National Forest in southern Cayo District (Moyes et al. 2012; Figure 1). The site is reached via a spur off the Caracol road, with the site cores of the two centers only 14km apart. The distance between the two communities is drastically reduced when you take into account the surrounding settlement associated with each site. Sixteen structures have been identified in the site core across the two plazas (Figure 2).

The site core is somewhat typical with a main plaza dominated by an east/west pyramid complex and north/south range structures. A secondary structure (Structure 2) in the northeast corner is linked to the northern structure by a one course high platform. A second plaza, to the southeast of Plaza A, takes a more unusual form. The western end is bounded by the ballcourt with an inset staircase on the backside of the eastern ballcourt structure (Structure 6), facing into the plaza. The eastern end of the plaza is bounded by a pyramidal structure. The north and south, are formed by a series of low linear platforms, the northern set ringing the top edge of a sinkhole that leads into a large cave that runs directly under the site core. The opening to the cave system is below the eastern structure of Plaza A, in an ideal vertical arrangement of the sacred cosmological landscape, stretching from the underworld to the heavens.

The entrance chamber to the cave itself is cathedral like, and incorporates extensive architectural modifications, including stairs, walls, and platforms. A spring in the entrance chamber provides a constant water supply as well as being a focal point within the cave (See Moyes 2012). A handful of uncarved possible monuments are present at Las Cuevas, including two potential altars in Plaza A and two possible stelae in front of the inset staircase of Structure 6 in Plaza B. Limited settlement survey has identified a range in domestic architectural size and complexity, including an elite plazuela group on a platform behind the western structure of Plaza A. Recently obtained LiDAR data will guide future settlement research.

Archaeological History

Prior to the LCAR project, archaeological research at Las Cuevas was limited to a single short season in 1957 conducted by Adrian Digby of the British Museum, with the then Archaeological Commissioner for Belize, A.H. Anderson. During the season Digby excavated in the cave and Anderson surveyed and mapped the surface site core, excavating a single trench Structure 2. Digby presented his initial findings at the Royal Anthropological Institute in 1958, and published a journalistic article in the The Illustrated London News (Digby 1958). The early research notes a general similarity to other Maya sites, but highlights the presence of the unusual complex of low linear structures and the relationship between the surface architecture and the cave below.

The Wider Region

Caracol dominates the region with a sprawling settlement that housed a large population (Chase and Chase 1998). The stratified society supported a monumental architectural program including the construction of large temples and palaces, the construction and maintenance of reservoirs, agricultural terraces, and causeways, and the use of skilled
artisans to decorate architectural friezes and inscribe stelae and altars (Chase and Chase 1998, 2001; Healy et al. 1983). One site of note is the large cave, Naj Tunich, across the modern international border into Guatemala. Of particular importance is the presence of a tomb and wall paintings, including a glyphic text that directly refers to Caracol, strongly suggesting the use of the cave by the Caracol elites (Stone 1995; Colas 1998). Beyond the extensive research at Caracol, the broader region has been subjected to limited archaeological investigation. Notable exceptions come from the research projects conducted by Dr. John Morris and Dr. Jaime Awe of the Belize Institute of Archaeology. Awe (1985) excavated at Caledonia, and Morris (2004a, 2004b) conducted excavations at the site of Mountain Cow, 12km northeast of Caracol, finding clear links to the larger polity including a causeway connecting it to Caracol’s site core and a stela bearing the Caracol emblem glyph.

Monkey Tail, a similar sized settlement to Las Cuevas, is located 3km to the east of Las Cuevas towards the Monkey Tail branch of the Raspaculo River. Brian Woodye undertook preliminary excavations at the site and the LCAR, with the assistance of Josue Ramos of the Belize Institute of Archaeology, surveyed the site in 2012 (See Ramos 2012). The site survey illustrated similarity to Las Cuevas site layout (albeit minus the cave) and future excavations at the site will seek to determine the relationship between the two communities and to the local socio-political and environmental landscape.

Anderson’s work in caves in the region were reported by Pendergast (1970, 1971), showing a range of ceramics, including unit-stamped pottery at Rio Frio and Eduardo Quiroz, a distinctive southern Belize tradition.

Figure 2. Las Cuevas site core and tunnel system.
Mountainous terrain to the south of Las Cuevas has left the area undeveloped in modern times. An increasing number of archaeological projects in southern Belize have identified a complex and heterogeneous regional identity that incorporates both common Maya traits, as well as distinctive features (Braswell and Prufer 2009; Leventhal 1992; McKillop 2002).

**Excavation at Las Cuevas**

Excavation rarely solely provides culture-historical information and can be designed to be multi-purpose to pursue a variety of questions. A targeted excavation strategy at Las Cuevas sought to determine the basic characteristics of the site, address features pertinent to the local environmental context, assess the presence and absence of common ancient Maya ritual practices, and ultimately, gather data to understand the broader socio-political landscape. A broad excavation program was begun in 2011 to investigate the site core, including architectural excavation at structures in both plazas, and test pitting of the plazas (Moyes et al. 2012).

**Structure 1**

Eastern structures are often the most important ceremonial building for the Maya, frequently used as ancestral shrines, linking the deceased with the rising sun and cycles of creation, life and rebirth (Chase and Chase 1998). As such, eastern structures often contain elite burials. Sub-floor caches are also common dedicatory features in front of structures and under floors and staircases, containing a wealth of chronologically and geographically sensitive material. Located above the cave opening, the 12m tall eastern structure of the Plaza A at Las Cuevas is in a particularly cosmologically charged location. Excavations at Structure 1 undertaken in 2012 and 2013 sought to uncover the construction history, chronology, architectural form, and ritual practices, including potential burials and ritual deposits (Figure 3).

A vertical “phone booth” excavation through the center of the structure in 2012 encountered four construction phases, as determined by intact plaster floors. Each additional construction phase expanded the previous structure with the addition of a layer of gradated dry core fill, consisting of limestone boulders, the largest of which were located at the base of each construction level. Pebbles and small cobbles covered the boulders in each construction phase to provide support for the plaster floors. The excavation continued to 5.5m below the top surface and was abandoned due to

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**Figure 3.** Structure 1 staircase profile and stratigraphic reconstruction.
safety concerns. Large boulders were present below the earliest floor, suggesting this was part of an extensive initial construction phase. Following the initial construction, an extensive remodeling of the structure took place adding 2.24m of vertical height. After this, two smaller construction phases added 0.29cm and 0.4m of height. No burials or sub-surface deposits were present. Although the excavation contained few material remains, all diagnostic ceramic sherds throughout the structure dated to the Late Classic (A.D. 600 – 850; Kosakowsky et al. 2013).

The terminal construction at the summit of the structure consisted of a 2m deep open front platform, with a step up through a 2.25m wide central doorway into an 8m by 1.5m vaulted inner chamber (Figure 4). Although the roof had collapsed, the presence and location of extensive fragments of moulded stucco confirms the presence of a frieze that was likely to have been placed above the doorway across the front of the building. The iconographic program for the frieze remains undetermined, but a tooth element suggests a potential witz earth monster was depicted (Figure 5). The presence of a frieze at such a relatively small site substantiates the importance of the polity and the ability of the builders to mobilize highly skilled labor.

Six clusters of ceramic fragments were present on the terminal floor on the top platform outside the temple chamber. The vessels consisted of red slipped dishes dating to the late part of the Late Classic period (Spanish Lookout phase/ Tepeu 2/3), with no Terminal Classic (A.D. 850 – 900) markers present. A large 4.5m wide amorphous marl deposit, 0.6m tall, placed against the back wall of the temple chamber blocked access to the temple (Figure 4). The deposit incorporated large fragments of freshly broken ceramics dating to the Late Classic. The top of the deposit was burned. Vessel fragments on top of the deposit, in a mixed context with structural collapse and tree roots, included a Belize Red bowl and a Miseria Appliqued vessel. Sometime after the placement of the marl deposit, ostensibly closing the temple, the top of the structure was burnt and the additional vessels deposited. The presence of a Miseria Appliqued vessel atop the marl suggests the later event dated to the Terminal Classic period.

In 2013, excavation was expanded to expose and penetrate the front of the building to refine structural form and sequence, and also search for potential sub-surface deposits beneath the stairs. In front of the building was an unusual 3m wide low platform rising only 40cm above the plaza floor. Three partially intact staircases were uncovered, each characterized by a distinct masonry style. The most recent style incorporated a mosaic of different sized limestone blocks, including upright limestone slabs and smaller stacked blocks (Figure 6).
This masonry style is repeated across the site. The earlier staircases utilize more standardized limestone blocks.

A 4 x 4 meter unit excavated to bedrock on the centerline at the front of Structure 1 abutting against the front edge of the building, revealed the construction of the plaza floor, including two plastering events. Small boulders and pebbles were laid atop the naturally undulating landscape to create a flat surface,
which was then plastered. A second plastering event underlain by 5cm of pebbles, raised the plaza slightly. Although no sub-floor cache was present, a cluster of Late Classic ceramic material and two obsidian blades were encountered on top of the terminal floor, in front of the first riser of Structure 1.

**Ballcourt**

The pan-Mesoamerican ballgame is characterized by distinct formal architecture consisting of two parallel structures. The game likely had many variants and other sporting, combative, and performance events also took place in the court. Although a ballcourt is easily identifiable, courts across the region show variability in size, form, and orientation (Ferguson 1999; Taladoire 1981). Due to the variability in ballcourt design and as a focus for ritual and performance, the ballcourt was an ideal place to look for inter-site similarities that may suggest socio-political relationships. The ballcourt at Las Cuevas sits on top of a constructed platform that levels the uneven terrain. Excavations focused on the eastern structure of the ballcourt (Structure 6) as a series of horizontal exposures to reveal architectural form. The playing alley incorporated a 4m wide alley, a shallow sloping playing surface, with a 1m wide low bench abutting the back wall (Figure 7). The base of the back wall was characterized by the same distinctive masonry style present on the terminal construction of Structure 1, with a mosaic of different sized limestone slabs and blocks. The flat top of the structure did not support masonry architecture, although a perishable superstructure cannot be ruled out. The backside of the structure forms the western boundary to Plaza B, incorporating an inset staircase that rises to the top of the structure. The southeast corners were both excavated revealing squared corners. The playing surface was trenched to the back wall, showing a single construction phase that included the platform that the ballcourt sits on. Figure 8 is an artistic reconstruction of Structure 6 based on the archaeological data.

**Linear Structures**

The linear structures of Plaza B are a distinctive feature of Las Cuevas. The northern series of structures ring the southern and western edges of the sinkhole, creating a formal boundary between the plaza and the sinkhole, continuing behind Structure 1. Excavations on Structure 9, 10, 11, and 25 revealed a similar architectural pattern with each rectangular structure incorporating an upper back platform, although the dimensions vary between buildings. The landscape of the sinkhole behind each structure also varies, with a flatter area and gentler slope behind Structure 11 and the western end of Structure 10. A steep drop off is present behind Structure 9, 25, and the east end of Structure 10.

Structure 9 abuts Structures 10 and 25, forming an unbroken chain of buildings. Structure 11 is a discreet structure with narrow access routes to the sinkhole at either end. Excavation behind Structure 11 shows a distinct difference to the formal plastered plaza. A high density of eroded ceramic sherds suggested a potential pathway down the slope to the cave entrance.

All the linear structures appear to be of a single construction phase. They were constructed using dry core fill incorporating few artifacts. Structure 10 and 11 were part of the original plaza conception, with the core of the structures added before the plaza floor was completed. Structure 9 and 25, were added after the plaza was constructed, evidenced by the plaster of the plaza floor continuing underneath the structures, although a short back wall was put in before the plaza was plastered. All construction events took place in the Late Classic, but finer chronological understanding of the sequence of construction and the timing between the construction of the Plaza, Structure 11, Structure 12, and Structure 9 and Structure 25 cannot be established at present.

Three linear structures are present on the south side of Plaza B. Each structure shows a similar form, with an upper back platform. The southern platforms are orientated the same way, but staggered, narrowing the plaza toward the ballcourt. The landscape drops away behind the structures, with an aquada behind Structure 18 that today is the home to the critically endangered Morelet’s tree frog (*Agalychnis moreletii*).
The linear structures served multiple purposes. They bounded the formal constructed space of the plaza and directed and restricted access to the sinkhole. As a formal building they also would have served an as yet undetermined function, perhaps supporting administrative, spectator, or commercial endeavors. None of the structures supported masonry superstructures, although perishable superstructures cannot be ruled out.

**Ceramics**

Aside from a handful of late Preclassic (Sierra Red Group) and a few Terminal Classic sherd (Miseria Applique and diagnostic large Cayo Unslipped jar rims), the Las Cuevas assemblage, and by extension, the site construction, dates to the Late Classic period (primarily Tepeu 2/3, Spanish Lookout). Interestingly, there is a lack of a single ceramic sphere affiliation for the Las Cuevas material (Figure 9; Kosakowsky et al. 2013). The assemblage includes distinctive markers from the Belize Valley (including Belize, Vaca Falls, Garbutt Creek, and Dolphin Head Groups), the Petén (Tinaja Red Group), southern Belize (Remate Red Group), and local types (Chiquibul Scored-Incised).

The high proportion of unit stamped Remate Red bowl and jar sherds is of particular
note (Figure 10). Although the tradition is also present in the Pasion Region at Seibal (Sabloff 1975) and Altar de Sacrificios (Adams 1971), the stamp design style, dominated by the S scroll, is distinctive of the southern Belize tradition, as found at Lubaantun (Hammond 1975) and on the coast (McKillop 2002). Examples of unit stamped pottery are documented at Rio Frio Cave to the north in the Mountain Pine Ridge, and Eduardo Quiroz Cave close to the logging camp of Millionario (Pendergast 1970, 1971). However, aside from a few solitary examples, the tradition is not found outside of this narrow corridor from southern Belize through the Maya mountains, with Las Cuevas being the largest site with a sizable sample in the north. Of particular note is the near absence of unit stamped pottery at Caracol.

**Comparisons and Discussion**

Site identity can be understood in regards to a community’s internal characteristics and their similarities and differences to other communities. Similarity suggests a shared identity manifested through socio-political and economic networks, whereas differences suggest non-participation in an exchange sphere and a separate identity. At Mountain Cow, Morris (2004b) noted the imposition of Caracol’s identity in the Late Classic as Caracol expanded. The previously distinct characteristics of Mountain Cow were brought in line with the larger polity as Caracol exerted socio-political and economic influence, creating a wider community with a unified identity, as identified through connecting causeways, architectural orientation, caching practices, shared material culture, and a monument tradition including references to the ruler of Caracol (Chase and Chase 2001; Morris 2004b).

Morris (2004b) discussed the complexities of identity in the Chiquibul in relation to the changing socio-political landscape through time and the history and evolution of site planning. The independent histories of a site’s layout created a unique configuration on top of which later architectural programs were built. The earlier signature is often apparent in later formations, although changing styles help trace the timing and extent of shifting regional dynamics. Mountain Cow underwent stylistic change as Caracol exerted control over the region in the Late Classic period, geographically linking communities with a network of formal causeways and imposing stylistic features, such as a change in architectural focus from the north to the east, and a monument construction program that glorified the central authority of the Caracol king, Tum Ohl K’ínich (Chase and Chase 1992).

At this time of regional identity unification, Las Cuevas was established. As such, Las Cuevas was something of a blank slate upon which a dominant identity could be imposed without having to accommodate prior configurations. Despite the proximity of Caracol to Las Cuevas, the centralized authority of Caracol did not encompass the smaller site. Although some similarities exist, the differences between the polities, in regards to architectural style, ritual practices, and ceramic sphere, confirm a level of independence from Caracol and an identity for Las Cuevas that is distinct from other spheres of influence in the wider region.

Site layout at Las Cuevas was designed around the natural landscape, with the sinkhole and the cave of central focus. The unusual linear structures of Plaza B formalized the conceptual boundaries between the natural and the built world, emphasizing cosmological concepts of the ordered and the wild landscape. Large scale landscape modification was also required to flatten out the undulating terrain, creating space to accommodate public places. While the eastern focus of architecture is present at Las Cuevas, the absence of burials or sub-surface ritual deposits is in marked contrast to the ritual program employed at Caracol (Chase and Chase 1998). The lack of burials negates in-depth discussion until other structures in the main plaza can be excavated and the context better understood. Further data on the presence or absence of interments in the site core will enable speculation as to formulation of political hierarchy and question why no one claimed the eastern structure as a tomb.

The absence of carved monuments, references to Caracol, ballcourt markers, monuments at the summit of the eastern structure, and rounded building corners, lacks
the distinct ties expected if Caracol controlled the site and as are evidenced at polities that did come under Caracol’s sway (Morris 2004b). The distinct masonry style, utilizing a mixture or upright limestone slabs intermixed with smaller blocks further characterize Las Cuevas and suggest the deliberate assertion of an individual identity through architectural design.

The Las Cuevas ballcourt shows both similarities and disparities with those at Caracol. Just as the Las Cuevas ballcourt forms the western boundary of Plaza B, Caracol’s Group B is bounded by a ballcourt. Both courts run north-south as is most common across much of the Maya area; exceptions to this norm include the east-west courts at Quirigua, Seibal, Rio Bec, and locally at Baking Pot in the Belize Valley (Ferguson 1999). Both courts also incorporate a low bench. The rounded corners of the Group B ballcourt at Caracol, and common throughout the site, are notably absent at Las Cuevas. Also, the two staircases are vastly different, the inset stair of Las Cuevas contrasting to the outset stair of Caracol. Even though teams from each site may have played at each other’s court, Las Cuevas was not bound by a centralized architectural tradition.

Although ballcourts are not always a feature at sites the size of Las Cuevas, the presence of a ballcourt is not surprising. The presence of the structure does support the performance and ritual function of the site. The association of a ballcourt and a cave on the landscape draws parallels with the stories recorded in the Popol Vuh (Christensen 2003), with the Hero Twins ultimately defeating the underworld lords after a series of ballgames. The ritual specialists at Las Cuevas likely drew from the themes covered in the Popol Vuh, using performance and public spectacle to reenact the trials and triumphs of the Hero Twins.

Perhaps most telling of all is the ceramic assemblage at Las Cuevas and the mixture of ceramic sphere affiliation. The strong representation of the distinctive unit stamped Remate Red pottery, all but absent at other polities in the region, evidences participation in a distinct trade network stretching through the Maya Mountains to southern Belize that establishes the independent socio-political and economic identity of Las Cuevas. The presence of Belize Valley and Petén types demonstrates that Las Cuevas was not excluded from other exchange spheres, but was situated at an exchange crossroads (Kosakowsky et al. 2013).

Summary

As a previously unknown entity, initial excavations at Las Cuevas have targeted the site’s culture-history, revealing architectural expression, and the presence and absence of ritual practices and material culture. Inter-site comparisons characterize the site as distinct from the unified identity imposed on the region by Caracol, revealing a distinct identity that evidences individuality but participation in multiple cultural spheres. These data provide the base to build anthropological lines of inquiry that can flesh out the site’s identity.

Important questions remain unanswered that are integral to understanding Las Cuevas’s identity. Who settled the polity? Who was the dynamic leader who could mobilize a population and skilled workers in the face of the large Caracol polity? Were the settlers from the south, bringing trade connections with them? Was Las Cuevas established by a member of the Caracol court? If so, why did they establish independent style and economic ties? If they were exiled, why did the Caracol elite tolerate the growth of the site in such close proximity? Was Caracol’s attention focused on the political theatre to the north with the ongoing conflicts with Tikal and Naranjo, and alliances with Calakmul? Why did Caracol not co-opt the Las Cuevas cave? Did Naj Tunich already fulfill the cave requirements for Caracol’s ritual circuit? Who did use the Las Cuevas cave? Was Las Cuevas a pilgrimage center, drawing people from across a number of ceramic spheres? Was Las Cuevas administered by ritual specialists, controlling activity in the cave, but unable to claim divine rule and burial in the eastern pyramid?

The further development of a characterization of Las Cuevas’s identity will incorporate a refined understanding of the political and economic landscape, but will ultimately be based in the socio-environmental relationship between the cave and the surface site. The location of the cave directly under the site core distinguishes Las Cuevas from other
polities with the relationship amongst the natural landscape, the built environment, the community, and cosmology defining the function and identity of Las Cuevas.

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References Cited

Adams, R. E.

Awe, Jaime, J.

Braswell, Geoff (editor)

Braswell, Geoff, and Keith, M. Prufer
2009 Political organization and interaction in southern Belize. Research Reports in Belizean Archaeology 6, 43-54. Institute of Archaeology, NICH, Belmopan, Belize.

Chase, Arlen, F., and Diane, Z. Chase

Chase, Diane, Z., and Arlen, F. Chase

1998 The architectural context of caches, burials, and other ritual activities for the Classic period Maya (as reflected at Caracol, Belize). In, Houston (ed), Function and meaning in Classic Maya architecture, p299-332.

Christensen, Allen

Colas, Pierre, Robert

Digby, Adrian

Gifford, James C.

Hammond, Norman

Healy, Paul, F., John, D. Lambert, J.T. Arnason, and Richard, J. Hebda

Kosakowsky, Laura, Holley Moyes, Mark Robinson, and Barbara Voorhies
2013 Ceramics of Las Cuevas and the Chiquibul: At World’s End, Research Reports in Belizean Archaeology 10, Institute of Archaeology, NICH, Belmopan, Belize.

Leventhal, Richard, M.

McKillop, Heather, I.

Morris, John


Moyes, Holley
Moyes, Holley, Mark Robinson, Laura Kosakowsky, and Barbara Voorhies  
2012 Better Late than Never: Preliminary Investigations at Las Cuevas, Research Reports in Belizean Archaeology, 9, Institute of Archaeology, NICH, Belmopan, Belize.

Moyes, Holley, With contributions by Mark Robinson, Laura Kosakowski, Barbara Voorhies, Rafael Guerra, Fabrizio Galleazi, and Josue Ramos  
2011 Sleeping Next to the Giant: Preliminary Investigations of the Las Cuevas Site, Chiquibul Reserve, Belize: A Site Report of the 2011 Field Season, On file at The Institute of Archaeology, National Institute of Culture and History, Belmopan, Belize

Pendergast, David, M.  

Pendergast, David, M.  
1971 Excavations at Eduardo Quiroz Cave, British Honduras (Belize). Royal Ontario Museum Art and Archaeology Occasional Papers No. 21. Toronto, ON.

Ramos, Josue  
2012 The tale of Monkey Tail. In, Moyes and Robinson (eds) Second report of the Las Cuevas Archaeological Reconnaissance project: The 2012 field season. On file at The Institute of Archaeology, National Institute of Culture and History, Belmopan, Belize

Sabloff, Jeremy, A.  

Stone, Andrea, J.  

Trigger, Bruce  
This study focuses on the adaptations of households to the processes of social reorganization due to the collapse of institutionalized rulership at Baking Pot, located in the upper Belize River Valley of western Belize. Breaking from the strict social hierarchies of the Classic period, households were increasingly participating in mercantile exchange in the Terminal Classic and Postclassic periods, with exotic luxury items becoming more evenly distributed throughout the community, particularly among commoner households. New relationships between noble and commoner households were forged, as noble households hosted large-scale community feasts during the Terminal Classic and Postclassic periods. Although households were not found to have been utilizing Pan-Mesoamerican symbols as a form of status differentiation, they did display Maya iconography on ceramics and other media, demonstrating a sense of shared identity and cohesion. However, this and other forms of shared identity, such as burial practices, shifted in the Postclassic period. Overall, households at Baking Pot developed innovative strategies to adapt to the changing social landscape following the sociopolitical collapse of the polity, playing a prominent role in the processes of social reorganization in the Postclassic period.

Introduction

Over the past 50 years, archaeological studies focusing on the collapse of complex societies have detailed the multifaceted aspects of change in political, economic, and social organization within repetitive cycles of political integration and disintegration (Marcus 1992, 1993). More recently, archaeological studies have focused on the processes of regeneration and reorganization following collapse (Schwartz 2006) as well as resilience in social systems (McAnany and Yoffee 2010). These studies suggest that despite cultural continuities, major changes in social organization and wealth accumulation are a part of regenerative social systems (Kolata 2006). While most studies have focused on political and demographic collapse at the regional or site levels, archaeological studies have begun to examine the ways in which households responded to the processes of political decentralization and social reorganization (Faulseit 2011, 2012; Hoggarth 2012; Hoggarth and Awe n.d.).

Here, we explore the political, economic, and ideological strategies that ancient Maya households used to adapt to the collapse of institutionalized rulership. Based on previous studies, we consider how households of different socioeconomic status adjusted to changing social orders, by hosting large-scale community feasts, amplifying participation in long-distance exchange, and adopting forms of Pan-Mesoamerican ideology. Based on excavations at Baking Pot, a major center in western Belize with occupation during the Late Classic (A.D. 600-800), the Terminal Classic (A.D. 800-900), and Postclassic period (A.D. 900-1521) we seek to identify broad patterns of adaptation and reorganization at the household and community level.

The Classic Maya Collapse

The “Classic Maya collapse” has been a popular theme in Maya archaeology. Numerous studies have detailed the changes associated with the collapse of political systems at the end of the Classic period (A.D. 800-1000) (Table 1). These studies suggest regional variation in the timing, causes, and attributes of political and demographic collapse, including the depopulation and abandonment of large regional centers in the central and southern Maya lowlands, the cessation of monumental construction, declines in the production of elite paraphernalia (including carved stelae and polychrome ceramics), increasing warfare in some regions, and changes in ideology and rulership (Aimers 2007; Andrews V and Sabloff 1986; Culbert 1973; Demarest 2004; Demarest et al. 2004). These studies have suggested that the demographic depopulation of large regional centers in the central and southern lowlands was gradual, with many sites being slowly abandoned over several hundred years. While many interior centers were completely depopulated, some small centers along lakes, rivers, and the coast endured, albeit with smaller populations than their Classic predecessors.
Archaeological studies on the Classic Maya collapse have generally focused on regional variation, largely ignoring questions of how these broad regional changes affected households and communities. When not ignoring continuities and changes inherent at the household level, many studies assume that political decentralization affected communities in static ways, with little interaction or agency exercised by families and individuals. However, archaeological studies in other regions (Bermann 1994) suggest that households responded to large-scale social and political change in innovative and varied ways. In fact, research at the household and community scale may suggest dimensions of change that are not apparent at larger scale. In this paper, we explore the economic, political, and ideological strategies of adaptation and reorganization before and after the collapse of Classic Maya institutionalized rulership.

**Household Strategies of Adaptation and Reorganization**

At Laguna de On and Caye Coco in northern Belize, research by Marilyn Masson and her colleagues (Masson 2002; Masson and Boteler Mock 2002; Masson and Peraza Lope 2004) suggests broad changes in household production and exchange during the Terminal Classic and Early Postclassic periods. These studies indicate that households of all status levels increased their participation in long-distance mercantile exchange. These strategies served to align with the amplification of mercantile exchange along the coast, with households producing locally available goods to exchange for exotic items such as obsidian and jade (Masson 2000; Masson and Boteler Mock 2002; Masson and Peraza Lope 2004). Taking advantage of expanded exchange, Postclassic residents in these communities became more dependent on obsidian for stone tools in comparison to earlier periods when households primarily used local chert.

Scholars working in western Belize (LeCount 1999, 2001; Robin et al. 2010; Yaeger 2000) have also presented evidence that households actively adjusted their political interactions to the processes of collapse. At Xunantunich, a Classic period site in the Cayo District, evidence of large-scale community feasting at elite households was identified in the form of high quantities of serving vessels in the largest residential groups in the center and surrounding communities (Yaeger 2000; LeCount 2001). This research suggests that nobles sought to forge new relationships with...
commoner households through hosting communal feasts where special types of food, such as venison, and other materials were redistributed in order to foster community solidarity and integration (Robin et al. 2010). Within this strategy, higher status households actively created new political alliances in order to adjust to reorganization.

In their discussion on changing social and political interactions in the Naco Valley, Urban and Schortman (2011:186-192) suggest that high status individuals appropriated symbols and motifs associated with shifting ideological systems during the Postclassic period. In this case, community leaders displayed iconography associated with the Cult of Quetzalcoatl (Ringle et al. 1998; Boone and Smith 2003). Claiming access to foreign knowledge and ideological systems to legitimate power, this strategy served to align leaders with changing ideological systems in the Postclassic period.

These studies provide evidence that households developed varied ways in which to adapt to the processes of political decentralization and regional depopulation. However, although each study has presented important information about singular strategies of adaptation, no study has focused on identifying whether multiple strategies were employed within communities to respond to collapse. In this paper, we explore each of the strategies that have been presented, in order to understand whether households at Baking Pot employed similar means of reorganization.

**Baking Pot**

Baking Pot is located on the southern bank of the Belize River in the Cayo District of western Belize (Figure 1). Archaeological evidence at Baking Pot suggests that it was occupied from the Middle Preclassic onwards, reaching its apogee as a small kingdom at the end of the Late Classic (A.D. 600–800) (Table 1) (Helmke and Awe 2008). Although evidence of Postclassic occupation has been recorded at the site, it is unclear whether this occupation was continuous from the Classic period or if this represents reoccupation after the Terminal Classic abandonment of the palace. Late to Terminal Classic population at Baking Pot is estimated at around 3,000 people (Hoggarth 2012:62) with the abandonment of the palace complex occurring around A.D. 800-900. The Postclassic population is mainly concentrated in the central, eastern, and northern settlement clusters at Baking Pot, with a population around 2,000 people (Hoggarth 2012). Future research will focus on refining the chronology for Postclassic occupation, along with identifying whether these individuals were local to the area.

To test the strategies of household and community adaptation that have been presented, settlement research at Baking Pot was undertaken in several stages. In the first stage, we sought to map the entire extent of the urban settlement. Building upon Conlon’s survey (Conlon and Ehret 2000, 2001), the survey was expanded to cover a block area encompassing 9 km², which included eight settlement clusters. In the second stage, surface collections and test pit excavations were conducted to understand the chronological occupation of the settlement. This research found high concentrations of Postclassic occupation in the northern, central, and eastern settlement areas, with particularly...
Figure 2. Proportions of exotic luxury items, including shell, jade and greenstone, copper items, and pyrite (to total sherds), in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.

Figure 3. Proportions of exotic utilitarian items, including obsidian and basalt grinding stones (to total sherds), in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.
high concentrations in Settlement Cluster C to the east of the epicenter. Eight house groups were selected for extensive horizontal and vertical excavation, and also chosen using a stratified methodology to include noble, high status commoner, and low status commoner households (Hoggarth 2009, 2012). Using a modified version of Hirth’s (1998) distributional approach, the proportional distributions of the artifacts in the domestic inventories of house groups were explored to identify changes in economic, political, and ideological interactions through time.

Strategies of Household Adaptation and Reorganization

Economic Interactions

To explore whether mercantile strategies such as those Masson presented were utilized at Baking Pot, we identified artifacts that were associated with long distance exchange, including jade, greenstone, basalt, pyrite, obsidian, marine shell, and copper items. The proportional distribution of these items displays several patterns. Figure 2 shows that most of the exotic luxury items, including jade, greenstone, and pyrite were absent from all Late Classic domestic inventories. However, during the Terminal Classic and Early Postclassic periods this pattern shifts, as exotic luxury items were present in low, albeit relatively even, amounts across all status groups. However, marine shell items did not conform to this pattern, being distributed in all household status groups in all three periods.

Exotic utilitarian goods include obsidian blades and basalt grinding stones. Figure 3 shows that the proportions of obsidian (to total sherds) declined among all groups during the Terminal Classic period, increasing approximately 6% among nobles and over 1.75% among commoner households during the Postclassic period. However, this amount of obsidian use was still lower than Late Classic obsidian use. In contrast, basalt grinding stones were more rare, only being found in the domestic inventory of Postclassic commoner households.

To identify whether households at Baking Pot became more dependent on obsidian during the Postclassic period, we compare the proportions of material types (to all chipped stone) used in stone tool production through time. Figure 4 shows that local chert was the primary material type used in stone tool production throughout all time periods, with Late Classic households using between 68 to 75% and obsidian accounting for 7 to 20% of the chipped stone assemblage. The use of local chert increased in the domestic inventories of all status groups during the Terminal Classic period, at 20% among nobles and 11 to 16% among commoners, while the use of non-local chert and obsidian declined. During the Postclassic, the proportion of obsidian increased among all status groups between 2 to 6%. This provides evidence that households were not becoming more reliant on exotic utilitarian items such as obsidian, although small increases did occur. However, the Postclassic residents of Baking Pot were using less obsidian than their Late Classic counterparts.

Similar patterns that were discussed by Masson were identified at Baking Pot. As in northern Belize, exotic luxury items were distributed in relatively even amounts among both noble and commoner households in the Terminal Classic and Postclassic. This suggests that the amplification of mercantile exchange provided new means of wealth accumulation for lower status households at Baking Pot. In contrast, unlike the northern Belize examples, households did not become more reliant on obsidian in stone tool production. Furthermore, the decline in obsidian during the Terminal Classic period was likely due to disruptions in long-distance exchange. Although obsidian use increased among all groups during the Postclassic, local chert continued to be the primary material used in stone tool production.

Political Interactions

LeCount (1999, 2001), Yaeger (2000), and colleagues (Robin et al. 2010) have suggested that community feasting was used as a means for community integration to respond to the widespread instability associated with the end of the Classic period. Hayden (2001:40-41) lists several archaeological correlates of feasting, including higher amounts of serving vessels (especially those that are decorated or rare)
Figure 4. Proportions of local chert, non-local chert, and obsidian (to all chipped stone) in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.

Figure 5. Proportions of items associated with large-scale community feasts, including serving vessels and decorated vessels in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.
along with large quantities of food remains and special food disposal features (among other features). As community-scale feasts would have required large amounts of resources and labor, we would expect only the wealthiest families to be able to host such events.

Figure 5 shows no significant proportional differences in serving vessels between noble and commoner households during the Late Classic period at Baking Pot, which does not suggest large-scale feasting. In contrast, Terminal Classic noble households had approximately 8% more serving vessels than commoners, with this difference increasing to approximately 10% in the Postclassic period. Furthermore, the ratio of serving vessels to cooking vessels (Table 2) shows that activities associated with serving, as opposed to cooking, increased among nobles in the Terminal Classic and Postclassic. Together, this evidence provides some indications that noble households hosted large-scale community feasts during the Terminal Classic and Postclassic periods.

Decorated ceramics would have played an important part in feasts, as a means to display the wealth and status of the hosting household. Hayden (2001) suggests that feasts can serve many different purposes, particularly in the realm of social differentiation and integration. Differences in the proportions of decorated ceramics, particularly in noble households, provide a means in which to assess the role of feasts within the community. Figure 5 shows that decorated ceramics were hierarchically distributed during the Late Classic period. However, the proportions of decorated ceramics declined across all groups, including noble households, during the Terminal Classic and Postclassic periods. This is likely due to the decline in the production of elite paraphernalia, a phenomenon recorded across the Maya lowlands (Aimers 2007). However, as the evidence from serving vessels indicates that noble households hosted feasts during these periods, it suggests that status differences were minimized during feasts, providing additional support for LeCount and Yaeger’s proposition that these events fostered community solidarity and integration.

Despite the similarities in the evidence for feasting at Baking Pot and Xunantunich, evidence from faunal remains suggests that there were some differences. While faunal remains were found exclusively in the domestic inventories of high status households at Xunantunich and San Lorenzo (Robin et al. 2010), they were distributed among all status groups and all periods at Baking Pot (Figure 6). No statistical difference can be identified in the distribution of faunal remains in commoner and noble house groups for the Late and Terminal Classic period; however, Postclassic nobles had approximately four times more faunal remains than commoner households. This evidence suggests that while Postclassic feasts may have involved the redistribution of meat, few differences in the distribution of faunal remains were present between households of different status at the end of the Classic period.

### Table 2. Ratios of serving vessels to cooking vessels among house groups in the Late Classic, Terminal Classic, and Postclassic periods.

<table>
<thead>
<tr>
<th></th>
<th>Late Classic</th>
<th>Terminal Classic</th>
<th>Postclassic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noble</td>
<td>1.49</td>
<td>1.58</td>
<td>1.60</td>
</tr>
<tr>
<td>High Status Commoner</td>
<td>0.88</td>
<td>0.67</td>
<td>0.77</td>
</tr>
<tr>
<td>Low Status Commoner</td>
<td>0.74</td>
<td>0.78</td>
<td>0.70</td>
</tr>
</tbody>
</table>

**Ideological Interactions**

Several lines of evidence, including iconography and burials, were used to explore whether households at Baking Pot appropriated Pan-Mesoamerican ideology as a means of legitimation and social differentiation. Symbols and motifs on various material classes were identified in the domestic inventories of commoner and noble households at Baking Pot. No Pan-Mesoamerican symbols were identified in any context or period; however, local (Maya) iconography was distributed hierarchically on media and declining from the Late Classic to Postclassic, (Figure 7). This suggests that unlike community leaders at Naco (Urban and Schortman, 2011), individuals or families at Baking Pot did not use Pan-Mesoamerican iconography as a form of status differentiation (or for any other means). Baking Pot’s interior
position, along with its smaller

![Faunal Remains](image1)

**Figure 6.** Proportions of faunal remains (to total sherds) in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.

![Maya Symbols and Motifs](image2)

**Figure 7.** Proportions of materials with Maya symbols and motifs (to total sherds) in noble (black), high status commoner (dark grey), and low status commoner house groups (light grey) during the Late Classic, Terminal Classic, and Postclassic periods. Proportions are represented with attached 80 percent, 95 percent, and 99 percent confidence levels to identify statistically significant differences in the proportional distributions.

...population, were likely causes of this discrepancy, as Naco was a large exchange center with migrants from across Mesoamerica.

Burial patterns provide another means in which to understand changes in local ideological systems. The prominent Classic burial pattern in the Belize Valley featured extended burials, with the head oriented to the south. This pattern was widespread in both public and domestic burials at Baking Pot as well. Of the 11 burials excavated in Settlement C, nearly all primary burials conformed to this pattern, with the exception of a Late Classic seated burial and two flexed Postclassic burials with the heads oriented north. A multi-dimensional scaling analysis of burials from public and domestic contexts at Baking Pot (Figure 8) shows the public burials in the upper section, with domestic burials grouped below. Additional groupings are apparent as well, with burial investment (including mortuary architecture and grave goods) serving as the horizontal grouping factor. Burials with low investment or wealth are skewed to the left, with the most elaborate burials in the upper right. Postclassic burials were only identified in domestic contexts, but the two primary burials are skewed downward in the figure, suggesting that while distinct wealth differences continued to exist, that mortuary ritual was altered during the Postclassic period. Together, the lack of Pan-Mesoamerican iconography, coupled with the drastic shift in...
burial patterns, suggests that households at Baking Pot adopted new forms of ritual and ideology to adapt to major changes in the Postclassic period.

**Conclusions**

Research at Baking Pot has revealed both similarities and differences in comparison with other examples of household and community adaptation. Economic interactions at Baking Pot were both analogous and disparate to households in northern Belize. A similar pattern of increased access to exotic luxury goods, particularly by lower status households, was identified at Baking Pot. However, unlike Laguna de On and Caye Coco, households at Baking Pot did not become more dependent on exotic materials such as obsidian for the production of utilitarian items. This difference is likely due to the interior location of Baking Pot. Although the site lies on the Belize River, which would have been a major transportation route, this region was likely not as heavily traveled as the coastal areas for exchange during the Postclassic period.

Second, evidence for large-scale community feasting by nobles in the Terminal Classic and Early Postclassic was identified at Baking Pot. While evidence supports the interpretation at Xunantunich that these events were likely serving to integrate the community during a time of social and political instability, Terminal Classic households at Baking Pot may not have used these venues to redistribute high quality meat, such as venison. However, high status households may have used similar strategies during the Postclassic period.

Although no evidence of Pan-Mesoamerican symbols or motifs were identified in house groups in Settlement Cluster C for any period, the decline in Maya iconography suggests lessening status differentiation. In addition, the shift in burial patterns, with Postclassic burials in flexed positions oriented to
the north, represented a major break in long-held traditions. Similar burial patterns have been identified at other Postclassic settlements, including Santa Rita and in the Petén Lakes (Chase 1997) suggesting these changes in burial practices were part of a regional change. Overall, the decline in Maya iconography, along with a break in burial patterns, suggests a shift in concepts of shared identity in the Postclassic.

In conclusion, an examination of household and community interactions at Baking Pot revealed that complex strategies were adopted to adapt to the processes of political decentralization. Economic and political interactions were similar to other examples, while ideological change may have featured more local responses. Due to the social and political instability at the end of the Classic period, households would have faced major changes within their daily activities. In some instances, new forms of interaction such as community feasting sought to promote solidarity. Reorganization in economic organization, primarily the amplification of mercantile exchange along waterways, provided new means for wealth accumulation. In addition, a leveling of status differences may have occurred, manifested in the decline in iconography and decorated ceramics.

While it is still unclear whether Postclassic occupation at Baking Pot represents continuity or disjunction from the Classic period, major changes can be identified. First, Postclassic settlement at Baking Pot is primarily concentrated in the eastern, central, and northern sections of the site. Shifts in material culture and ritual are present as well. The introduction of new types of goods, including copper bells, shows the wide-ranging impact of mercantile exchange during this period. The shift in burial patterns may represent an introduction of new forms of ideology or the movement of new residents into the site. In order to resolve the questions associated with the chronology of Postclassic occupation and the origin of its residents, burials and other materials are currently being radiocarbon dated. Furthermore, strontium and oxygen isotopes from these burials may provide additional clues to elucidate the continuity versus reoccupation scenarios. With either result, evidence at Baking Pot provides important clues in which to understand the collapse of institutionalized rulership along with mechanisms of social reorganization in the Postclassic period. These results suggest that we can no longer only focus on regional or site-specific patterns to clarify the collapse; rather, we must examine the variable social responses to these processes at the household level in comparison with broader patterns of social change.

References Cited

Aimers, James J.

Andrews V, E. Wyllys, and Jeremy A. Sabloff

Bermann, Marc P.

Boone, Elizabeth H. and Michael E. Smith

Chase, Diane Z.

Conlon, James M. and Jennifer J. Ehret

2000 Ancient Maya Settlement at Baking Pot, Belize: Results of the Continually Expanding Survey

Culbert, T. Patrick
1973 *The Classic Maya Collapse*, University of New Mexico Press, Albuquerque.

Demarest, Arthur A.

Demarest, Arthur A., Prudence M. Rice, and Don S. Rice (editors)

Faulseit, Ronald K.


Hayden, Brian

Helmke, Christophe G.B. and Jaime J. Awe

Hirth, Kenneth G.

Hoggarth, Julie A.


Hoggarth, Julie A. and Jaime J. Awe

Kolata, Alan

Lecount, Lisa


Marcus, Joyce


Masson, Marilyn

Hoggarth and Awe

Boulder.

Masson, Marilyn and Carlos Peraza Lope

McAnany, Patricia A. and Norman Yoffee (eds.)

Ringle, William M., Gallareta Negron, Tomás. Bey, George J. III.

Robin, Cynthia, Jason Yaeger, and Lisa LeCount

Schwartz, Glenn M.

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4 FISH FROM AFAR: MARINE RESOURCE USE AT CARACOL, BELIZE

Petra Cunningham-Smith, Arlen F. Chase and Diane Z. Chase

The ancient Maya had strong ties to the sea. The trade, transportation and use of marine resources were important not only to coastal Maya communities, but also to the heavily populated cities that lay many miles inland. Zooarchaeological evidence recovered from excavations at the inland site of Caracol, Belize suggests that the inhabitants imported marine fish for food, marine shell for working into trade items, and sharks teeth and stingray spines for ritual use. This research examines the manner in which fish and other marine resources were used, procured and transported from the coast to the site of Caracol. The possibility that certain marine fish might have been transported alive to the site is explored. An examination of present day fishing and animal husbandry practices suggests that many species could have survived an inland trip in ancient times if transported under conditions that allowed for water exchanges and minimized stress. Marine resources had important economic and ritual significance to the people of Caracol. Understanding the methods by which these valuable items were transported and traded ultimately facilitates a greater understanding of the economic and socio-political relationships among these ancient polities.

Introduction

The ancient Maya city of Caracol flourished in the tropical jungles of what is now Belize between 300 B.C. and A.D. 1050. The city is located in the Maya Mountains, far from the Caribbean coastline (Figure 1), yet archaeological evidence reveals that the inhabitants of this inland city were interested in the sea, and the creatures that lived there. Like the elite inhabitants of other inland Maya cities, residents of Caracol imported fish and other marine resources for use as food, as implements, as adornments and for ritual purposes.

The recovery of marine shell and faunal bone material from marine animals at archaeological excavations in Caracol is evidence that a trade network in marine products occurred between the ancient Maya inhabitants of the city and the Caribbean coast, but the mechanics of how this trade occurred are poorly understood. This study explores how such trade might have occurred, including the possibility of fish being transported alive from coastal fishing grounds to thriving inland cities through a system of river-borne trade.

The Belize River is the closest fully navigable river to Caracol, lying approximately 38 km from the site. The Belize River is one of the largest in the country and the ancient Maya would have relied heavily on it, both as a water source, and for waterborne transportation (Garber 2004). The Belize River has two principal tributaries, the Mopan River and the Macal River. The Macal River is the closest tributary to the Maya site of Caracol (Chase and Chase 1987:1). Unsuitable for waterborne navigation for its full extent (A. Chase personal communication 2010), the Macal River drains water from the Maya Mountains and joins the Belize River approximately two km north of the modern Cayo District town of San Ignacio. From here, the Belize River flows in an east-northeasterly direction to the Caribbean Sea, collecting water from major tributaries along the way.

Coastal trading ports, such as Mojo Cay, may have provided marine goods and resources to inland sites in the central part of Belize. Located at the mouth of the Belize River, the island site of Mojo Cay could have facilitated the importation of marine items to inland sites using the Belize River as its primary conduit (McKillop 2004b:37). Ancient Maya cities far from the coast were dependent on such trading ports for food. Many inland sites, including Caracol, made use of marine resources as food (Chase et al. 2004:15; Powis et al. 1999:6; Wing 1975:383). Lange (1971) suggested that much of the Maya population of the Yucatan Peninsula was dependent on marine resources as a primary protein source. While isotopic studies of the Maya diet do not support this theory (White and Schwartz 1989), there is evidence to suggest that the ancient Maya inhabitants of many inland sites went to considerable effort and expense to import marine fish to supplement their diet (Teeter 2001:81; Wing 1975:379; Wing and Steadman 1980:328).
Bishop Diego de Landa documented the extensive fishing industry of the Maya in the Yucatan after the arrival of the Spanish:

“The others pursue their fisheries on a very large scale, by which they eat and sell fish to all the country. They are accustomed to salt the fish, to roast it and to dry it in the sun without salt and they take into account which of these methods each kind of fish requires, and the roasted keeps for days, and is taken twenty or thirty leagues for sale, and for eating it they cook it again, and it is well flavored and sound. The fish they kill and which are found on that coast are very excellent and very fat skates and trout…” (Tozzer 1941:190).

Landa describes a number of marine species that were particularly favored by the Maya fishermen, both for consumption and trade. Chronicles such as these, while they were written during the contact period, suggest that fishing and commercial trade in food fish were profitable occupations that utilized contacts and trade routes that had likely been in place for generations.

In addition to their value as a food item, abundant evidence also exists for the ceremonial or religious use of both marine fish and mollusks (Wing and Hammond 1977:50-51). The demand for these items were remarkably consistent across the Maya Lowlands, with some items, such as stingray spines, being found in similar contexts throughout this vast area.

Faunal Analysis at Caracol

Zooarchaeological examination of faunal remains from inland sites can provide a wealth of information about the trade and use of animal resources (Emery 2003). Initial analysis of faunal remains recovered from archaeological excavations at Caracol was conducted by June Morton (1987). Morton’s work concentrated on 537 faunal elements from excavations conducted at the site during the 1985 and 1986 seasons. Morton identified eight species, primarily terrestrial animals indigenous to the surrounding areas. Stingray spines, recovered from a human burial were the only marine resource identified. Morton concluded that stingray spines, used for ceremonial purposes, were the only evidence of animal resource trade at Caracol. No evidence of other marine fish use was recorded in this study.

A subsequent detailed analysis of the faunal assemblage from Caracol was conducted by Wendy Teeter using information collected from excavations at the site between 1985 and 1998. Teeter (2001) analyzed over 84,000 pieces of animal bone recovered from a wide variety of contexts that included refuse deposits, burials, caches, in-situ floors, and construction fill. In addition to identifying bone to the most discrete taxonomic unit, Teeter examined the context of the assemblage to determine the subsistence and ceremonial practices of the ancient Maya residents across time. This detailed analysis became the subject of Teeter’s 2001 University of California PhD. dissertation, and resulted in a number of other publications (Chase et al. 2004; Teeter 2004; Teeter and Chase 2004).

Teeter’s investigation into animal use at Caracol revealed that a diverse number of marine vertebrates were used at Caracol (Teeter 2001; Teeter 2004; Teeter and Chase 2004). Teeter identified 194 fish elements from at least eight different taxa at Caracol. While a number of elements recovered could be identified only to the level of osteichthyes (bony fish), the majority could be distinguished between Rajiformes (skates and rays) which made up half of the marine assemblage, and different species in the Perciformes order. Teeter found that reef fish dominated the number of identified taxa at Caracol (Teeter 2001:81). Stingray, grouper, jack, snapper, parrotfish, sea catfish, grunt and barracuda were among the identified remains found at Caracol. Sharks were represented by teeth found in ritual caches (Chase and Chase 1998; 2007).

Teeter (2001:72) found that stingrays were the most common species of fish remains recovered at Caracol. Teeter identified at least fifty tail spine elements in burials and caches at Caracol that ranged in date from the Preclassic to the Late Classic Period. Teeter (2001:73) also noted that at least three caches and one burial contained stingray vertebrae or cranial elements. The use of vertebra centra appears to be limited to ceremonial caches and offerings, which
Teeter (2001:87) interpreted as being restrictive of their use.

The presence of stingrays at archaeological sites throughout Mesoamerica is nearly ubiquitous due to the demand for their spines. For the Maya, stingray spines had very strong religious and ceremonial significance, thus they are found in caches and burial offerings throughout the Maya world (Beaubein 2004:45-52; Chase and Chase 1998:316; Hamblin 1985:169; Moholy-Nagy 2004:199; Pohl 1983:75). The spine of the stingray was often used in bloodletting rituals to pierce the tongue, ears and penis (deBorhegyi 1961:283; Miller and Taube 1993:46; Schele and Miller 1986:71; Sharer 1994:108). Bloodletting ceremonies by Maya nobles are graphically depicted in Maya art, most notably at the site of Yaxchilan, where a number of stone sculptures celebrate the ceremonial bloodletting of several high status individuals (Schele and Miller 1986:189; Tate 1991). This ceremony, integral to Maya religion, gave the royal Maya access to the gods and confirmed the divine right of kingship (Schele and Freidel 1990:87). Stingray spines are found throughout the Maya world, and were likely a high-demand trade item at all sites (McKillop 2004a:222).

Parrotfish, another species identified by Teeter at Caracol, may have been especially desired for their beauty, as they are extremely colorful and distinctive. Hamblin (1984:37) described parrotfish as one of the “most popular fishes” in the faunal assembly at Cozumel. The stoplight parrotfish (Sparisoma viride), the type identified by Teeter (2001) from the Caracol faunal assemblage, is generally found on offshore reefs (Humann and Deloach 2002). As such, considerable effort would have been required to catch and transport them from offshore waters to coastal trading ports, and then from coastal areas to inland sites. Other reef fish found at the site, such as snapper, barracuda and grouper, may have had high value as food items.

Vertebrates were not the only important marine resource used at Caracol. Marine shell, primarily Strombus gigas and Spondylus americanus, are also found in burials and ritual contexts at Caracol, suggesting their importance as a ceremonial item (Chase and Chase 1998).

Transportation of Live Fish

The use of fish as food does not come without peril. The ingestion of bacteria associated with spoiled fish and the often fatal infections that follow could quickly decimate a population. The ancient Maya developed the methods of preparing and storing fish so that they did not spoil. Various methods of fish preservation- including salting, filleting and drying- would likely have been used for the transportation of fish from the coast to distant inland destinations such as Caracol. However the transportation of some species of fish alive would have been possible, and is, in fact, suggested by some archaeological contexts.

The presence of fish vertebrae and cranial elements at Caracol (Teeter 2001:75) suggests that not all fish coming into the site were processed elsewhere. Ethnohistorical accounts of fish being prepared for trade, such as those described by Landa and recounted above, would produce processed fish with little or no skeletal remnants to be found by archaeologists during excavation. Wing (1977:51) suggest that vertebral remains could be recovered in such cases if the fish were simply split down the middle, smoked or salted, with the vertebral column being left intact. These methods are plausible, but do not account for the recovery of some individuals, such as stingrays, which appear to have been used for ceremonial purposes and deposited intact (Chase and Chase 2008a).

Transporting fish alive to inland sites has been proposed as one means of acquiring the entire fish without having it spoil upon arrival. Healy and colleagues (2004:119) suggest that fish may have been transported up the Belize River in canoes partly filled with seawater. For ritual creatures, such as sponges and stingrays, seawater filled crocks might have been used to transport the items inland (Schele and Freidel 1990:200).

A canoe journey from the mouth of the Belize River to its apex at the modern town San Ignacio likely would take at least three full days.
(A. Chase, personal communication, 2009). A modern canoe race, La Ruta Maya Belize River Challenge, takes place each March and takes four days of paddling in three-man canoes on the Belize River, from San Ignacio to Belize City, approximately 180 miles (paddling for approximately 6 hours each day)- and this is downriver. Depending on river currents and seasonality, paddling from the Caribbean Sea to San Ignacio, upstream, would be considerably more arduous.

The transportation of live fish from reef areas, often located many kilometers off shore, to coastal trading areas, where they could be loaded onto canoes for the trip up river to inland sites, would require careful planning. Fish would have to survive in shallow water containers for at least four days and possibly longer. In the case of salt water fish, additional sea water would have to be carried to replace spilled water, or oxygen depleted water. Alternatively, the fish would have to be able to survive the lower salinity created by dilution with small amounts of river water when salt water was not available. Consequently, estuarine species, or at least 30 species that could survive in brackish water, would be best suited for such a journey. However, hardy reef fish in good condition would also be candidates.

To determine if such transportation was possible, an examination of modern fish husbandry practices is in order. Aquarium curators and tropical fish retailers often transport live fish long distances in closed containers. While some aquarists use mechanical aids, such as fish aerators to increase dissolved oxygen in the water, and chemical enhancers to slow fish metabolism, a great many fish are simply transported in containers from one location to another over many hours or even several days.

Miller (1956) describes a typical fish transport container as being a plastic bag containing approximately 5 gallons of water placed in a single-ply cardboard box. Fish thus packaged were transported by motor vehicle and by air from the interior of Mexico to the town of Tijuana. The elapsed time between capture and release of the live fish was 80 hours. Miller reported no mortalities among the transported fish.

Not every species of fish would survive transportation under these conditions. However, of these species whose remains were recovered at Caracol, small stingrays, grunts, sea catfish and parrotfish would be likely candidates. Modern research methods show that management of water quality enhances the survival rate of fish undergoing transport (Lim et al. 2003). Maintenance of water salinity improves water quality and, thus, enhances survivability.

Fishermen have known for generations that water quality must be maintained and fish must be kept alive long enough to get to market in the best possible condition. Archaeologists in Italy recovered the remains of a Roman fishing vessel in Grado, Italy dating to 200 AD that bore evidence of a well in the hull with a hydraulic feature designed to keep and transport live fish (Beltrame, et al 2011:276).

Modern fishing vessels use mechanical means to keep fish in a fresh state. Most modern fishing vessels are equipped with water aeration and circulation equipment to maintain water quality and keep fish alive until they can reach market. Prior to the availability of such mechanical devices, fishermen needed to rely on live bait wells to keep fish alive, sometimes for many days, during offshore trips for fish.

It is difficult today to find fishing boats with live wells that do not rely on mechanical means to keep fish alive. However, in the Bahamas, some older fishermen still fish the reefs with older boats that do not have aeration equipment in their fish holding tanks. Using the Bahamas as a reference point to make comparisons is valuable because many of the fish utilized there are the same as those found in the Maya area, and the history of the maritime economies between the ancient Maya and ancient Caribbean cultures share many similarities (McKillop 2010).

Cunningham-Smith (2011) observed modern fishermen in the Bahamas who use boats for offshore and reef fishing that do not have aeration equipment in its live well. These boats are generally older, with live wells that have been modified so that sea water is able to flow into the well with the motion of the boat, creating a continuous water exchange in the hold, and thus increasing oxygen content and
improving water quality which allows the fish to survive longer in the hold. Typically, this modification involves creating openings in the hull of the boat to allow for a free exchange of sea water. The fishermen who utilize these vessels are often gone from port for many days, and the oldest of these fishing boats do not have refrigeration on board. Thus, the fish must remain alive in the hold until the fishermen can get them to the fresh fish market, located in Nassau on the Isle of New Providence, Bahamas.

While not meant to draw direct comparisons between contemporary Bahamian fishermen and ancient Maya canoe traders, observation of the above fishing and animal husbandry practices strongly suggest that select fish could have been kept alive in containers for the journey up the Belize River if the conditions were right. Pottery vessels may have been used for such transport, as they could be constructed to hold the five gallons of water necessary for such transport. Additional salt water could be carried as needed for replenishing the containers.

Fish Size as a Condition of Live Transport

Size would be an important element in determining whether animals could be transported alive. The size of the animal would be constrained by the container in which it was transported. Thus, smaller animals with strong ritual significance would have been the most likely candidates for live transport.

As previously noted, stingrays are animals with strong ritual significance to the Maya. Teeter (2001:72) found that stingrays were the most common species of fish recovered at Caracol. Most of the stingray remains recovered at Caracol were found in caches and deposits, indicating their high value as a ceremonial item. Stingray size can vary, so smaller animals would have been most likely to survive live transport.

In 2008, 52 stingray vertebrae were recovered in a cache deposit during the excavations of a plaza in front of Structure C21 at Caracol (Chase and Chase, 2008a). The vertebrae were photographed, with scale, as part of the archaeological investigation (Figure 2). Although the original vertebrae were not available for inspection, the photograph provided an opportunity to make a rough estimation of the size of the stingray for the purpose of determining if it was small enough to be transported alive as described. Based on the size and shape of the vertebrae, it was determined that the animal was most likely a member of the genus *Dasyatis*, which includes a number of stingray species found in Caribbean waters. The size of the stingray can be estimated using an allometric formula developed by Reitz et al (1987).

As used in zooarchaeology, allometric equations relate proportional changes between parts of an animal as size increases (Reitz et al, 1987). The skeletal elements of an animal scale allometrically with body size (Peters 1983). As described by Reitz, et al (1987), the scaling relationship can be predicted using the following formula:

\[
\log Y = \log a + b \log x
\]

In this formula, \(b\) represents the slope of the line, \(a\) represents the \(y\) intercept, \(x\) represents the independent variable (skeletal measurement), and \(y\) represents the dependent variable (estimated body mass). Many vertebrate characteristics scale allometrically, but for this study the most useful was bio mass, or live body weight, and total length in relation to the measure of the most cranial vertebrae.

To estimate the standard length and live weight of the stingray recovered from Caracol, the height and width of the most cranial were measured. These data were correlated with data collected from similar species represented in the zoological collection at the Florida Museum of Natural History. The above allometric formula
Table 1. Results of allometric scaling to determine the size of an archaeological specimen (Dasyatis sp.) found at Caracol, Belize.

<table>
<thead>
<tr>
<th>Measurement (mm)</th>
<th>N=</th>
<th>R²</th>
<th>Intercept a</th>
<th>Slope b</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vht. vs. TL</td>
<td>4.67</td>
<td>16</td>
<td>0.53</td>
<td>2.4981972</td>
<td>0.4667100</td>
</tr>
<tr>
<td>Vht. vs. Bio (g)</td>
<td>4.67</td>
<td>16</td>
<td>0.9069503</td>
<td>1.0805382</td>
<td>3.1264508</td>
</tr>
<tr>
<td>Vwd. vs TL</td>
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<td>16</td>
<td>0.5307620</td>
<td>2.4577064</td>
<td>0.4936919</td>
</tr>
<tr>
<td>Vsd. vs. Bio (g)</td>
<td>5.23</td>
<td>16</td>
<td>0.8717668</td>
<td>0.8588430</td>
<td>3.2347913</td>
</tr>
</tbody>
</table>

was used to calculate the estimated total length and weight of the stingray (Table 1).

These data indicate that the Caracol stingray was approximately 650 mm in length and weighed approximately 1500 grams. The accuracy of this prediction is based on the assumption that the vertebrae recovered from this deposit represent a single animal, and that the largest of the vertebrae recovered were also the most cranial. If these assumptions are correct, the stingray would have been small enough to have been carried alive from Caribbean waters to Caracol, providing adequate water quality was maintained throughout the journey.

Discussion

Zooarchaeology can tell us many things about the possibility of long-distance trade in the Maya world. At its most basic, the identification of faunal elements in areas far outside their natural geographic range is evidence of long distance transport and trade (Hamblin 1984). The recovery of marine fish remains and other marine fauna from Caracol and at other inland sites clearly illustrates that this long distance trade occurred, however, the methodology of how these items were transported is somewhat more obscure. The presence of reef fish, such as parrotfish, at coastal Maya sites suggests that fishing technology was sophisticated enough to support transport over water, some 55 km offshore in some cases, and to return with fish in usable condition for food (Wing and Hammond 1974). The presence of reef fish remains at inland sites such as Caracol (Teeter 2001), Lubantuun (Wing 1975), Cahal Pech (Powis et al. 1999) and others suggests that the ancient Maya had a strong demand for such fish; the ability to transport it long distances; and, the ability to preserve or otherwise keep it in good condition until it could arrive at the site of its intended use.

Coastal trade has been linked to the emergence of strong northern polities such as Chichen Itza during A.D. 950-1200, after the collapse of major urban centers in the southern lowlands (Finamore 2010). Other scholars, (Andrews 1990, 2003; Cobos 2004) see this emergence as being much earlier, but still linked to coastal trade. It should be noted that even in the south, coastal trading centers such as Marco Gonzalez (Graham and Pendergast 1989), Mojo Cay (McKillop 2004b) and others remained thriving after the collapse. Lamanai, an inland site located on the New River, appeared to survive the lowland collapse, perhaps because of its association with the trading port of Marco Gonzalez. Caracol shows evidence of occupation through at least 900 AD (Chase and Chase 2007, 2008b) in conjunction with a continuation of the importation of fish and other marine items. Thus, marine trade items were maintained at least through the Terminal Classic Period.

It is likely that most of the marine fish transported to Caracol were preserved through filleting, salting, drying, or some other method and were transported with other trade goods through the usual networks of coastal and inland river trade. However, the recovery of cranial and vertebral fish remains from inland sites such as Caracol suggests that at least some fish were not butchered and prepared for inland sale on the
coast. Some species of ritual significance or those desired as luxury food items may have been transported alive to the site. It has been suggested that this could be accomplished in canoes partly filled with water, but it also could have occurred in pottery vessels that would easily have held smaller animals of ritual significance, such as stingrays, or with animals of great beauty, such as parrotfish. Modern husbandry practices suggest these species could have survived an inland trip if transported in conditions that allowed for adequate water exchanges and minimized stress.

Fish with enhanced value, or animals of value for ritual purposes would have been the strongest candidates for live importation. Colorful fish or those with iridescent scales might have had value to ancient Maya elite based on their beauty. Iridescence was particularly valued by the Maya. Houston et al. (2009: 49) notes that the Maya were attracted to the iridescent feathers of the quetzal and the hummingbird, and that the fragility and limited availability of these feathers may have added to their appeal. The mirror-like iridescence of the snapper and barracuda, or the turquoise and jade colors of the parrotfish, apparent only as long as the animal was alive, may have held a similar attraction, thus making them worth the considerable cost and energy required to procure them from the coast.

Marine animals may also have been transported alive to inland sites for ritual purposes. Particular species with strong ritual connotations, such as stingrays, might have been valuable offerings for a particular ceremony or burial. Maxwell (2000) has argued that toxic marine animals, such as stingrays, might have held great significance as ritual objects. Maxwell proposed that the toxic state of stingray spines and other marine organisms (such as puffer fish, sponges, and coral) found in ceremonial connotations at Tikal made the objects more valuable for ritual purposes. Maxwell suggests that the dangerous aspects of these species, coupled with the possible physical effects of exposure to their toxins, would have enhanced the ritual experience of the participants and, possibly, increased the value of their sacrifice. Transporting these animals alive to ceremonial sites would have enhanced their value, as their venom would have remained fully potent and intact. Small stingrays, which can survive for many days in shallow brackish water conditions, could possibly be transported in ceramic vessels as suggested by Schele and Freidel (1990:200).

The use of such methods could explain the recovery of what appear to be the remains of entire organisms from caches such as those recovered at Caracol (Chase and Chase 2008a). The transportation of live animals over great distances would have been costly in terms of labor and equipment. While it is unlikely that such effort would be expended on everyday food items for the population at large, it may have been appropriate for items that were reserved for special ritual events or as particular luxury food items for the elite.

Salted and dried for food, or carefully carried inland for ceremonial uses, fish and other marine resources were of great importance to the Maya. The use of marine resources by inland Maya communities was possible only through the utilization of complex economic and transportation networks. Based on this preliminary study, it is suggested that there were multiple modes of transport for marine animals, and that future research on the use and transport of live marine resources is warranted.

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References

Andrews, Anthony P.

Beaubien, Harriet F.

Beltrame, Carlo, Dario Gaddi, and Simon Parizzi

Chase, Arlen F. and Diane Z. Chase

1998 Scale and Intensity in Maya Classic Period Agriculture: Terracing and Settlement at the “Garden City” of Caracol, Belize. Culture and Agriculture (20) 2-3 pp. 60-77.

2007 “This is the End”: Archaeological Transitions and the Terminal Classic Period at Caracol, Belize. Research Reports in Belizean Archaeology 4:13-27.


Chase, Arlen F., Diane Z. Chase & Wendy G. Teeter

Cobos, Rafael


Cunningham-Smith, Petra

deBorhegyi, Stephan F.

Emery, Kitty

Finamore, Daniel

Graham, Elizabeth and David M. Pendergast

Hamblin, Nancy L.


Healy, Paul F., David Cheetham, Terry G. Powis and Jaime J. Awe

Houston, Stephen, Claudia Brittenham, Cassandra Mesick, Alexandre Tokovinine and Christina Warinner

Hunan, Paul and Ned DeLoach
Lange, Frederick W.  


Lim, Lian Chuan, Phillipe Dhert, and Patrick Sorgeloos 2003 Recent Developments and Improvements in Ornamental Fish Packaging Systems for Air Transport *Aquaculture Research* 34: 923-935.


Wing, Elizabeth S.

Wing, Elizabeth S. and Norman Hammond

Wing, Elizabeth S. and Steadman, D.

Witschey, Walter R. T. and Clifford T. Brown
5 **LIVING THROUGH COLLAPSE: AN ANALYSIS OF MAYA RESIDENTIAL MODIFICATIONS DURING THE TERMINAL CLASSIC PERIOD AT ACTUNCAN, CAYO, BELIZE**

David W. Mixter, Kara A. Fulton, Lauren Hahn Bussiere, and Lisa J. LeCount

Research during the 1990s by the Xunantunich Archaeological Project found that Mopan River Valley populations experienced a relatively rapid decline during the ninth century in association with the collapse of Classic Maya polities. Recent research by the Actuncan Archaeological Project indicates a locally different demographic pattern. Rather than a slow abandonment, Actuncan’s urban households continued to grow during the Terminal Classic period. This paper reports on the patterns of architectural modifications within three households at Actuncan during the Late and Terminal Classic periods and their possible implications for shifting social and political power structures within the Mopan Valley region.

**Introduction**

In recent years, the ninth and tenth century collapse of Classic Maya society in the southern lowlands has been increasingly characterized as varied in pace and form (Aimers 2007; Demarest et al. 2004). As the regimes of Classic period kings failed, the institution of divine kingship marked by the title k’uhel ajaw was rejected (Rice et al. 2004); however, the processes of collapse varied substantially between polities (Yaeger and Hodell 2008). This variability was particularly true for Maya occupying secondary centers in the hinterlands of eighth century capitals. These populations may have had greater latitude in reacting to political turmoil, possibly because distance allowed them to disassociate themselves from failing rulers.

How hinterland communities responded to the collapse of centralized power has been a particular concern of research in the upper Belize River Valley (Ashmore et al. 2004; Connell and Silverstein 2006; Hoggarth 2012). Multi-scalar research on rural and secondary center households provides evidence to investigate different reactions to collapse within a single polity (Golden and Scherer 2013; Manahan 2004). For example, during the dissolution of the Xunantunich polity, the majority of rural households emigrated in step with the declining political authority of capital elites during the latter part of the Late Classic period (Ashmore et al. 2004). Yet some populations remained longer than others. At the farming village of San Lorenzo, founding households endured into the Terminal Classic period, reflecting their deep investment in land and local resources. In a similar vein, we view the collapse through the lens of strategies adopted by households at Actuncan, located 2 km south of Xunantunich. Here, populations remained stable through the Late to Terminal Classic periods, indicating a different set of strategies than those adopted by households at Xunantunich, San Lorenzo and other minor and major centers in the valley. Investigating the varied responses of households within sites, as well as across different sites, will help us untangle the socio-political impact of the collapse at all scales of Maya society.

Antonia Foias (2013) emphasizes three different scales of socio-political interaction: macro-, middle- and micro-scales. Macro-scale politics address interactions between polities, which for Mayanists is largely reconstructed through events recorded in hieroglyphic texts found on monuments, gifts exchanged across royal families, and similarities in site layouts (Ashmore and Sabloff 2002; Martin and Grube 2008). Middle-scale politics focus on the structure of political organization and administration within polities, evident through site-size hierarchies and the distribution of populations across the landscape. Finally, micro-scale politics focus largely on household mechanisms for establishing, maintaining, or resisting community and polity level authorities as signaled through household architecture and artifact assemblages (Canuto and Yaeger 2000). The two smaller scales provide an opportunity to understand the agency of commoner and non-royal elite households within Maya politics.
This multi-scalar approach is particularly important in understanding the substantial political transformations of the Maya collapse. Without a doubt, the failure of some royal regimes was influenced by pan-Maya, macro-scale politics; however, the variability in events following regime failures points to the importance of intra-polity dynamics in determining local trajectories. Middle-scale dynamics can be tracked through demographic changes within a polity and geographic shifts in the centers of regional power. At the micro-scale, changes in power relations can be seen by carefully tracking changes within individual households. These lower-order investigative scales focus on understanding the collapse from the variable, agent-driven reactions of communities and households rather than top-down failures of Classic hierarchies.

In this paper, we focus on middle- and micro-scales to explore the strategies adopted by Actuncan households. We begin by examining demographic trends within the Xunantunich polity, of which Actuncan was a member by the Late Classic period (A.D. 600-780). However, Actuncan’s construction of new Terminal Classic (A.D. 780-1000) civic architecture reflects a re-centering of local power. Actuncan’s Terminal Classic prosperity may have derived partially from its history as the first Preclassic capital of the region, which attracted people intent on revitalizing the site and local culture (Mixter 2013). But its success would have been founded on micro-scale political negotiations that established stable power dynamics among local community members. To address micro-scale politics, we look at how three Terminal Classic households modified their architecture and then link these modifications to the adoption of more collaborative relationships among households. These collaborative relationships differ from the hierarchical ones seen in the Late Classic period. Ultimately, this renegotiation of relations allowed Actuncan to succeed as a post-collapse community for at least a century after the failure of its neighbors.

**Actuncan and the Fall of Xunantunich**

Actuncan is located on top of a ridge along the Mopan River upriver of its confluence with the Macal River (Figure 1). The site is well-known for its Late Preclassic and Early Classic monumental architecture and an early carved stela (Fahsen and Grube 2005). Research on the site’s monumental architecture by James McGovern (2004) identified negligible amounts of Late Classic construction and no evidence of construction associated with the site’s monumental core during the Terminal Classic period (Figure 2). McGovern concluded that by
the end of the Early Classic period (A.D. 300-600), Actuncan’s ceremonial center ceased to serve as the seat of a local king, a finding that recent Actuncan Archaeological Project excavations have largely confirmed (Mixter et al. 2013). Classic authority shifted from Actuncan to Buenavista del Cayo before the end of the Early Classic period and to Xunantunich sometime in the first part of the Late Classic period (LeCount and Yaeger 2010; Leventhal and Ashmore 2004).

Despite the loss of power, Actuncan was not abandoned in the Early Classic period. Recent excavations on households within the Actuncan core indicate that most households continued to be occupied throughout the Classic period, at which time the site likely functioned as a small secondary center within the Buenavista and later, Xunantunich polities. The rise and fall of Xunantunich as a center of authority has been well documented (LeCount and Yaeger 2010; LeCount et al. 2002). Under the probable sponsorship of an ascendant king at Naranjo, Xunantunich rose rapidly to power during the seventh century accompanied by a boom in civic construction and the growth of hinterland populations connected to the capital. Actuncan’s allegiance to Xunantunich during Late Classic period is documented by the erection of Group 8 and remodeling of Structure 19 (the site’s largest range structure) into a household group befitting a vassal noble (Mixter et al. 2013). Yet, by the end of the Late Classic period, Xunantunich’s palace was sacked and ritually buried (Yaeger 2010a). This action and the erection of three carved stela between A.D. 820 and 849 indicate a transition to local rule and the attenuation of Naranjo’s authority within the valley (Helmke et al. 2010). Nonetheless, even as Xunantunich gained independence, its new leaders began to lose control over their own polity. This trend is marked by changes in both the Xunantunich center and in its hinterlands. Much of the site’s civic complex was abandoned and public activities were restricted to one small plaza in front of the site’s largest ceremonial structure (Jamison 2010). At the same time, other local centers, such as Buenavista del Cayo and Cahal Pech (Awe 2013; Helmke et al. 2008), began to bury individuals in the manner of kings, possibly contesting Xunantunich’s claim to wide-reaching regional authority. Other local settlements, such as Arenal and Actuncan, initiated new programs of civic construction (LeCount et al. 2011; Taschek and Ball 1999). Taken together, these events indicate a decentralization of Terminal Classic power within the immediate region.

The dissolution of Xunantunich’s power provided opportunities for previously allied centers and households to gain independence and make their own decisions. At some centers, such as Cahal Pech, ostentatious displays of wealth, in the form of kingly burials, represented a declaration of power. Other centers, including Actuncan, resumed the construction of public architecture, representing an aggregation of labor and authority at these locations. Individually, households also reacted to the failing power at Xunantunich, most strikingly by deciding whether or not to leave their homesteads and resettle in other territories.

Population Dynamics and the Collapse

Household decisions to stay, to leave, or to build anew reflect middle-scale political dynamics. In this section, we present data that describe the changing distribution of people across the valley landscape from the Late Classic to Terminal Classic periods (Figure 3). Three sets of data are presented here (Table 1). First, Xunantunich Settlement Survey (XSS) data document the occupation of residential mound groups along Transect 2 (Ehret 1995), which ran from the northern edge of Xunantunich to Callar Creek, a secondary center between Xunantunich and Buenavista del Cayo (see Yaeger 2008:Figure 3). The transect was divided in four sections to chart the distribution of settlement clusters between these competing centers. From south to north, these segments are Xunantunich, Actuncan, Vaca Bravo, and Callar Creek. Conveniently, the transect ran just west of Actuncan’s core but did not include households located within the Actuncan core. Second, data collected by Jason Yaeger (2010) document occupational phases of residential structures within the village of San Lorenzo, located across the Mopan River from Xunantunich and Actuncan. These data result from excavations at 29 individual structures from 15 mound groups. Finally, data collected
by the Actuncan Archaeological Project document the occupation of eight intensively excavated residential mound groups, through the excavation of 20 structures (Table 2)\textsuperscript{1}.

Data from XSS indicate that all hinterland zones reach a peak of population during the second half of the Late Classic period, followed by a substantial decrease in the Terminal Classic period, and near complete abandonment by the Postclassic period (Yaeger 2008). While 79 percent of tested households are occupied in the Late Classic period, only 38 percent of households were occupied during the Terminal Classic period. The testing program of urban households at Actuncan indicates a more measured pace of abandonment. After a decrease in occupation from the Early Classic to the first half of the Late Classic period, some households are reoccupied during the second half of the Late Classic period. Unlike other areas of the Mopan River Valley, household occupation then declines by only one household in the Terminal Classic period with evidence of continued occupation into the Early Postclassic period. Contrary to previous models, which see the Mopan River Valley slowly but entirely depopulated, these data strongly indicate that Actuncan maintained its population following the collapse of Xunantunich.

Taken in aggregate, these figures indicate a difference in decision-making between the occupants of Actuncan’s core and other local centers and communities. Yaeger and Cynthia Robin (Ashmore et al. 2004; Robin 2013:168-171; Robin et al. 2010) document that the longest remaining households were also the oldest at the villages of San Lorenzo and Chan, and they attribute this pattern to the greater historical control of resources afforded founding families following the Principle of First Occupancy. Robin (2013:168-171) also documents that those Chan households showing the strongest affiliation to Xunantunich were among the earliest to be abandoned, perhaps indicating that their position in the community was largely contingent on political backing from the center.

At Actuncan, the question of first occupancy does not apply because no clear decline in population happened until its final abandonment in the Postclassic period. Further, the only household abandoned before the Terminal Classic period is Group 8, the noble compound focused on Structure 19. Mixter and

Figure 3. Chart showing the percentage of residences occupied during each time period within settlement zones along the Mopan River Valley (modified from Yaeger 2008:Figure 4).
Table 1. Occupation histories of Mopan River Settlement zones (after Yaeger 2010b:Table II.3 from Ehret 1995, Yaeger 2000, 2008; Actuncan core data is courtesy of the Actuncan Archaeological Project).

<table>
<thead>
<tr>
<th>Periods</th>
<th>Xunantunich Transect</th>
<th>Actuncan Transect</th>
<th>Vaca Brava Transect</th>
<th>Callar Creek Transect</th>
<th>San Lorenzo</th>
<th>Actuncan Core</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 6</td>
<td>N = 7</td>
<td>N = 5</td>
<td>N = 10</td>
<td>N = 29</td>
<td>N = 8</td>
<td>N = 65</td>
</tr>
<tr>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td>(N) Freq (%)</td>
<td></td>
</tr>
<tr>
<td>Middle Preclassic</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>100%</td>
<td>3</td>
<td>9</td>
<td>90%</td>
</tr>
<tr>
<td>Late Preclassic</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>57%</td>
<td>2</td>
<td>6</td>
<td>60%</td>
</tr>
<tr>
<td>Terminal Late Preclassic</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>57%</td>
<td>3</td>
<td>9</td>
<td>90%</td>
</tr>
<tr>
<td>Early Classic</td>
<td>2</td>
<td>33%</td>
<td>4</td>
<td>57%</td>
<td>1</td>
<td>20%</td>
<td>70%</td>
</tr>
<tr>
<td>Late Classic I</td>
<td>5</td>
<td>83%</td>
<td>5</td>
<td>71%</td>
<td>2</td>
<td>40%</td>
<td>9</td>
</tr>
<tr>
<td>Late Classic II</td>
<td>6</td>
<td>100%</td>
<td>7</td>
<td>100%</td>
<td>5</td>
<td>100%</td>
<td>2</td>
</tr>
<tr>
<td>Terminal Classic</td>
<td>2</td>
<td>33%</td>
<td>3</td>
<td>43%</td>
<td>2</td>
<td>40%</td>
<td>1</td>
</tr>
<tr>
<td>Postclassic</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
</tbody>
</table>

1. San Lorenzo frequencies refer to structures following Yaeger 2010b while both Xunantunich Settlement Survey (Ehret 1995) and Actuncan core counts refer to residential groups.

Table 2. Residential groups investigated at Actuncan and their associated structures. Structures in bold have been the target of excavations.

One Structure-focused Patio Cluster
Group 8
Structures 19, 19b, 20, 21a, 21b, 22, 24, 25

Four Patio-focused Groups
Group 1
Structures 59, 60, 61, 62
Group 5
Structures 63, 64, 65, 66
Group 6
Structures 53, 54
Group 7
Structures 55, 56, 57, 58

Three Large Single Mound Residences
Structure 29
Structure 41
Structure 73

colleagues (2013) document that Structure 19 was razed by the end of the Late Classic period and certain parts of the compounds received termination rituals in the early part of the Terminal Classic period, actions that point to Actuncan’s rejection of Xunantunich’s rule. This palace termination did not adversely affect Actuncan’s urban core; rather, it preceded the creation of a large civic platform (Group 4), the largest documented Terminal Classic building within this portion of the Mopan Valley (LeCount et al. 2011). The construction of this new center of governance points to Actuncan’s success in consolidating their post-collapse community. This building is symbolic of a political consensus among households about the nature of post-royal leadership, while the continued occupation of households marks successful household negotiations to create a new social contract.

In the remainder of the paper, we address the micro-scale politics of the collapse through the results of excavations at three households at Actuncan. These investigations have revealed a complex pattern of household construction,
abandonment, and reoccupation that speaks to both the site’s complex political history and the entanglement of individual urban households in that history. In particular, we look at Late and Terminal Classic renovations in order to understand the social strategies adopted by Actuncan’s households following the collapse. From these strategies we can begin to infer aspects of social regeneration at Actuncan and the engagement of specific households in this process.

Three Actuncan Households

Eight households within the Actuncan site core have been intensively excavated: one structure-focused patio cluster (Group 8), four patio-focused groups (Groups 1, 5, 6, and 7) and three large single mound residences (Structures 29, 41, and 73). For the purposes of this paper, we limit the sample to the two most extensively investigated patio-focused groups and one large single mound residence. The patio-focused groups, Groups 1 and 5, consist of several buildings oriented towards a central patio (Figures 4a and 4b) and are situated on the northwest edge of the site’s civic core. The large single mound residence, Structure 41, is located on the eastern edge of Actuncan’s core (Figure 4c). During the Classic period, the large patio-focused groups may have been the residences of wealthy commoners given their close proximity to the civic core. In contrast, Structure 41 was likely a founding elite family of the Terminal Preclassic civic center and “big house,” similar to the nimja documented in the Maya highlands (Braswell 2003; Carmack 1981). For each of these households, we briefly summarize the occupation history and focus on the Late and Terminal Classic architectural modifications.

Group 1

Group 1 is the largest patio-focused group within the Actuncan core. Founded sometime in last years of the Late Preclassic period, Group 1 grew into the largest patio-focused group both in terms of area and mound size. Major building periods were marked by the laying down of three plaster patio floors, the last of which was constructed in the Early Classic period. After a break of at least 80 years, architectural modification began again in the second half of the Late Classic and continued into the Terminal Classic period. During this time, building platforms were raised and expanded, but only dirt floors accumulated on top the Early Classic plaster patio floor.

While excavations have uncovered some ceramic material from the first part of the Late Classic period (Samal phase), no construction is clearly dated to this period. While we don’t have strong evidence to indicate that the group was abandoned during this time, the lack of household renovation suggests it may have been.
But if residents remained, their inability to renovate speaks to diminished access to labor.

Group 1 is renovated during the second half of the Late Classic period with architectural modifications present on all four structures. However, during the Terminal Classic period, residents focused their architectural efforts on the enlargement of the southernmost structure, Structure 61, which faces the public plaza to the south. No other Terminal Classic architectural modifications are evident elsewhere in the group. Structure 61’s building platform was increased by at least 1 m in size using dry laid, chert-cobble fill not unique to Group 1 (Figure 5). Elsewhere in the site, we have found dry laid cobble-fill to be a hallmark of Terminal Classic construction, indicating a distinct change in building practices from the densely packed cobble, dirt and midden fill of the Late Classic period. Because of Structure 61’s location fronting Plaza H, it seems likely that the effort to increase its size was meant to amplify the grandeur of the group’s appearance when viewed from this plaza, south of Group 1. Residents may have been attempting to emphasize their perceived socio-political importance to regain prestige within the community. In short, this construction could have been an effort by residents to emphasize their return to prominence or an attempt by new occupants to assert their importance within the community.

**Group 5**

Group 5 is a small patio-focused group in the northwestern part of the site center, just west of Group 1. Occupation began during the Terminal Preclassic period and continued into the Terminal Classic period. Unlike the building hiatus at Group 1, occupation at Group 5 shows continuity and stability throughout the sequence. Our 2011 excavations at Group 5 focused on trenches through the group’s northern and western structures, Structures 64 and 65, respectively. Both of these structures have long occupation histories that stretch back to at least the Terminal Preclassic period, when most of the civic core was constructed.

During the Terminal Classic period, architectural modifications served to enlarge the size of both buildings. A bench feature was added to Structure 64, and the orientation of Structure 65 was shifted from 350 degrees to almost directly north-south (Figure 6). All Terminal Classic building phases are associated with the creation of new patio floors, some of which were plastered, indicating that occupants had a more consistent access to resources than...
those living at Group 1, where dirt floors accumulated. In sum, Group 5 does not appear to have suffered a dramatic decline in the Terminal Classic period as measured by building episodes. Instead, the residents continued to build platforms with dressed stones and plaster surfaces. This pattern is especially interesting given that of the three residential groups discussed in this paper, Group 5 is the smallest in size. If size can be equated with socio-economic status, then it was the lowliest patio-focused group.

Structure 41

Structure 41 is a single large platform surrounded on all sides by low terraces. It is considered a domestic building because of its large attached terraces, which likely functioned as work areas, and its association with two auxiliary buildings located off its east side. We view this residential layout as suggesting multiple tiered and segregated work areas similar to those reported in elite residences at Calakmul (Folan et al. 2001).

The building has a long history of modifications. It was originally constructed during the Late Preclassic period and modified substantially in the Terminal Preclassic period. The Early Classic version of the structure likely supported a masonry superstructure based on the buried remains of a low wall stub and vault stones located off the northern edge of the structure (Figure 7). Before the end of the Early Classic period, a termination deposit of finely decorated ceramics was placed on the structure’s southern terrace marking the abandonment of the structure. This deposit was not covered by a subsequent construction until the end of the Late Classic period, at which time the structure was rededicated, renovated, and reoccupied.

When the southern façade was renovated, the Early Classic termination deposit was covered by a single large deposit of chert river-cobbles. The masonry structure was torn down and the southern half of the platform was cut into and lowered slightly, creating the two tiered platform. In the process of removing the masonry superstructure, only the basal course was left in place. Burning on the Early Classic floor and the remaining wall stones suggests intentional destruction (Figure 7). After its dismantlement, the wall stub was covered by a plaster platform surface, on which a pole and thatch building was constructed. This structure, 41-1st, was used for over a century. Ceramic data indicates the building remained occupied through the Terminal Classic period and was abandoned sometime during the Early Postclassic period. During the Terminal Classic period, the upper section of the platform underwent a series of minor architectural modifications typical of long occupied households.

The identity and social status of the Terminal Classic occupants of Structure 41 is not entirely clear. Because of the break in occupation between the Early Classic and Terminal Classic periods, we cannot assume continuity in kinship of the occupants. Although the Early Classic residents of Structure 41 were likely among the site’s most powerful elite, the group that reoccupied the building did not adopt the same architectural symbols of elevated status. Most tellingly, by removing the masonry structure and replacing it with pole and thatch, the new occupants lived in conditions on par with their neighbors in patio-focused groups.

Discussion

These three households are examples of the types of Terminal Classic constructions built by Actuncan residents during the time when Xunantunich underwent its protracted dissolution. Each of the households discussed here outlasts Xunantunich by as much as 100 years. Group 1 and Structure 41 survived into the Postclassic period, and Group 5 has multiple phases of Terminal Classic construction.
Further, the residents of these households formed part of the labor party that built Group 4, the Terminal Classic civic building. Given these data, it is clear that following the termination of Xunantunich Late Classic regime, Actuncan’s households were able to successfully establish a new social order. But each household responded differently to the developing political situation. The occupants of Group 1 felt the need to legitimize their importance within the new society through the enlargement of their southern structure, possibly as a display of long-term connections to the past and their substantial command of labor. In contrast, the occupants of Group 5, the most continuously occupied but lowest ranked group, did not change their pattern of renovation. It is possible that this group’s deep roots in the community and humble architecture positioned them well for post-royal Actuncan. Unlike the changes in façade, fill, and patio floor construction techniques seen in Group 1, the residents of Group 5 continued to build using masonry block façades and plaster patio surfaces, a practice that indicates continued access to resources and labor in Actuncan’s Terminal Classic society. Structure 41 experienced the most dramatic changes. While the platform is reoccupied at the end of the Late Classic period, the occupants did not live in the masonry superstructure previously located on the platform’s surface. The destruction of this superstructure indicates to us that the occupants were sensitive to social disparities. The razing of the superstructure may have functioned as a leveling mechanism marking a rejection of socially overt elites. Based on these data, we suggest that the Actuncan community negotiated the collapse at the micro-scale by rejecting the Classic period hierarchical social system. In its place, they relied on a more heterarchical system, complete with leveling mechanisms, to integrate their new community.

Conclusions
Terminal Classic populations adopted a variety of strategies to reorganize their communities during the collapse. Many emigrated, possibly to the northern lowlands or the southern highlands. Others took advantage of the power void to establish new regimes under different rules. What is important about the site of Actuncan is that it was the setting of an in situ reorganization. The local community banded together, along with possible immigrants, to create a new community structure.
From a population perspective, Actuncan was very successful in weathering the collapse. Middle-scale analysis indicates that populations across the valley declined, even in established agrarian settlements, such as San Lorenzo and Chan, where only the oldest families remained into the beginnings of the Terminal Classic period. In contrast, most members of the Actuncan community remained and established new political structures founded on the recognition of greater equality. Overt displays of class difference, such as masonry superstructures, were no longer acceptable. Although class boundaries dimmed or disappeared, wealth differences apparently continued to exist. Distributional studies of obsidian indicate that formerly elite households, such as Structure 41, had substantially greater access to obsidian during the Terminal Classic period than their plaza-focused neighbors (Shults and LeCount 2013). The possibility that material differentiation continued to exist, and in some situations considered socially acceptable, presents an interesting tension to the apparent rejection of class differentiation at the time.

Ultimately, the Terminal Classic revival at Actuncan did not last. Ceramics from the Terminal Classic civic center and several households indicate continued occupation into the Postclassic period (LeCount et al. 2011). By this time, most other local sites were entirely abandoned except Baking Pot, Barton Ramie, and Tipu (Aimers 2004). At Xunantunich and Chan, small altars used for reverential offerings mark Postclassic visitation, but no solid evidence remains for residential occupation (Brown 2011; Robin et al. 2012). During the Late Postclassic period, the center of public life switched to Tipu located in the Macal River Valley (Graham et al. 1985). Regardless, Actuncan’s short-term success points to one way local populations reorganized themselves after regime failure during the Maya collapse.

Acknowledgements We would like to thank the Belize Institute of Archaeology for providing us the opportunity to undertake this research. In particular, Drs. John Morris and Jaime Awe have been encouraging and we greatly appreciate their observations, suggestions, and support. We would like to thank our fellow members of the Actuncan Archaeological Project for creating an intellectually stimulating field environment. We would particularly like to recognize Dr. John Blitz, Dr. Carolyn Freiwald, Dr. Angela Keller, and Bobbie Simova who worked with us during the 2011 field season when much of the research for this paper was completed. We would also like to thank the men and women of San Jose Succotz village, without whose hard work none of this would be possible. Our research has been funded by the National Science Foundation (grant BCS-0923747 to LeCount), the Wenner-Gren Foundation for Anthropological Research, the UCSD Center for Iberian and Latin American Studies, the Tinker Foundation, and the Washington University Graduate School of Arts and Sciences. We also thank BrieAnna Langlie for providing comments that greatly improved this paper.

References Cited

Aimers, James J.

Asmore, Wendy, and Jeremy A. Sabloff

Ashmore, Wendy, Jason Yaeger, and Cynthia Robin


LeCount, Lisa J., Jason Yaeger, Richard M. Leventhal, and Wendy Ashmore

Leventhal, Richard M., and Wendy Ashmore

Martin, Simon, and Nikolai Grube
2008 Chronicles of the Maya Kings and Queens: Deciphering the Dynasties of the Ancient Maya. 2nd ed. Thames and Hudson, London.

Manahan, Kam T.

McGovern, James O.

Mixter, David W.
2013 The Memory of Collapse: Considering the Role of Cultural Trauma in Societal Reorganization following the 9th Century Maya Collapse at Actuncan, Belize. Poster presented at the 29th Annual Visiting Scholar Conference, Center for Archaeological Investigations, Southern Illinois University, Carbondale.

Mixter, David W., Thomas R. Jamison, and Lisa J. LeCount

Rice, Prudence M., Arthur A. Demarest, and Don S. Rice

Robin, Cynthia

Robin, Cynthia, James Meierhoff, Caleb Kestle, Chelsea Blackmore, Laura J. Kosakowsky, and Anna D. Novotny

Robin, Cynthia, Jason Yaeger, and Wendy Ashmore

Shults, Sara C., and Lisa J. LeCount

Taschek, Jennifer T., and Joseph W. Ball

Yaeger, Jason


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NEIGHBOURHOODS AND DISPERSED/LOW-DENSITY URBANIZATION AT BUENAVISTA DEL CAYO, BELIZE

Meaghan M. Peuramaki-Brown

The past decade has witnessed an increased number of scholars who have come to acknowledge Maya centres as expressions of urban processes. These are commonly characterized as forms of dispersed or low-density urbanism, typical of tropical agrarian civilizations. An important social and spatial unit of organization and analysis in urban contexts is that of the neighbourhood: a currently under-theorized and poorly investigated concept within Maya studies. This paper revises criteria recognized in Sociology-Psychology and New Urban Design Theory regarding the cross-cultural and diachronic identification of neighbourhoods and their functions within broader urbanization processes. The criteria are then applied in order to assess a residential settlement cluster at the site of Buenavista del Cayo in west-central Belize. Settlement and household research, subsumed under the Mopan Valley Archaeological Project from 2007-2010, aimed to begin to understand and characterize the roughly 2000 year process of dispersed/low-density urbanism expressed at this centre.

“Understanding the ways in which human communities define themselves [and are defined] in relation to landscapes has been one of the crucial research questions in anthropology” (Tokovinine 2013:1).

This paper addresses the aforementioned comment in the context of ancient Maya settlement in west-central Belize, as examined through a spatial and social assessment of settlement clusters and the concept of neighbourhood. From 2007 to 2010, the Mopan Valley Archaeological Project (MVAP) engaged a program of study in the southern settlement zone of Buenavista del Cayo: a dispersed-low density urban centre that was occupied from the Middle Preclassic through to the Terminal Classic (approx. 1000 BC to 1000 AD), although civic decline was initiated by the late facet of the Late Classic (670-780 AD) (Ball and Taschek 2004). This work, full results of which can be found in numerous publications (Peuramaki-Brown 2012, 2013; Yaeger et al. 2009, 2010, 2011, 2012), served as the basis for my dissertation research. I adopted outlooks focused on the integration (the interdependence and interconnectedness among units) and subsequent disintegration of urban environments, as exemplified through the manipulation of the built environment (space/place) and knowledge bases (cultural experts –people and things); I also emphasized the horizontal and vertical integrative methods adopted and manipulated in a local urban “shoulder zone” community (Greenberg 2011), and the larger urban and polity-level settings.

Although my dissertation focused to a degree on the notion of “community”, I have recently expanded to consider in greater detail the concept of “neighbourhood” as it appears in urban theory literature, and the process of “neighbouring” in sociology and psychology. This interest arose from problems I encountered with use of the community concept. Archaeologists typically focus heavily on the positive aspects of community, and much of our current discourse is inspired by our inhabited world, in particular the “good” that community is associated with in political rhetoric today: emphasizing ideal aspects—unity, cooperation, resiliency—as oppose to the reality that involves a considerable amount of tension, potential friction, division, and sources of collapse and failure (Harris 2012). Our theoretical and methodological frameworks must therefore attempt to understand both the ideal and real of various community forms. A distinctive anthropocentric approach has also characterized our paradigms, with the community typically addressed as an outcome of purely human social relations (human-human entanglements), independent of spaces and things. I believe this to be inherently wrong, particularly among the Maya where space and things are important to various forms of community identity (Tokovinine 2013).

The organizational structure of ancient Maya society remains a matter of interpretation. In this paper I begin the process of attempting to understand both the spatial and social concepts...
of neighbourhoods, and apply criteria outlined in New Urban Design Theory (NUDT) to better understand the possible role of a settlement cluster in the urbanization processes experienced at Buenavista over a period of 2000 years. This analysis will be further expanded upon in an upcoming publication.

**Urban Environments**

Perceptions and understandings from modern urban studies proper have been largely ignored in the definition and interpretation of archaeological communities. Urban areas and their associated attractor points are where flows of people, places, and things intersect on a given landscape (Appadurai 1990; Fletcher 1995). They are simultaneously terrains of cooperation and of struggle: the ultimate “exercise in organized complexity” (Greenberg 2011). Urban forms represent and shape their associated culture(s), and vice versa; as such, they reflect elements of both the ideal and the real of community-based entanglements. Urban development is rooted in real human processes and is the result of both the actions and reactions of unique individuals, as well as networks of political agents. Urban areas and their associated units are therefore part of wider networks that develop over time, with the evolution of community in both hierarchical and heterarchical fashions. Finally, the organization of urban systems varies according to place and time, requiring the striking of a balance between levels of centralization and decentralization that allow for the successful construction and operation of resulting reciprocal human-space-thing entanglements (Harris 2012; Hodder 2012; Lewellen 2003:93). This is particularly true in the case of dispersed-low density urbanism where social integration remains difficult to achieve (Fletcher 2009, 2012).

**The Neighbourhood: Past and Present**

The neighbourhood, one form of community, is a common building block (decentralized organization) within larger centralizing urban environments, and is an important unit of social and spatial organization within dispersed/low-density urban processes in particular (Isendahl and Smith 2013). Neighbourhoods have proven difficult to address archaeologically, as they are not only the result of top-down organization but also of bottom-up processes (evident in our own societies today).

**Maya studies**

Mayanists have previously adopted the term neighbourhood to describe settlement formations, but have rarely defined the concept beyond that of “community” or residential “cluster”. In fact, the terms are often used interchangeably. When neighbourhood is defined, it is often only ever considered from a problematic historical particular perspective (e.g. Blackmore 2011; Coe 1965; Okoshi-Harada 2012; Vogt 1969). Few scholars have considered the notion of a Maya neighbourhood from a modern urban studies perspective and to compare potential examples with cross-cultural contexts or within larger questions concerning dynamic urbanization processes.

Because some researchers, historically, do not conceive of the Maya as having had true urban centres (e.g. Sanders and Webster 1988), neighborhoods have received little serious attention from Mayanists (Chase and Chase 2012; Smith 2011). When it has been considered, Smith (2011) points out that the term has been only haphazardly and uncritically applied in Maya studies, including the simple assigning of neighbourhood status to bounded areas; recognizing spatial clustering of buildings or spaces; acknowledging areas of social distinctiveness; or a general assumption of the presence of neighbourhoods. Chase and Chase (2012) suspect that integrative units such as neighbourhoods were as important to the Classic Maya as they were for later groups, such as the Postclassic Maya and the Aztec (Chase and Chase 1988; Smith 2010).

**Sociology-psychology and anthropology**

Within sociology and psychology, the notion of “neighbouring” has long been a focus of discussion. Various scholars have presented such a concept as a form of community psychology; a “community of practice” involving short-term, problem-focused assistance behavior; and an example of psychological cohesiveness and spatial optimization (see review in Unger and Wandersman 1985). This notion has been
steadily gaining in popularity in the archaeological understandings of neighbourhood, as it emphasizes the bottom-up aspects of such organization (currently heavily focused upon due to the influence of agency theory within the discipline).

Within anthropology, under the influence of globalization processes, a neighbourhood has been considered a particular “locality”: a self-reproducing “life-world” of relatively stable associations and shared histories (Lewellen 2002:191). Such a broad and fluid concept allows for the spatially bounded communities of traditional ethnography and archaeology, but also considers more postmodern notions such as transnational communities and “virtual neighbourhoods”.

Smith’s (2011:53, 2010:139) definition of neighbourhood is more limiting yet useful: “a residential zone that has considerable face-to-face interaction and is distinctive on the basis of physical and/or social characteristics”. These are relatively small spatial zones whose creation and maintenance result from social interaction, mutual support, and other bottom-up or generative social processes. They can also coexist with and within larger residential and institutional bodies, allowing the recognition of nesting and overlapping potential. Smith’s view emphasizes neighbourhood as process: it must be generated and continuously reinforced. It is, by definition, a struggle between people, places, and things. Because it is a process, our approach to understanding neighbourhoods must reflect the non-static, dynamic nature of such affairs: it is a study of clustering and not of clusters. As such, my research has adopted a biography approach to urbanism in order to understand the represented processes of human-space-thing entanglements.

From a survey of primarily sociological literature, Smith (2011:66) outlines a set of criteria for the identification of neighbourhoods in a cross-cultural fashion: frequent and regular social interaction, shared physical and social characteristics, an administrative role in the city, and a ceremonial focus for integration. Although these factors remain important in the identification of Maya neighbourhoods [e.g. recently applied by Chase and Chase (2012) at Caracol], I am interested in identifying applicable cross-cultural factors that focus specifically on the use of space that can be applied to our archaeological remains as well. An additional and complimentary set of criteria for neighbourhoods, particularly useful in archaeology due to its spatial focus, comes from New Urban Design Theory (NUDT).

**New Urban Design Theory**

New Urban Design Theory (NUDT) emerged in the 1970s and 80s as an alternative design paradigm to the conventional patterns of urban development promoted by the Modernist movement (Ellis 2002:261). It incorporates ideas surrounding neo-traditional/pre-industrial development and neighbourhood design, and was focused on the problem of post-World War II dispersed urban patterns (suburbia). It invokes the ability of the built environment to integrate such settings through the creation of a “sense of community” (Kelbaugh 2001; Talen 1999, 2002). Contrary to criticisms (e.g. Audirac and Shermeyen 1994), NUDT does not maintain that community can be “designed” in any simplistic way, but suggests there is a connection between spatial design and a sense of community (Ellis 2002:277).

Advantages to the design theory and principles of NUDT is its adoption of a cross-cultural, historical perspective to outline what are believed to be the fundamental criteria of effective urban neighbourhoods (Duany and Plater-Zyberk 1994; Kostof 1991), and combination of theory with ethnographic fieldwork and practice-based observations (i.e. constantly changing). Neighbourhoods, along with districts and corridors, are argued to serve as the building blocks of urbanism through spatial proximity and public shared- and mixed-use areas (Jacobs 1961; Rofé 1995). Neighbourhoods are urbanized areas with a balanced mix of human activity; districts are areas dominated by a single activity; and corridors are connectors and separators of neighbourhoods and districts (Duany and Plater-Zyberk 1994). Unlike many other urban design bodies, NUDT is applicable at all scales of settlement (Steuteville 1999); for example, it treats a peri-urban settlement (e.g. “rural village”) as a neighbourhood.

NUDT scholars and practitioners have
Table 1. Neighbourhood criteria.

<table>
<thead>
<tr>
<th>Human-space-thing entanglements from NUDT (Duany and Plater-Zyberk 1994)</th>
<th>Human-human entanglements from Sociology (Smith 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre and edges defined.</td>
<td>Frequent and regular social interaction.</td>
</tr>
<tr>
<td>Optimal size approximately 400m radius.</td>
<td>Shared physical and social characteristics.</td>
</tr>
<tr>
<td>Building sites and traffic structured by fine network of interconnected &quot;streets&quot; vs. area/regional corridors.</td>
<td>Administrative role in the city (urban centre).</td>
</tr>
<tr>
<td>Priority to public space and appropriate location of civic buildings.</td>
<td>Ceremonial focus for integration.</td>
</tr>
<tr>
<td>Balanced mix of activities/people.</td>
<td></td>
</tr>
</tbody>
</table>

outlined a set of spatial criteria that are observed to be commonplace in pre-industrial (pedestrian-oriented) neighbourhoods (Duany and Plater-Zyberk 1994):  

1) The neighbourhood has a centre and an edge.  
2) The optimal size of a neighbourhood is approximately 400m from centre to edge (the ideal walking distance for daily needs).  
3) The neighbourhood structures building sites and traffic on a fine network of interconnecting streets/corridors (contrasted with regional networks).  
4) The neighbourhood gives priority to public space and to the appropriate location of civic buildings: at the centre of the neighbourhood or at edge if amalgamating with another neighbourhood.  
5) The neighbourhood hosts a balanced mix of activities—dwelling, shopping, working, schooling, worshipping, and recreating—and is a representation of multiple socio-economic strata.  

These criteria, considered alongside Smith’s sociology-based human-human entanglements of neighbourhood (Table 1), provide us with associated human-space-thing entanglements, and are argued to represent a more useful and rigorous approach (although also more spatially determinist) to the identification of neighbourhoods in ancient Maya and other urban environments. In the remainder of this paper, I will begin to consider these criteria in an attempt to understand a settlement cluster as a neighbourhood that comes into being and subsequently disintegrates within the dispersed/low-density urban process exhibited at Buenavista del Cayo (Figure 1). Due to spatial constraints, I will focus solely on the NUDT criteria.

**Case Study: Buenavista South Settlement Zone**  
My research in the Buenavista South (BVS) settlement zone involved the delineation of two settlement clusters located east of the Mopan River, and sandwiched between feeder streams to the north and south, with the incomplete sacbe extending on the east side (Figure 2). Work within BVS Cluster 1 included transect and GPS survey, testing of all mounded features, and extensive horizontal excavation of five of the 15 identified settlement sites, along with an inter-site (discrete) midden and activity area (Peuramaki-Brown 2012). Of the five settlement sites selected for further investigation, two were determined in testing to be residential in nature and were not occupied into the
Figure 1. Map of west-central Belize indicating location of Buenavista del Cayo (modified from Peuramaki-Brown 2012: Figure 3.4).

Figure 2. GPS map of Buenavista South (BVS) settlement map showing location of Senior houselots (blue stars), Junior houselots (purple stars), and non-domestic architectural complexes (yellow stars) (modified from Peuramaki-Brown 2012: Figure 4.4).
Terminal Classic, while another two were occupied well into the Terminal Classic beyond the point of epicentral decline. The fifth excavated site, BVS-007, was one that appeared enigmatic following mapping and testing, and was believed to possibly represent a non-domestic context (Peuramaki-Brown 2012, 2013).

**Human-space-thing entanglements of neighbourhood at BVS Cluster 1**

1. Centre and edges

At the height of occupation, during the early facet of the Late Classic (Figure 3), the edges of BVS Cluster 1 are delineated by both natural and manmade boundaries: over 100m of “empty” space between the west end and BVS Cluster 2, sloping topography and streams to the north and south, and the *sacbe* to the east. As previously mentioned, this identification of settlement clusters through the presence of natural or manmade boundaries is the typical end point for Mayanists when identifying and discussing neighbourhoods.

At the centre of the bounded cluster, beginning in the Early Classic, is located the architectural complex BVS-007, previously argued to be of a community integrative, public function (discussed below; Peuramaki-Brown 2013). Prior to the Early Classic, this is not the centre of the cluster, as it then consisted of only a few houselots in the east end surrounding a small household shrine (second yellow star on Figures 2 and 3; discussed below). The location of BVS-007 also creates a division within the cluster: all older “Senior” or “Founding” households (represented by settlement sites first occupied in the Middle Preclassic and most continuing all the way into the Terminal Classic; blue stars on Figures 2 and 3) are located in the east half of the cluster, with only the younger “Junior” households (settlement sites occupied only after the Early Classic and abandoned prior to the Terminal Classic; purple stars on Figures 2 & 3) located west of the architectural complex.

2. Walkable distances

Distances from centre to edge at the height of cluster occupation do not exceed the noted 400m by NUDT criteria. This would allow for easy daily interaction between residents (Smith’s frequent and regular social interaction), as well as ease of pedestrian access to any “services” offered within the
neighbourhood boundaries. Students and crew of MVAP 2007-2010 walked this area several times every day.

3. Network of streets

As the identification of neighbourhoods was not a focus of my initial work at Buenavista, I did not have the opportunity to investigate a network of trails within the cluster, and plans to return to the area have been complicated due to recent ploughing (although 2008/2009 GPR and ground truthing results from one area of the cluster might be of future assistance). However, work by Robin (2002) at nearby Chan Noohol demonstrated the use of inter-household paths for daily interaction within the site. It would not require a huge leap to assume such regularly used paths were also present within and between the Buenavista clusters. Such trails are noted among the modern Lacandon, and allow residents to walk through the cluster area without having to walk across the space of other households (Boremanse 1998). Such a local network in BVS Cluster 1 would be contrasted with the area/regional corridors represented by the Mopan River, the sacbe, as well as a possible route that follows the natural slope of the South Settlement zone from the sacbe to the river (followed by the modern road; Peuramaki-Brown 2013).

4. Central location of public buildings

Public space provides a venue for chance encounters, which serves to strengthen associated neighbourhood bonds (Langdon 1994). The placement of BVS-007 at the physical centre of the clearly demarcated BVS Cluster 1 is typical of neighbourhood integrative buildings, in that a centralized location, as well as a position overlooking a plaza or terminating a street vista, is critical toward achieving overall amalgamating functions: “The importance of these civic and community structures is enhanced by their suitable siting…” (Duany and Plater-Zyberk 1994: xix). As previously mentioned, the architectural complex BVS-007 is found at the centre of the cluster at the height of occupation. However, when it was initiated, it was located at the edge of a previously existing community of Founding/Senior households. Why would such an important building be placed at the edge of this preexisting community, and not at its centre? Although BVS-007 is centrally located, it demarcates an important division within the cluster: all but two of the house lots located to the east of the complex represent Founding/Senior cluster members, while those located to the west of the complex represent Junior cluster members. This pattern of construction, with new public buildings being placed at the interstices of old and new (or expanding) communities, highlights the amalgamative nature of BVS-007 (Duany and Plater-Zyberk 1994).

5. Balanced mix of activity and people

Although Smith’s neighbourhood definition and criteria emphasize shared physical and social characteristics among residents, the reality of these forms of communities is that a balanced difference also exists when it comes to activity and people.

Ritual and administrative activities

My initial use of New Urban Theory in my dissertation focused on the spatial nature of BVS Cluster 1, as reflected in the integration of public and private space with the surrounding landscape. I assessed the integrative potential of BVS-007, a possible community-oriented site, applying six characteristics outlined by NUDT designers for identifying (and planning) such spaces, and explored its biographical development and entanglement within the community, associated splinter groups (Senior versus Junior households), the larger urban entity, and the larger state and inter-state bodies (Peuramaki-Brown 2012, 2013). Ceremonial and administrative activities were argued to serve in binding the cluster community both horizontally and vertically as part of the larger urban administration.

The central location, large size (relative to surrounding settlement sties), odd architectural configuration, and non-typical domestic assemblage led to the suggestion of non-domestic (ritual and administrative) functions. The architectural style of the associated buildings also linked the construction of the site to activities and identities expressed in the Buenavista epicentral district. BVS-007-1
Table 2. “Special” economic activities engaged by a sample of Senior households in BVS Cluster 1 at Buenavista del Cayo (full assemblage details available in Peuramaki-Brown 2012).

<table>
<thead>
<tr>
<th>Senior Houselot</th>
<th>&quot;Special&quot; Activity</th>
<th>Archaeological Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>BVS-004</td>
<td>metateros</td>
<td>special activity area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>grano-diorite fragments in floatation</td>
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<tr>
<td></td>
<td></td>
<td>metate fragments = 53.8% of habitation debris</td>
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<tr>
<td></td>
<td></td>
<td>7 metates (versus typical 1 or 2 at other sites)</td>
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<tr>
<td></td>
<td></td>
<td>hammerstones and battered/utilized chert cores</td>
</tr>
<tr>
<td></td>
<td>woodworkers?</td>
<td>13 graver/incisors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 drills</td>
</tr>
<tr>
<td></td>
<td>biface manufacturers</td>
<td>preforms</td>
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<tr>
<td></td>
<td></td>
<td>bifacial reduction flakes</td>
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<tr>
<td></td>
<td></td>
<td>higher % tertiary flakes</td>
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<tr>
<td></td>
<td></td>
<td>higher % thick bifaces (whole and fragment)</td>
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<tr>
<td></td>
<td></td>
<td>higher % cores</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site 037 heat treating (Yaeger et al. 2010)</td>
</tr>
<tr>
<td>BVS-006</td>
<td>ceramic manufacturers</td>
<td>40cm thick ceramic deposit below BVS-006-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>thick ceramic deposits around edges of BVS-006-2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>special activity area and firing pit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>enigmatic bajareque superstructure?</td>
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<tr>
<td></td>
<td></td>
<td>wind block</td>
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<td></td>
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<td>carbonized wood (dicots)</td>
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<td></td>
<td></td>
<td>opportunistic ceramic tools</td>
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<tr>
<td></td>
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<td>Site 160 midden</td>
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<tr>
<td></td>
<td>slate workers</td>
<td>high % raw slate</td>
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<td>high % worked slate</td>
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<td>slate plaque fragment</td>
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<td>slate wrench fragment</td>
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<td>biface manufacturers</td>
<td>preforms</td>
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<td>bifacial reduction flakes</td>
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<tr>
<td></td>
<td></td>
<td>higher % tertiary flakes</td>
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<td></td>
<td>higher % thick bifaces (whole and fragment)</td>
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<td></td>
<td></td>
<td>higher % cores</td>
</tr>
</tbody>
</table>

Exotic material access and use: 5 obsidian EDXRF sources (including Pachuca), 1 obsidian core, and higher average CE/M represented in Senior household assemblages

possessed a ritual-oriented assemblage and was used from the Early Classic and into the Terminal Classic, beyond the point of civic decline, and was suggestive of a horizontal integrative function for the associated BVS Cluster 1 community. BVS-007-2 was a range-like structure and possessed little use debris given its long use life, although it was abandoned just prior to the point of civic decline. I suggested a secondary administrative (vertical integrative) purpose to this building. Both buildings were focused on a plaza area large enough to accommodate the entire cluster population. In addition to examples from the ethnographic record, this complex is similar to various integrative built environments already recovered within the archaeological record of the Maya area (e.g. Brown and Sheets 2000 Hendon 2012; Yaeger 2000). The presence of both vertical and horizontal integrative methods
within neighbourhoods represents the heterarchy that is reflected in the relative autonomy of each neighbourhood (own politico-religious focus) and separate from others by physical boundaries, while still being an important integrative unit within the larger urban entity (Hendon 2012).

**Similar and different people, spaces, and things**

Although similarities do exist among the people, spaces, and things of BVS Cluster 1 -- such as the fact that all residents are members of commoner strata (based on architectural remains and assemblages) and the orientation of all residential architecture in the cluster are similar (as oppose to BVS-007 that differs) -- there are also many differences between residents and the activities in which they were engaged. Such differences, which can serve to bind residents as well as being the source of division or friction within many forms of community, are key to both neighbourhood engagement and failure.

In my dissertation, I apply notions of esoteric and *mētis* knowledge based on High Modernist State Schemes (Scott 1998) and Traditional Use Knowledge (Rockman 2003) paradigms to highlight differences between local community and larger urban administration, but also to investigate divisions within the local community: Senior (Founding) versus Junior households, that represent both a cooperative and divisive relationship throughout the history of the neighbourhood and larger urban processes. The life histories, along with the nature of the material assemblages recovered from the two groups suggest dependency on one another at some point within their lifespans (see below). Preliminary life histories (based on ceramic dating and limited radiocarbon correlates; Peuramaki-Brown 2012) helped to distinguish between Senior and Junior households, with the former arriving before the initiation of urbanization, and leaving beyond the point of decline (Figure 3).

In her study of knowledge and landscape, Rockman (2003) outlines three types of practical (*mētis*) knowledge to consider in the development of any social landscape: locational, limitational, and social knowledge. Locational knowledge might be represented by such features as dwelling location and form; limitational knowledge represented by engaged economic activity; and social knowledge might be reflected in domestic ritual and burials (Peuramaki-Brown 2012). As is the case with all archaeological study, it is the patterns of activity that are key to the investigation of knowledge bases, how they develop, and how they change or remain consistent over time.

At this point I will limit discussion to the use of limitational knowledge, as reflected in economic activity, to further differentiate between the Junior and Senior households of the BVS Cluster 1 neighbourhood. The distribution of economic activity can serve to bind as well as to separate households within a neighbourhood by fostering either multi-household dependency or competitive splinter groups. At BVS Cluster 1, the potential for dependency is represented by Junior households present to support Senior households and vice versa. All households appear to have been involved in basic domestic pursuits, such as food growing and processing, while differences in resource and knowledge access is visible in additional craft production dominated by the Senior households (Table 2). A predominance of ritual activity among Senior households is also present: a characteristic noted within the ethnographic record as well (Vogt 1969).

**Discussion and Conclusion**

Once an actual neighbourhood process is identified, we can begin to examine the larger urbanization processes at work. At Buenavista, over the length of its occupation, we witness a number of integrative strategies at an urban and neighbourhood level (Table 3 and Figure 3; Peuramaki-Brown 2012). Over time these measures alter and/or overlap; however, often one is favoured at the expense of another along the trajectory of centralization within the urbanization process. Because integrative strategies are altered to fit changing landscapes of control opportunities, particularly critical within dispersed/low-density settlement situations and shaped by multi-interacting and perpetual systems, this makes the study of such strategies from a life history perspective vital to the understanding of the urbanization processes.
Table 3. Neighbourhood and Urban Integration/Disintegration Processes at Buenavista.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Urbanization and Neighbourhood Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Preclassic</td>
<td>No occupation.</td>
</tr>
<tr>
<td>Middle Preclassic</td>
<td>Senior households established. BVS Cluster 1 integrated through local ritual (BVS-034) and kinship.</td>
</tr>
<tr>
<td>Late Preclassic</td>
<td>Monumental architectural construction initiated in epicentre. South ballcourt used as initial urban boundary?</td>
</tr>
<tr>
<td>Proto/Early Classic</td>
<td>Junior households established. BVS-007 horizontal and vertical integrative activity.</td>
</tr>
<tr>
<td>*START OF TRUE NEIGHBOURHOOD</td>
<td></td>
</tr>
<tr>
<td>Early Classic</td>
<td>Epicentral expansion and elaboration. Decommissioned south ballcourt replaced by stelae at BVS-007 and Callar Creek(?). Expansion of urban boundaries?</td>
</tr>
<tr>
<td>Early Late Classic</td>
<td>East Plaza used for larger urban area integration</td>
</tr>
<tr>
<td>Late Late Classic</td>
<td>BVS-007 down to only ritual use (urban administration ignoring local secondary administration of neighbourhoods?) Further centralizing attempts from epicentre based on new sacbeob constructed at north and south ends.</td>
</tr>
<tr>
<td>*END OF TRUE NEIGHBOURHOOD</td>
<td></td>
</tr>
<tr>
<td>Terminal Classic</td>
<td>Loss of Junior households *URBAN DISINTEGRATION ALREADY INITIATED</td>
</tr>
</tbody>
</table>

Previously noted patterns in dispersed/low-density urban integration management include a period of neighbourhood integration, followed by loss of sight of a systemic vision of urban planning, usually associated with an overreaching of centralizing tendencies. At this point, integration mechanisms that work on a local scale become questionable at the larger urban scale and can lead to disintegration (Brunfaut 2002; Greenberg 2011). Any tool of integration that is hinged on the strengthening of sense of place and identity keeps all its value in its specific contexts and can create strong local entities that are detrimental to the larger system. This is exemplified at Buenavista by the continuing use of BVS-007-1 by the BVS Cluster 1 neighbourhood, beyond the administrative use-life of BVS-007-2. It is this exact pattern that is observed over time at Buenavista: an initial focus on individual local neighbourhoods and then a loss of that focus to a larger “urban vision”.

It remains essential to continuously incorporate the local integrated development initiatives into the broader urban structure, or else alienation of those local communities can lead to disintegration (Greenberg 2011; Jacobs 1961). An overall “cautionary tale” is therefore created, in emphasizing that the efficiency of an urban dispersed/low-density city hinges on the administration’s ability to recognize and incorporate complementary power structures at the varying scales of local-urban-region, through diverse means of integration, requiring a significant balancing act. The disintegration of dispersed civic systems occurs when neighbourhoods take on their own concerns at the expense of the whole, known as “extreme locality” (Greenberg 2011). The efficiency of an urban dispersed city therefore depends on the complementarities with which its integrative strategies project at varying scales. Although many of the component parts, such as neighbourhoods, can be highly unified and durable, the overarching political and civic
entities into which they were assembled were comparatively easily disrupted. The diversity of interest groups represented by the urban core may therefore be both the foundation of urban life as well as the threat to it.

Acknowledgement First and foremost, I would like to thank the Belize Institute of Archaeology for its on-going support of the MVAP and for editing RRBA. Special thanks go to Dr. Jaime Awe, Dr. John Morris, and Melissa Badillo. The data published here is the product of hard work by the crew, staff, and students of MVAP 2007-2010. I am grateful to Dr. Jason Yaeger for inviting me to be a part of this wonderful project. Finally, thank you to the Social Sciences and Humanities Research Council of Canada, the University of Calgary, and the Choquette Family Foundation for funding support.

References Cited

Appadurai, Arun

Audirac, I. and A. Shermyen

Ball, Joseph W. and Jennifer T. Taschek

Blackmore, Chelsea

Boremanse, Didier

Brown, Linda, and Payson Sheets

Brunfaut, V.
2002 Towards an URBAN for the “dispersed city”. In EURA Conference, Urban and Spatial European Policies: Levels of Territorial Government. Turin.

Chase, Arlen F., and Diane Z. Chase

Chase, Diane Z., and Arlen F. Chase
1988 A Postclassic Perspective: Excavations at the Maya Site of Santa Rita Corozal, Belize. Pre-Columbian Art Research Institute Monograph 4, San Francisco,

Coe, Michael D.

Duany, Andres, and Elizabeth Plater-Zyberk

Ellis, C.

Fletcher, Roland


Greenberg, Ken

Harris, Oliver J. T.
2012 (Re)assembling Communities. Journal of Archaeological Method and Theory. DOI: 10.1007/s10816-012-9138-3

Hendon, Julia A.

Hodder, Ian  

Isendahl, Christian, and Michael E. Smith  

Jacobs, Jane  

Kelbaugh, D.  

Kostof, Spiro  

Langdon, P.  
1994 *A Better Place to Live: Reshaping the American Suburb*. University of Massachusetts Press, Amherst, MA.

Lewellen, Ted C.  

Okoshi-Harada, Tsubasa  

Peuramaki-Brown, Meaghan  


Robin, Cynthia  

Rockman, M.  

Rofé, Y.  

Sanders, William T. and David Webster  

Scott, James C.  

Smith, Michael E.  


Steuteville, R.  

Talen, Emily  


Tokovinine, Alexandre  

Unger, Donald G., and Abraham Wandersman  

Vogt, Evon Z.

Yaeger, Jason

Yaeger, Jason, Bernadette Cap, and Meaghan Peuramaki-Brown

Yaeger, Jason, Sarah Kurnick, Christina Dykstra, and Meaghan Peuramaki-Brown

Yaeger, Jason, Meaghan Peuramaki-Brown, and Bernadette Cap

Yaeger, Jason, Meaghan Peuramaki-Brown, Christina Dykstra, Sarah Kurnick, S. Salgado-Flores
2011 Political Dynamics in the Mopan River Valley: Recent Research in the Buenavista del Cayo Hinterlands. Research Reports in Belizean Archaeology 8: 31-44.
7 STANDARDIZED LITHIC TECHNOLOGY AND CRAFTING AT THE “GATEWAY GROUP” FROM CARACOL, BELIZE: IMPLICATIONS FOR MAYA HOUSEHOLD ARCHAEOLOGY

Lucas R. Martindale Johnson

Households make up the bulk of the ancient Maya archaeological record. These are the historical places where the Maya lived, reproduced, remembered, and worked, thus archaeologists can analyze the artifacts of what peoples did at their living groups. This paper presents and analyzes one of only a few case studies of small chert tools or “drills” from the Maya lowlands to identify what ancient peoples did and possibly infer their potential impact at the local scale. Lithic data from the “Gateway Group” at Caracol, Belize, located approximately 300m southeast of Caana, Caracol’s largest structure, and the Conchita Causeway yielded a highly standardized tool assemblage. These data in conjunction with other investigated assemblages enable discussions of the organization of intensive localized lithic and non-lithic craft production. I conclude by describing the importance of this research on how archaeologists might draw relational connections between households using standardization studies and thereby consider the technical learning, sharing, and doing that took place between ancient Maya residences.

Introduction

For decades, Maya archaeologists have focused on the household as a unit of production, both economic and social. Wendy Ashmore and Richard R. Wilk (1988) have argued that due to the household as a “unit of production”, the household should be studied as an active social location where archaeologists can reconstruct what ancient peoples did at their residences. The development and continued emphasis on Mesoamerican household activities, like craft production shows the organizational dynamics of domestic resource consumption, transformation(s), use, distribution and deposition (Aoyama 1998, 2007; Costin 2001; Hirth 2009a, 2009b). Recently, John E. Clark (2007) has argued that we “rethink” craft production research to emphasize how the physically crafted material might index the crafter, contributing to constructions of personhood, and continued practice by archaeologists to breakdown of object/subject dualities (see also Joyce 2007). This approach further emphasized the gendered tasks, spaces, and rituals that surrounded crafting or other domestic production activities (Clark and Houston 1998; Hruby 2007). Such perspectives also ask that archaeologists understand the relational networks of household crafting connecting raw resource materials, crafters, and the greater population. Given these research issues, household craft production is dynamic and must therefore be contextually defined using organization models that question dualistic assumptions, such as elite/commoner production or independent/attached. Through research in Prehispanic Mesoamerica, Kenneth Hirth (2009b) dispels with dualistic models of craft production where labor and time are omnipresent in favor of a multi-crafting approach (see also Shimada 2007). For example, Hirth (2009b:14) asserts we move past dichotomies of part-time/full-time and attached/independent because these have led to an emphasis on labor time and over simplified models of elite control. A multi-crafting approach explores how crafting was organized either continually throughout the life of a given household or how it was intermittent and situated with other subsistence practices. Hirth (2009b:21-23) also emphasizes that a multi-crafting perspective shows that households often practiced different, yet related or contingent, crafting activities and that these multi-crafting behaviors enabled household members to remain adaptable and resilient through time. For example, for households to produce pottery they might also need to produce tools used to quarry and mix clays, build kilns, or inscribe or paint exterior designs on finished forms; they did not only produce pottery.

One major hindrance in archaeological analysis of household based craft production is that little may remain of the material residues of the actual crafting process and tools used. Despite these limitations, investigations at Caracol, Belize have shown that some data on the crafting process can still be recovered and
interpreted (Chase et al. 2008; Cobos 1994; Pope Jones 1996; Martindale Johnson 2008). In this article, I present analysis of a recent investigation of an ancient Maya household to determine the organization of household based lithic craft production, its technological comparison to other possible workshops at Caracol, other Maya sites, and the potential dynamics of household crafting at Caracol. In particular, I use detailed attribute analysis in conjunction with quantitative tests to determine the degree of standardization of lithic crafts used in various household multi-crafting activities. Cathy Costin (2001) has shown that the presence and degree in crafts standardization is used as a proxy for interpreting levels of production intensity, specialization, and learning and sharing of traditions in craft manufacture across space and time.

This case study in the standardization of technological practice will show that the activities of crafters at the Caracol’s Gateway Group were linked to the activities of other households. Arguably, these archaeologically visible shared practices can form the basis for defining ancient communities of practice. Here a “community of practice” is a social unit where individuals and groups learn and share through participation in physical activities, in particular locations (Lave and Wenger 1991). Caracol’s chert flake stone data may reinforce an archaeological understanding of a community of practice where shared resources and technical actions among particular networks existed between spatially separate households. A case study of small chert tools from Caracol, Belize demonstrates the importance of lithic analysis to a greater understanding of the diversity, resiliency, and shared dynamics of household lithic and non-lithic craft production during the Classic to Terminal Classic periods (AD 250-900). This article therefore explores how prevailing household crafting models, like multi-crafting, and an understanding of standardization in crafting practices can inform the existence of integral relational networks where technical learning, sharing, and doing existed broadly across an urban area.

Studies of lithic craft standardization will help us to recognize household technological practice and the ways in which households were socially networked through a sharing and learning of lithic reduction, tool manufacture, and use across an ancient low density urban area. In addition, research of this type holds the potential to explore the nature of control over craft production and distribution. For example, the spatial location of household based workshops in relation to roads, markets, and monumental architecture do help to point out the nuances or problems in archaeological interpretations of political and economic controls over craft production.

The ancient Maya’s use of flaked and ground stone technology structured and transformed the complexities of daily life and ritual practices (G. Braswell 2011). Much of what archaeologists know regarding the importance of stone for the ancient Maya is from archaeological investigations at ancient Maya households through the traditional emphases on trade and exchange (G. Braswell 2004). At Caracol, Belize, extensive household investigations throughout the site have yielded a wealth of information on the daily and ritual life of the ancient Maya throughout the Preclassic and Classic periods (A. Chase and D. Chase 2004; D, Chase and A. Chase 1998). Through these investigations, the Caracol Archaeological Project found that many households obtained locally available cherts and chalcedonies. It is likely that chert was extracted during the quarrying of limestone bedrock blocks for the construction of agricultural terraces and household structures. Recent LiDAR images have revealed an extensive anthropogenic landscape (A. Chase et al. 2011). Typically, these silica based raw materials are smaller nodules that required heat treatment prior to reduction for tool production taking place at household lithic workshops. During early excavations at many of Caracol’s residential groups, researchers recognized that certain crafted small chert tools, including associated lithic reduction debitage, often co-occurred with debris from other crafted materials, such as shell, bone, and slate. These data help to establish a set of operational criteria for determining the presence or absence of intensive lithic crafting and implications regarding the organization of multi-crafting household
workshops at Caracol and potentially, other sites as well.

Caracol’s Flake Stone Industries, Crafting and a Case-Study in Standardized Production

The continual interest in economic organization at the site of Caracol has revealed the importance of flaked stone analysis in understanding marketplace exchange and the overall distribution of flaked stone crafts amongst residential groups (D. Chase and A. Chase 2014). Though these artifact distributional data are critical for reconstructing the macro-socioeconomic dynamics of Caracol and the overall integration of a very large population, there is always a need to focus on defining and operationalizing household practices through contextual artifact analysis.

Analyses of Caracol’s chert “drill” industry highlights the ways in which the local population was situated around a local raw material found in the surrounding karstic bedrock. Currently, the Caracol Archaeological Project has excavated roughly 2000 of these tools (Figure 1). Traditionally “drill” tools are argued to be an essential tool for crafting shell, bone, or slate (A. Chase and D. Chase personal communication [2008]; Cobos 1994; Pope Jones 1996). While a small collection of these tools has been recovered from ritual caches (Pope Jones 1996:70), the majority of these tools come from household refuse deposits within construction fill layers. Similar tools at Tikal were initially understood to be part of a workshop toolkit (Puleston 1969). Olga Puleston (1969:23-45) argues that drill-like tools were most likely used during the Preclassic to Classic periods at Tikal and these tools are small wedge or pointed blade-like tools. Puleston separates tools based on a number of technological and use related attributes into formal Classes A-K.

Cynthia Pope Jones (Pope 1994, 1996:103) describes Caracol’s “drills” as produced by a percussion strike to the multidirectional core platform to remove small blades (e.g., tertiary flakes/blades) that are usually thick and robust with steep dorsal ridges. After removal, the blade was retouched laterally on the dorsal surface to make at least one steep lateral side (perhaps for hafting) and shaped distally to create a pointed end. The presence of a high number of these tools in association with shell debris indicates their use in shell craft manufacture in a household workshop (Pope Jones 1996, Cobos 1994). Jennifer Braswell (2010) describes an almost identical tool assemblage from a context at Xunantunich, Belize. Braswell (2010) defines these as “drills-on-blades” by stating, “drills have a steep edge angle and a flat dorsal side, making the tool better suited for jabbing, gouging, or drilling by applying the tip to the worked material.” Investigations at Caracol’s Gateway Group is yet another household example where these tools have been found and it further demonstrates the archaeological evidence for the organizational continuity and complexities of Maya household crafting activities.

Archaeological Investigations at the ‘Gateway Group’

The Gateway Group is just beyond the border of the epicenter, approximately 300m east of the Conchita Causeway and Caana, and
adjacent to Reservoir C. Similar to many other residential groups at Caracol, the Gateway group was composed of four low structures situated around a central plaza. Investigations at the Gateway Group (Figure 2) were initiated to investigate the functional nature of low lying structures just outside the epicenter (A. Chase and D. Chase 2006).

Excavations included a series of small trenches in the southern, eastern, and western platforms. These platforms would have most likely supported perishable superstructures. A test unit was also placed over a small depression just north of the western structure. Small to large axial trench excavations and test units are normal methods used at Caracol and often help to determine the overall chronology of structures based on super-imposed construction episodes and associated fill debris. In addition to general chronology, these excavations expose artifacts deposited in construction fills by the ancient Maya as structures are maintained or remodeled over time. These construction fills often have complete artifacts and fragmented refuse debris from the household’s daily activities and therefore have direct implications for inferring a
household’s socioeconomic organization of consumption, production, and distribution of crafts.

Recovered from a series of small trenches and one test pit into a chultun was fill layers yielding an abundance of chert artifacts (Figure 3). Arlen and Diane Chase (A. Chase and D. Chase 2006) suggest that the presence of these chert artifacts in construction fill layers suggested that the Gateway Group was involved in workshop activities during its use in the Terminal Classic Period. Because of the probable presence of a workshop area, all excavations were screened using 1/4” or 1/8” mesh. Unlike other workshops at Caracol no shell or bone craft debris was encountered, thus it is argued that the final crafted material at the Gateway Group workshop may have been wood or some other perishable material. Flake stone data from the Gateway Group were similar to those recovered at other workshop areas located about 1.5 km south along the Conchita Causeway (Pope 1994, Pope Jones 1996). Past analysis techniques, by Pope Jones (Pope 1994, 1996) at Caracol and Puleston (1969) at Tikal, did allow for an comparative assessment of lithic reduction and tool manufacture behavior at the Gateway Group, but a more detailed attribute study beyond length, width, and thickness was conducted to better define the reduction techniques, potential tool use, and how to relate tools to other recovered contexts. Additional analysis was needed to determine the degree of variability or standardization in tool manufacture techniques and use. The presence of standardized technological practice indicates a shared knowledge that can provide insight surrounding the nature of crafting behavior and ancient Maya workshops.

Data and Hypotheses

Excavations at the group yielded a larger than normal sample of chert flake stone materials. Table 1 shows the overall size of the excavations, the number of chert artifacts from the four excavations, and the sampling strategies. A representative sample of artifacts from the Gateway Group comes from the chultun excavation. These included, various faunal remains, a stalactite fragment, a partial chert point, a partial ceramic labret, a partial sandstone palette, worked shell pieces, a large obsidian blade, an obsidian core, chert drills, a shaped and drilled sherd, drilled spondylus shell, a partial slate palette, a stingray spine, and a worked deer tine (A. Chase and D. Chase 2006). An unusual amount of chert was also recovered from the refuse or garbage fills within the chultun and the other structures on the east and south sides of the open plaza. Arlen and Diane Chase (2006) state, “The quantity of chert (in conjunction with the antler tine) indicates that this material was being worked nearby and then perhaps purposefully redeposited in or near the chultun.”

With the exception of the chultun excavation, trench excavations exposed bedrock less than 1.5 meters from the surface humus layer indicating the ephemeral nature of these residential units. The depositional locations and amounts of chert materials from the excavations also shows that there may have been conventional practices for disposing sharp lithic debitage and exhausted tools. For example, the
Table 1. Shows sampling strategy and context, kind of recovered chert lithic materials, and amount sampled. Notice that no lithic materials were excavated from the eastern excavation and only 74 chert artifacts came from the southern excavation. The western (Structure B143 and Chultun) excavations yielded the most amount of lithic material at the group.

<table>
<thead>
<tr>
<th>Context</th>
<th>Excavation Dimensions</th>
<th>Chert Object</th>
<th>Total for Excavation</th>
<th>Sampled from Excavation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C174B (Structure B140)</td>
<td>2.0 m N/S x 1.5 m E/W</td>
<td>n/a (no lithic material)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>C174C/2/6/7/8 /10/11/12/ 14/15/16/ 20/21/22/23* (Chultun)</td>
<td>2.0 m N/S x 1.5 m E/W</td>
<td>Flakes 557</td>
<td>12</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chunks (Angular Waste) 281</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flake Tools** 60</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>**Total N= 898</td>
<td>**Total Weight 5,462.7g</td>
<td>339.8g</td>
</tr>
<tr>
<td>C174D/1*** (Structure B142)</td>
<td>6.92 m N/S x 1.5 m E/W</td>
<td>Flakes 71</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partial Biface 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flake Tools** 2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**Total N= 74</td>
<td>**Total Weight 1,839.7g</td>
<td>72.0g</td>
</tr>
<tr>
<td>C174E/3/5/7/8/9* (Structure B143)</td>
<td>1.5 m N/S x 2.5 m E/W</td>
<td>Chunks 295</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flakes 1,639</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flake Tools** 219</td>
<td>219</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>**Total N= 2,156</td>
<td>**Total Weight 3,897.7g</td>
<td>588.8g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**Total N= 3,128</td>
<td>**Total Weight 11200.1g</td>
<td>1000.6g</td>
</tr>
</tbody>
</table>

Note: * Indicates only sampled lots, not entire excavation. Refer to Lot Diagrams for approximate locations of lots within the excavations (Martindale Johnson 2008, Figures 8 and 11).
** Includes all flakes tools. Not all are included in the analysis.
*** Excluded from analyzed sample as no relevant tool types are present.

The majority of chert artifacts (n=2,156) was recovered from discrete lenses of deposited construction fill in Structure B143 (Figure 4), whereas the chultun excavation recovered less than half the amount (n=898). There were more exhausted tools from within Structure B143 than others including the chultun. Furthermore, the chultun strata do not appear as relatively discrete lenses of soil and artifacts that suggests the chultun was filled gradually overtime rather than more rapidly like construction fills in Structure B143.

As stated above, the majority of the data collected were flake stone debitage, but there was also a large sample of formal tools. Although traditionally referred to as Caracol “drills”, the analysis will show these tools were most likely used for more than drilling. Braswell (2010) has also shown that these small tools were used for a variety of activities. By analyzing all recovered lithic materials from the Gateway Group, an entire reduction sequence can be reconstructed (Figure 5). The tools most often described as “drills” are small blades removed from direct/indirect percussion techniques and often still retain high to moderate percentages of dorsal cortex. These artifacts did not co-occur with many other artifacts like other workshops at Caracol, so it is likely that these tools crafted perishable materials, like wood. Perhaps a larger sample from the construction fills at the group will change this default
position. These tools, excavated from other house groups have co-occurred with shell and bone crafting debris (Pope 1994).

In order to gain a better understanding of the production and use of these small stone tools, a detailed attribute analysis was devised to test a series of hypotheses. One goal of the detailed analysis was to record data that would enable statistical tests to determine the degree of tool production standardization. There is also data from artifacts to suggest various uses of these tools during crafting activities. These attributes along with a contextual comparison to other households at Caracol formed the basis to construct a number of working hypotheses. These hypotheses along with Kenneth Hirth's (2009b) multi-crafting model described above for the organization of household crafting, help to facilitate a broader understanding of Caracol's domestic production and the diversity of household activities during the Classic to Terminal Classic periods.

Specifically, I use standardization statistics and contextual data to test whether or not the Gateway Group was involved in lithic crafting to produce non-lithic crafts that were then distributed outside the house. In so doing, I ask (1) does the assemblage of flake tools

Figure 4. Section (top) and lot diagram (bottom) of Op C174E. Lot diagram shows sampled amount over collected amount (e.g., Lot 3, n=113 sampled out of 1,741 or 113/1,741).

Figure 5. Idealized reduction sequence in the production of small chert tools based on excavation data.
Table 2. Hypotheses tested using household contextual data and chert flake stone analysis.

<table>
<thead>
<tr>
<th>Flake Stone Use at Households</th>
<th>Day-to-day quotidian practice</th>
<th>Intensive tool production for household use</th>
<th>Intensive tool production for extra-household distribution of tools</th>
<th>Production of tools to make crafts for extra-household distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of Standardization$^1$</td>
<td>Low (Higher Variability)</td>
<td>High (Low Variability)</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Contextual Data$^2$</td>
<td>Similar used tools in trash of household</td>
<td>Low (when compared to others)</td>
<td>High</td>
<td>Low (to None)</td>
</tr>
<tr>
<td></td>
<td>Similar tools present at other households</td>
<td>Higher Probability</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Number of production debris (lithic and craft debitage) in trash</td>
<td>Lower #’s than others</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>Multi-crafting/Implications for Household Organization$^3$</td>
<td>Contingent or Independent</td>
<td>Contingent (tools used to craft another material)</td>
<td>Independent (b/c the tool is the craft being distributed)</td>
<td>Contingent</td>
</tr>
<tr>
<td></td>
<td>Inside or Outside Household Consumption</td>
<td>Inside</td>
<td>Inside</td>
<td>Outside</td>
</tr>
</tbody>
</table>

Note: 1- determined by CoV statistics; 2- developed through the excavation history of the Caracol Archaeological Project; 3- adapted from Hirth (2009b:21-23)

exhibit significant levels of standardization and (2) does the contextual and artifact data from the Gateway Group align with data from other household workshop crafting areas from Caracol? And then by using these observations in conjunction with Hirth’s (2009b) contingent/independent and spatial criteria of inside versus outside for crafting organization, I make inferences regarding the organizational type(s) of crafting that took place. This later interpretive framework is important for how archaeologists establish cross-cultural comparisons for the organization of craft production.

Four hypotheses were tested (Table 2). Was chert used for daily non-crafting quotidian activities craft production? If so, we might expect to see lower counts of tools recovered from trash or construction fills, a higher degree of tool variability (i.e., tools lack standardized form), similar assemblages at other households, and little to no crafting debris present. Second, did the Gateway Group produce standard tools for daily household practice that did not include the production of crafts intended for economic distribution outside the house? If so, then there would be tools, similar (and non-standardized) tools, associated reduction debitage in household refuse, and a higher probability for this practice at other households. Thirdly, did the Gateway Group produce chert tools for extra-household distribution? If so, then tools would have probably been highly standardized because these tools were intended for exchange outside the household. There would also be little or no tools present in the excavations. Lastly, were chert
tools produced at the household intended to then craft some other material that was later distributed outside the house? This last organizational mode is likely if there is a high degree of standardization and exhausted tools and tool production debitage is present in household refuse. Furthermore, support for this crafting mode suggests the Gateway Group as a locus of intensive craft production if there is a lack of similar data from other investigated house groups. This implies that not all households crafted with the same level of intensity or duration. Although these hypotheses are not mutually exclusive, they do help to create heuristic categories to establish a working understanding of household crafting organization that included the production and use of flake stone tools.

**Methods: Quantitative and Coded Attributes**

Attribute analysis was the principle method of understanding the overall morphological characteristics of small chert tools from the Gateway Group. These attributes were also developed to help standardize analyses of these tools for future excavations and to prepare for data sharing amongst interested researchers (see Martindale Johnson 2008:117-144). A total of at least thirty-five measurements or coded attributes were recovered on 175 tools when applicable. Usual measurements, like length, width, thickness, and weight were recorded during the initial infield cataloging performed during each field season at Caracol. Other attributes were recorded to gain a more detailed understanding of tool raw materials and manufacturing techniques. These included descriptive attributes like completeness, color, and cross-section. Manufacturing techniques were better understood by gathering metric data for statistical tests as well and these included plan form (i.e., how many sides a tool has [Martindale Johnson 2008:54, Fig. 14]), measurements of each side of a particular plan form, percent of cortex, and proximal platform thickness or thinning. Use information was described by recording the location, type, and invasiveness of retouch or edge damage per side, distal bit type, bit width, and bit length, the presence of distal retouch on ventral surface for resharpening, and edge angle per side if applicable (Martindale Johnson 2008:122-129).

Although each of these attributes helps to define the chert tools in greater detail, only some of these attributes provided data to suggest a particular degree of standardization and general tool use. For example, edge angle on lateral sides did not directly contribute to understanding tool standardization, but these data did highlight the potential multifunctional nature of these tools. Tool plan form or the number of sides and side dimensions of a tool was very informative for testing the presence or absence of standardization in tool production. Standardization can be simply understood as the degree to which metrics of a sample possess little statistically significant variation around a calculated mean. Measuring standardization is calculated by dividing the sample standard deviation by the mean to produce a number between 0 and 1 ($V$ or $\text{CoV} = \frac{SD}{x}$, where $V$ or $\text{CoV}$ is the Coefficient of Variation, $SD$ is the Standard Deviation, and $x$ is the sample mean). A $V$ or $\text{CoV}$ closer to 0 equates to less variation and thus more standardization. $\text{CoV}$ in this research is presented as a percent by multiplying the final decimal by 100. What is challenging is to determine which artifact attributes to include and measure. The $\text{CoV}$ results presented are from measurements of metric dimensions and particular coded attributes of 175 small chert tools. For example, the distal end is the portion that was intentionally shaped, used, and retouched consistently to manufacture crafts. As shown below many of the tools have an equal number of sides (e.g., 4, 5, or 6 sided) with statistically similar metric proportions and features.

Measuring standardization among artifact assemblages is not new. It has proven effective in analyses of variation in ceramic production and style in the Andes (Costin 1991) and even in groundstone metate manufacture in northern Mexico which imply where and how many crafters may have been involved in production (VanPool and Leonard 2002). $\text{CoV}$ statistics have shown little variation in recent results of geochemical analysis of obsidian artifacts by portable XRF (Brandt et al. 2012). Valentine Roux (2003:768) states, “degree of standardization may be assessed through raw
Table 3. CoV statistics expressed as a percent of variation for tool Types 3-6. The table also gives ranges of unifacial dorsal edge angle on tool types between 60°-90° (adapted from Martindale Johnson 2008: Figures 7 - 13).

<table>
<thead>
<tr>
<th>Type</th>
<th>n=</th>
<th>Length</th>
<th>Width</th>
<th>Thickness</th>
<th>Side A</th>
<th>Side B</th>
<th>Side C</th>
<th>Side D</th>
<th>n=</th>
<th>Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>17</td>
<td>36%</td>
<td>40%</td>
<td>36%</td>
<td>38%</td>
<td>33%</td>
<td>-</td>
<td>-</td>
<td>not recorded</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>21%</td>
<td>22%</td>
<td>26%</td>
<td>95%</td>
<td>90%</td>
<td>68%</td>
<td>89%</td>
<td>3</td>
<td>75-85°</td>
</tr>
<tr>
<td>5 (all)</td>
<td>146</td>
<td>21%</td>
<td>17%</td>
<td>29%</td>
<td>37%</td>
<td>43%</td>
<td>26%</td>
<td>28%</td>
<td>146</td>
<td>61-89°</td>
</tr>
<tr>
<td>5 only with distal rejuvenation</td>
<td>88</td>
<td>11%</td>
<td>13%</td>
<td>25%</td>
<td>28%</td>
<td>35%</td>
<td>18%</td>
<td>21%</td>
<td>included with all Type 5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>12%</td>
<td>12%</td>
<td>31%</td>
<td>23%</td>
<td>23%</td>
<td>22%</td>
<td>17%</td>
<td>4</td>
<td>62-89°</td>
</tr>
</tbody>
</table>

Roux (2003) further asserts that standardization in craft production can help archaeologists understand the intentional mechanical habits and skills of people and their organization of production. The continuity of production conventions across space and time implies strong traditions in learning and sharing of information, and so the determination of standardization can prove highly informative. It may also be a proxy for the number of craft producers (Costin 2001:301). It is not used in flake stone analysis very often or at all in Mesoamerica primarily because lithics, unlike ceramics, are reductive versus additive and thus are more likely used to compare some unintended errors in reduction. As a result, the CoV statistics are slightly higher or closer to 1 (see Eerkins and Bettinger 2001). For example, ceramic CoV tends towards < .17 of 17% variation and flake stone lithics tend towards < 11-34 percent depending on the measured attribute(s).

Discussion and Implications

Both the data and methods described above support the hypothesis that the Gateway Group produced small chert blade tools to make or modify crafts within a household workshop context. These crafts were then distributed outside the household to other households probably through transactions at a marketplace. In this section I will discuss and review important features or attributes of the small chert tools that reinforce the likelihood that standardized production and use was practiced at the Gateway Group.

For example, ceramic CoV tends towards < .17 of 17% variation and flake stone lithics tend towards < 11-34 percent depending on the measured attribute(s).

First, the dimensions of many of the tools situate into one of four plan forms: Type 3, Type 4, Type 5, or Type 6. Second, these tools had varying degrees of standardization within these Types and Type 5 tools or those with a converging distal tip, parallel lateral sides and a flat proximal platform were the most standardized and probably represent the "ideal type" to be used for crafting. Table 3 shows CoV statistics for length, width, thickness, and Sides A-D of various plan forms or tool types. Generally, the table shows that tools were manufactured and further retouched on a standardized blade size. For example, Type 5 tools (n=146) exhibited a less than 29 percent variation in overall length, width, and thickness. The further processing or shaping and using the blade as a tool created a standardized sidedness. Again, looking at Type 5 tools, measurements of Side A (the right distal side when viewing a tool dorsally) only showed a 28 to 37 percent variation with and without distal rejuvenation respectfully.

Distal rejuvenation was also a regular practice on Type 5 tools – although not exclusive to them – and was typically knapped by a small ventral pressure flake initiated from the dorsal surface. This practice would have created a sharp bit and an almost hook like end that could have been affective for incising (Martindale Johnson 2008:63 Figure 15). The presence of this kind of rejuvenation was previously unrecorded from other tools known from Caracol, but it appeared as though this was a regular feature of many of the tools from the Gateway Group. A 2x2 chi-square analysis (with one degree of freedom) for all tool types separated by the presence or absence of distal rejuvenation showed that there was a statistically significant ($X^2 = 48.3$ or $p= 0.0001$) association between distal rejuvenation for Type 5 and Type 6 tools (Martindale Johnson 2008:61 Table 4).
Through the actions of the crafter to distally rejuvenate Type 5 tools that are measured to be one standard deviation ($SD$) of the mean ($n=88$), he or she created a more standardized shaped distal bit (see Table 3). Because of the lack of this rejuvenation feature on Type 3 or Type 4 tools, it is possible these tools could have had other functions in antiquity. Unfortunately no time or resources were available during the initial study to determine micro-wear patterns on these or any tools, but such a study would help to make better informed conclusions.

Numerically coded retouch location and type, as well as measured edge angles, further reinforced the standardized use of these tools. These attributes were measured on Type 4, 5, and 6 tools because of the presence of lateral margins, apart from the converging distal bit portion. These analyses were conducted to infer whether or not these tools were used for more than drilling, incising, or piercing. All tools had unifacial retouch on the dorsal surface and edge angles (Table 3) consistent with experimental wood-working studies (Lewenstein 1991:214). These edge angles also suggest that these tools could have been used to scrap a material in addition to drilling, piercing, and incising.

The Gateway Group, compared generally to other household artifact assemblages, shows that it is unique among most, but similar to a select few. Household investigations at Caracol generally encounter household floors and construction fills above and below these dense plaster levels. Materials recovered from these construction fills, like those of the Gateway Group, have yielded assemblages of flake stone artifacts that help to define household practice and in some cases, can be quantifiably shown to exhibit more intensive activities. Reflecting on these kinds of data from construction fills or other refuse contexts from nearly 195 household investigations, the Caracol Archaeological Project can preliminarily show that 173 or 88.7% of households have chert artifacts, but 43 or 22% of household investigations exhibited chert counts over an average of 385. While quantitative counts alone cannot be used to designate crafting activities, the technological analysis of lithic materials within these households can provide a means to define crafting communities. However, in this case, both published and preliminary studies have shown that when a higher amount of chert artifacts are recovered, the assemblages include the complete reduction sequence, including utilized tools.

Now that the Gateway Group is understood to practice lithic production to make or modify crafts we can situate it generally within organization models of craft production. I argue these tools were a contingent component to the larger crafting process, because both finished and utilized tools were recovered, as well as a complete debitage assortment of the overall reduction sequence or $chaine$ $opéraoire$ are present; these tools were produced, used, and disposed of inside the house. These tools were not an independent craft in and of themselves intended for distribution outside the household. Other house groups at Caracol must have exhibited this type of organization because some excavated households do yield the presence of small chert tools but do not show evidence of their $in$ $situ$ production. This would mean that some households did manufacture or craft chert tools for extra-household distribution, while others were consumers rather than producers. It is likely, however, that the Gateway Group household could have produced these tools in abundance intended for both internal use and external distribution.

The Gateway Group is not unlike other households that yielded the relative abundance and presence of these small tools. Many of the excavated tools from Caracol have a similar morphology and appear to have comparable macro-scale use, retouch, or edge damage. Unlike the majority household groups throughout Caracol, however, the Gateway Group is not located near agricultural land and it is likely that a majority of household wealth came from craft production. These characteristics enable a more informed perspective into the adaptability and resiliency of ancient Maya households in an urban landscape, by highlighting household economic and social activities $apart$ from agricultural subsistence production. Although this household may be unique in spatial location, the flake stone data show the crafters followed site wide conventions or traditions of tool manufacture and use. In so doing they
Martindale Johnson

continued to remain connected to other household crafters through sharing materials, knowledge, and technical skill.

Lastly, the location of the Gateway Group adjacent to the city center and near multiple causeways could be argued to suggest a level of elite involvement over what kinds of crafts were produced as well as how they were distributed. However, this is not the case. The dominant perspective at Caracol is control over the distribution, not the production of goods via multiple market locations (A. Chase and D. Chase 2004). Technological practice was most likely learned and shared through the histories of household crafting traditions at Caracol, rather than through elite management. The widely distributed evidence of household chert flake stone crafting practice appears to support arguments for a relative equal access to locally available raw materials and reduction techniques. As stated earlier, the potential for local cherts to be available by simply surveying the karstic landscape for cherts during anthropogenic landscape transformations and still others procuring cherts through multiple market locations, implies very little elite involvement or control over crafting infrastructure, supporting previous interpretations of local rather than elite control of production.

Conclusions

This study was conducted to understand the dynamic organization of household practice through a study of the standardization of lithic technology in conjunction with general household patterns at Caracol, determined through the nearly thirty years of investigation. The study of standardized flake stone artifacts highlights the interconnectedness and diversity of multiple households that formed a community across a large site in terms of similar use of local resources for similar ends: those of craft production. The Caracol tradition of this type of tool production and use is confirmed through using CoV statistics and contextual data. This study created heuristic operations to organize data on flake stone artifacts from households with a focus on both metric and non-metric attributes. Furthermore, the broader goal was to develop similar analytical methods for effective transparency and data sharing. The hypotheses were designed to facilitate testable interpretive criteria of household organization, levels of crafting intensity, and better spatial and temporal controls regarding technological practice.

Households provide space in which people learn and transmit knowledge through practice. Once these households are networked, via causeways, a market economy, or other mechanism they can become larger “communities of practice” or overlapping social locations where technological knowledge is manifest in the production and use of tools for craft production. These communities of practice are not static and isolated to households within a “site boundary”, but rather have fluid boundaries stretching far beyond the household and overlap through a variety of shared social activities. Perhaps, a focus on the technological traditions in the tools of craft production that appear at household based workshops throughout a diverse region might enable a more comprehensive perspective to lithic studies, social organization, and the learning or sharing of practices beyond ritual uses of eccentrics, bifaces, and obsidian blades.

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References

Aoyama, Kazuo

Ashmore, Wendy and Richard Wilk

Brandt, Steven A., Lucas R. Martindale Johnson, and Arlen F. Chase

Braswell, Jennifer

Braswell, Geoffrey E.


Chase, Arlen F. and Diane Z. Chase


Chase, Arlen F., Diane Z. Chase, Elayne Zorn, and Wendy Teeter


Chase, Diane Z. and Arlen F. Chase

2014 Ancient Maya Markets and the Economic Integration of Caracol, Belize. In edited by XX, pp. XX-XX Archaeological Papers for the American Anthropological Association. No. XX

Clark, John E.

Clark, John E. and Stephen D. Houston

Cobos, Rafael

Costin, Cathy L.


Eerkens, Jelmer W, and Robert L. Bettinger

Hirth, Kenneth G.

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Martindale Johnson, Lucas R.

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8 BURIAL PRACTICES AT ACTUNCAN, BELIZE: A SEATED BURIAL AND ONGOING ANALYSIS FROM THE 2001-2013 FIELD SEASONS

Carolyn Freiwald, David W. Mixter and Nicholas Billstrand

Mortuary practices provide unique insight into key aspects of life. The Classic Maya interred, and sometimes moved, their ancestors to provide a connection to important places on the landscape, such as caves, public ceremonial spaces, and especially their homes. Burials of select individuals marked important events connected to constructed places, such as terminating use of rooms and buildings, or dedicating and ensouling newly renovated architecture. Excavations during seven field seasons between 2001 and 2013 have identified more than 18 burials at Actuncan, resulting in a burial population of at least 26 individuals ranging in age from perinatal to middle-aged adult. We present an overview of burial practices at the site, which include repeated use of specific residential locations as burial grounds. As in most Belize Valley centers, the dead were most commonly buried in an extended, prone body position with a southern orientation. However, one individual in a Late Classic burial was placed in a seated position. We analyze this burial and discuss its significance in the context of other seated interments in the Maya lowlands and burial practices at Actuncan.

Introduction

Archaeologists learn a great deal about the Maya from the burials they excavate in households, monumental architecture, caves and rock shelters, and myriad other locations in and around ancient sites. Reconstructing the life histories of each individual makes it possible to explore broader patterns in the burial population, including health and epidemiology, status differentiation, funerary practices, religious beliefs, migration networks, and even how identity was expressed by an individual and his or her community. At first glance, Maya burials appear to be quite variable: burials might include a whole body or a single bone, an individual or a family, and bones might be added or removed (Chase and Chase 1994; Harrison 1997; Welsh 1988). However, patterns can be reconstructed by studying details such as the orientation of a bone or its elevation in relation to other parts of the body.

Eastern structures in the Belize Valley were often used as domestic mausolea where the Maya curated their dead and practiced rites of ancestor veneration (Ek 2006; Gillespie 2002; Helmke 2006; Iannone 1996). At the Belize Valley center of Actuncan, connections between land and lineage served as ancestral sources of authority and may have legitimized claims to power (LeCount 2012; Mixter et al. 2013). Burial grounds served as places where these connections were manifested through funerary displays (Devlin 2007).

We present an overview of burial practices at Actuncan, which were highly patterned for generations. Eighteen burials include a minimum of 26 individuals (Table 1), with additional graves that have been identified, but not excavated. The predominant burial pattern was a prone, extended position and southern orientation. In contrast, one individual placed in a seated position (Burial 11) was associated with reoccupation and renovation of an elite residence (Mixter 2012) and may have represented an important source of ancestral authority (McAnany 1998) for this household as Actuncan grew during the Late and Terminal Classic periods.

Burials at Actuncan

Actuncan was settled as early as 1000 B.C., with continuous occupation through the Terminal Classic period (A.D. 780-1000). The site reached its political apogee during the Terminal Preclassic (A.D. 100-250) and Early Classic (A.D. 250-600) periods, and returned to similar population levels during the second half of the Late Classic period (A.D. 600-780) (Mixter et al. this volume). Actuncan was first excavated by James McGovern (2004) as part of the Xunantunich Archaeological Project, but the burials were excavated by the Actuncan Archaeological Project between 2001 and 2013 (Figure 1). Most were identified in residential structures, but two burials were associated with civic architecture.
Table 1. Question marks denote probable age and sex estimations. Data from Freiwald 2012; Freiwald and Micklin 2013; LeCount and Blitz 2002, 2005; Scopa Kelso 2005. More information on the burials can be found in the 2014 Actuncan Archaeological Report chapters by Donohue, Freiwald, and Simova.

<table>
<thead>
<tr>
<th>Burial #</th>
<th>Provenience</th>
<th>Minimum number of individuals</th>
<th>Body position and orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1, Op. 1A/1C Group 1, residential patio</td>
<td>Individual 1 (unknown)</td>
<td>Prone, extended, to the south, right arm flexed behind the back.</td>
<td></td>
</tr>
<tr>
<td>B2, Op. 5A in non-residential refuse by Plaza C near residence Str. 18</td>
<td>Individual 1 Individual 2 Individual “0”</td>
<td>Supine, extended, oriented to the south Semi-flexed, on right side, head to the south Unknown</td>
<td></td>
</tr>
<tr>
<td>B3 Op. 1D Group 1, residential patio</td>
<td>1 individual (2-4 years)</td>
<td>Supine, head to the south</td>
<td></td>
</tr>
<tr>
<td>B4 Op. 1D Group 1, residential patio</td>
<td>1 individual</td>
<td>Prone, extended, to the south</td>
<td></td>
</tr>
<tr>
<td>B5 Op. 6 XXXX/YYYY Residential Str. 41</td>
<td>1 individual</td>
<td>Head to the south</td>
<td></td>
</tr>
<tr>
<td>B6 Op. 12 Group 1 patio, residential</td>
<td>1 individual</td>
<td>Prone, extended, head to the south, right arm flexed behind the back</td>
<td></td>
</tr>
<tr>
<td>B7 Op. 12 Group 1 patio, residential</td>
<td>Individual 1 (adolescent 12-18 years) Individual 2 (unknown)</td>
<td>Prone, extended, head to the south, right arm flexed behind the back head prone, to the south and body disturbed</td>
<td></td>
</tr>
<tr>
<td>B8 Op. 12 Group 1 patio, residential</td>
<td>Individual 1 (unknown) Individual 2 (unknown) Individual 3 (unknown)</td>
<td>Prone, extended, to the south, right arm flexed behind the back Prone, extended, to the north? Partially excavated Prone, extended, to the south</td>
<td></td>
</tr>
<tr>
<td>B9 Op. 12 Group 1 patio, residential</td>
<td>Individual 1 (adult male?) Individual 2 (adult male?)</td>
<td>Prone, extended, to the south Prone position, oriented to the south</td>
<td></td>
</tr>
<tr>
<td>B10 Op. 12 Group 1 patio, residential</td>
<td>Individual 1 (unknown) Individual 2 (unknown)</td>
<td>Pone, extended, to the south, right arm flexed behind the back Extended position, partly excavated</td>
<td></td>
</tr>
<tr>
<td>B11 Op. 6 Residential Str. 41</td>
<td>Individual 1 (mid-old age adult male? 36-44 years)</td>
<td>Seated, semi-flexed arms and legs, facing south</td>
<td></td>
</tr>
<tr>
<td>B12 Op. 16 Residential Str. 57</td>
<td>Individual 1 (perinate?)</td>
<td>Oriented to the south</td>
<td></td>
</tr>
<tr>
<td>B13 Group 1 patio, residential</td>
<td>1 individual (unknown)</td>
<td>Supine, extended, to the south</td>
<td></td>
</tr>
<tr>
<td>B14 Op. 12 Group 1 patio, residential</td>
<td>1 individual (adult female?)</td>
<td>Prone, to the south (not fully excavated)</td>
<td></td>
</tr>
<tr>
<td>B15 Op. 18 Residential Str. 73</td>
<td>Individual 1 (unknown) Individual 2 (juvenile)</td>
<td>Individual 1: prone, extended, to the south Individual 2: flexed (not fully analyzed)</td>
<td></td>
</tr>
<tr>
<td>B16 Op. 18 Residential Str. 73</td>
<td>1 individual (adult)</td>
<td>Prone, extended position, oriented to the south</td>
<td></td>
</tr>
<tr>
<td>B17 Op 18 Residential Str. 73</td>
<td>1 individual (adult)</td>
<td>Prone, extended position, oriented to the south</td>
<td></td>
</tr>
<tr>
<td>B18 Op. 39I, G, E-Group structures 26 and 27</td>
<td>1 individual (unknown)</td>
<td>Prone, extended position, oriented to the south</td>
<td></td>
</tr>
</tbody>
</table>

Sixteen burials (twenty-two individuals) were identified in residential contexts, including patio-focused groups and single mound houses. Ten burials (15 individuals) were found in Group 1, spanning the Terminal Preclassic to Late Classic periods (Freiwald 2012; Rothenberg 2012; Scopa Kelso 2005) (Figure 2). Burials from the same broad timeframe also were found in Structure 57, the western building of patio-focused residential Group 7 (Burial 12),
Figure 1. Site map of Actuncan.

Figure 2. Burials adjacent to the eastern structure in Group 1. Image by K. Fulton and C. Freiwald.

and in single mound residential Structures 73 (Burials 15, 16, and 17) and 41 (Burials 5 and 11).

However, not all residences served as burial grounds (Freiwald and Micklin 2013; Mixter and Freiwald 2013). No burials were found during excavations adjacent to the eastern building (Structure 22) in Group 8, a group of nine structures and three patios that is interpreted as the ruling family’s residence during the Late Classic period (Mixter et al. 2013). Nor were any burials identified in the Group 5 household, although excavations focused on the central axis of the western and northern buildings (Hahn 2012).

The Burial Population

Analysis of the remains will not be completed until next year, but the burial population thus far includes one perinate (Burial 12), two children (Burials 3 and 5), one juvenile (Burial 15), one adolescent (Burial 7-1), four probable adult males (Burials 9-1, 9-2, 11, and 13), one female (Burial 14), and four adults (Burials 1, 2-1, 6, and 7-2). Age estimates range from 1-3 years to >30 years based on dental development and attrition, with patterns that vary from unworn occlusal surfaces to complete crown loss. Other preliminary age and sex determinations based on bone development and morphology follow standard conventions (e.g., Baker et al. 2006; Scheuer et al. 2010; Steele and Bramblett 1988; Ubelaker and Buikstra 1994; White and Folkens 2005).

The burial population at Actuncan was a relatively healthy one, similar to individuals at Chaa Creek and Xunantunich (Adams 1998). Observable pathologies were limited mostly to non-specific incidents of stress during childhood (Hillson 1996; Goodman and Rose 1990). Billstrand has completed dental analysis on 211 teeth from 16 individuals that has concentrated on the identification of hypoplastic activity, primarily the linear form. Twelve of sixteen individuals have observable linear enamel hypoplasias. Seven individuals had multiple incidents of stress. Twenty-six percent (56 teeth) have observable hypoplasias and 8% (17 teeth) are marked with two or more enamel defects (also see Scopa-Kelso 2005).
Most burials followed the Belize Valley convention of interring the dead in a prone, extended body position, with the head oriented to the south (Table 1). At least 11 of the burials were re-entered or disturbed, but it still was possible to observe that 85% percent of the individuals were oriented to the south, and more than 50% were placed in a prone, extended position. Only one individual had a northern orientation, and just three were interred in a supine position.

Two burials were identified in Structure 41, including the Terminal Preclassic period burial of a child (Burial 5), and the individual interred during the Late Classic period in a seated position (Burial 11) (Figure 3). Structure 41 was a large single mound house that likely served as the residence for a noble family at Actuncan. It originally was constructed during the Terminal Preclassic period, though a deep test excavation below the structure indicates that this portion of the site core was occupied as early as 1000 B.C. (Mixter 2012).

Burial 5 consisted of the fragmentary remains of a 3-5-year-old child, which were located immediately south of Structure 41 on a Late Preclassic plaza floor that was burned and buried by the construction of a Terminal Preclassic floor, which formed the architectural base on which all later construction phases were built (Mixter 2012).

Burial 11 was located in a terrace attached to the southern side of Structure 41. The burial event dates to the second half of the Late Classic, or the Terminal Classic period, based on direct dating of femoral cortical bone that will be presented in a forthcoming publication. The burial of one middle-aged probable male was contemporaneous with the construction of Structure 41-1st and appears to mark the reoccupation of the residence following at least 100 years of disuse. A description and interpretation of the skeletal remains and the burial context follows an overview of seated burials in the Maya lowlands.

**Seated Burials in the Maya Lowlands**

The seated burial position has been interpreted as a sign of high status (Lucero 2006), possible evidence for sacrifice (Tourtellot 1990), a marker of ancestor veneration, or as a symbol of authority (McAnany et al. 1999). Seated burials formed ~50% of burials at Cuello and K’axob during parts of the Preclassic period (McAnany et al. 1999; Robin et al. 1991). In contrast, a compilation of burial data that includes 1592 individuals (1425 burials) from 27 Classic-period sites shows that seated burials
Table 2. A summary of seated burials at some Maya lowland sites: MNI=Minimum number of individuals, A = adult, Yad=young adult, M=male, F=female. Burials marked with an asterisk were only partially excavated. Additional references can be found in Welsh (1988: 19-20) and Freiwald (2011: 415-428).

<table>
<thead>
<tr>
<th># Burials</th>
<th>Site</th>
<th>Seated Burials</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>255 burials MNI 325</td>
<td>Altun Ha</td>
<td>C13-14 (300-100 B.C.) A F</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>42 burials MNI 48</td>
<td>Ambergis Caye</td>
<td>2 (Terminal Classic) A M &gt;40 San Juan site</td>
<td>Glassman 1995</td>
</tr>
<tr>
<td>44 burials MNI 46</td>
<td>Baking Pot</td>
<td>none reported</td>
<td>Audet 2006; Freiwald 2011; McRae 2004; Piehl 2008, 2006; Welsh 1988</td>
</tr>
<tr>
<td>3 burials MNI 3</td>
<td>Benque Viejo</td>
<td>none reported</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>1 burial MNI 3</td>
<td>Blackman Eddy</td>
<td>none reported</td>
<td>Freiwald 2011; Garber et al. 2004; Piehl 2006</td>
</tr>
<tr>
<td>8 burials MNI 9</td>
<td>Buenavista</td>
<td>none reported</td>
<td>Mitchell 2000; Peuramaki-Brown 2009</td>
</tr>
<tr>
<td>19 burials MNI 20</td>
<td>Cahal Pech</td>
<td>none reported (includes some Zotz, Zopilote, and Tolok burials)</td>
<td>Cheetham 2004; Garber et al. 2004; Mitchell 2006; Piehl 2006; Song 1995</td>
</tr>
<tr>
<td>7 burials MNI 15</td>
<td>Chaa Creek</td>
<td>Chultun 2, Chamber 3</td>
<td>Adams 1998; Connell 2000; Lee et al. 2000 in Schwake 2008</td>
</tr>
<tr>
<td>67 burials MNI 69</td>
<td>Copan</td>
<td>6-46 (A.D. 575-825) A 16 (no date) A</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>116 burials MNI 113</td>
<td>Dzibilchultun</td>
<td>612-3 (A.D. 450-600) M</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>2 burials MNI 5</td>
<td>Esperanza</td>
<td>none reported</td>
<td>Schubert et al. 2001; Freiwald 2011</td>
</tr>
<tr>
<td>9 burials MNI 10</td>
<td>Floral Park</td>
<td>none reported</td>
<td>Brown et al. 1996; Freiwald 2011; Piehl 2006</td>
</tr>
<tr>
<td>22 burials MNI 25</td>
<td>Holmul</td>
<td>none reported</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>16 burials MNI 33</td>
<td>Mountain Cow</td>
<td>5 (A.D. 0-200) Yad M 13 (no date) “youth”</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>32 burials MNI 29</td>
<td>Palenque</td>
<td>11 (A.D. 600-650) A</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>11 burials MNI 14</td>
<td>Piedras Negras</td>
<td>none reported</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>7 burials MNI 9</td>
<td>Pook’s Hill</td>
<td>none reported</td>
<td>Helmke 2006; Helmke et al. 2001</td>
</tr>
<tr>
<td>70 burials MNI 70</td>
<td>San Jose</td>
<td>19 (A.D. 700-800), 1 infant</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>3 burials MNI 3</td>
<td>San Lorenzo, Belize</td>
<td>none reported</td>
<td>Adams 1998; Yaeger 2000</td>
</tr>
<tr>
<td>Burials</td>
<td>Site</td>
<td>Burial 1 Details</td>
<td>References</td>
</tr>
<tr>
<td>---------</td>
<td>---------</td>
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<td>------------</td>
</tr>
<tr>
<td>11</td>
<td>Saturday Creek</td>
<td>B2 (A.D. 800-900) M7, 14-20 years</td>
<td>Lucero 2006; Piehl 2002, 2006; Sanchez and Chamberlain 2002</td>
</tr>
<tr>
<td>52</td>
<td>Seibal</td>
<td>1 (A.D. 825-925) Yad F</td>
<td>Tourtellot 1990; Welsh 1988</td>
</tr>
<tr>
<td>116</td>
<td>Uaxactun</td>
<td>none reported</td>
<td>Welsh 1988</td>
</tr>
<tr>
<td>19</td>
<td>Xunantunich</td>
<td>none reported</td>
<td>Adams 1998; Audet 2006; Braswell 1998; Freiwald 2011; MacKie 1985</td>
</tr>
<tr>
<td>6</td>
<td>Zubin</td>
<td>none reported</td>
<td>Iannone 1996; Schwake 1996</td>
</tr>
</tbody>
</table>

account for less than 2% of individuals with recorded positions (Table 2).

Burials with seated individuals are not well-understood. A comparison of 28 seated burials in Table 2 shows that a great deal of variability exists in the location and type of grave, the number of grave goods, the demography of the seated individuals, and the burial position itself.

Burials described as seated include a variety of body positions. Tourtellot (1990: 87-88) described Burial 1 at Seibal as ventrally flexed, with the left leg crossed over the right, but with the trunk bent over the legs. The arms were flexed at the elbows, placed either behind the back or in front of the chest. While some post-mortem movement of the body occurred, the drawing shows how the alignment of the vertebrae and placement of ceramic vessels marked the original location of the head (Figure 4).

At Saturday Creek, Burials 2 and 11 contained individuals who were seated upright in strikingly similar positions, with the arms bent at the elbow and crossed in front of the body (Lucero 2006: 98-99). The legs were bent at a 90° angle with the left lower leg crossed over the right (Figure 5). An inverted dish also marked the location of the head in Burial 10, which was only partially excavated, but this individual appears to have been seated upright with the arms crossed in front of the body (Lucero 2006: 106, 110).

Variation in body position also is found at Barton Ramie. BR-1 Burial 6 was placed in an upright position with the arms and legs semi-flexed, but not crossed (Figure 6). The legs met at the ankles, the right hand rested on the right hip, and the left hand was on the left knee (Willey et al. 1965: 81). BR-1 Burials 7 and 9 were buried in the same mound in similar positions, although each individual had unique arm positions and there was greater movement of the bones post-burial (Willey et al. 1965: 84). In addition, burials in mounds BR-123, BR-5, and BR-4 had different seated body arrangements (Willey et al. 1965: 80, 118),

\[\text{Figure 4.} \quad \text{Seibal seated individual in Burial 1 in Figure 3 (Tourtellot 1990: 88) reproduced with the permission of the Harvard University Press.}\]
showing that ‘seated’ actually describes a wide variety of distinct body positions.

Orientation is reported for only 10 seated individuals in Table 2. It is not clear whether the direction a seated individual faced held a meaning similar to the orientation of the head in an extended or flexed burial, which has strong regional patterning (Schwake 2008; Welsh 1988; Willey et al. 1965). At Altar de Sacrificios, three distinct orientations are noted for four individuals. However, at Barton Ramie and Saturday Creek in the Belize River Valley, four of six individuals whose orientations are described faced a southern direction, the predominant burial orientation in the region. Placing vessels over the head of the deceased also was common in both seated and non-seated burials in the region (Welsh 1988).

There also is no clear pattern among grave types, grave goods, and burial locations of seated burials. Grave types of 30 seated individuals in a total sample of 836 burials include simple graves (50%), crypts (30%), cists (13%), and tombs (10%) in both residential locations and civic architecture (Welsh 1988). Many individuals buried in a seated position are accompanied by large numbers of grave goods; however, grave goods more likely to be found in tombs. Welsh’s (1988) data show a ratio of 9:3 goods in tombs versus simple graves at Mountain Cow for all types of burials, as well as at Holmul (6:3), Tikal (17:2), and Uaxactun (22:0.63), and at Baking Pot (2:0.62) and Barton Ramie (3:0.88) in a comparison of simple graves to crypts.

Nineteen of the seated individuals had grave goods, while none are reported for eight. Thirteen of the individuals had multiple goods, including three seated individuals buried in Tikal’s North Acropolis who were interred with jade and dozens of vessels (Welsh 1988). Rich burials with seated individuals also were identified at Seibal (Burial 1), Palenque (Burial 11), and San Juan, Ambergis Caye (Burial 2) (Glassman 1995; Tourtellot 1990; Welsh 1988).

The identity of the grave occupant may be responsible for some of the differences. Grave goods are more than twice as likely to be included with males as with females at Altun Ha, Tikal, and Uaxactun, although males and females interred at Barton Ramie had equal numbers of grave goods (Welsh 1988). More than twice as many males are interred in seated positions as females (12 males and 5 females). Three males have rich burials with dozens of goods as compared to one female, but this is not a statistically significant difference ($\chi^2 = 0.176$, $df = 1$, $p = 0.6744$).

McAnany and colleagues (1999) report predominantly males in Preclassic seated burials, but a Preclassic female is interred in a seated position, and by the Late and Terminal Classic periods, seated interments include an infant, a male adolescent, four male and four female adults, and one old-age male adult (Table 2). None of these variables alone – the individual’s sex, status as suggested by grave goods and construction, or body position that might be
linked to sacrifice or other non-funerary interment practices – explain why some individuals were buried in a seated position and not others. Instead, the context of the burial and a broader exploration of Actuncan burial practices suggest that ancestors and the historically rooted authority they represented provide insight that is useful for interpreting the seated burial at Actuncan.

**Actuncan Burial 11**

Burial 11 was interred in a pit cut into the southern terrace of Structure 41’s penultimate phase (Structure 41-2nd). The pit was adjacent to the façade of the central mound and was cut into the terrace’s plaster floor along the face of a red painted wall with an apron molding. The burial location was significant: the remains of a large ceramic smashing event were exposed on the terrace’s plaster floor and marked the termination of Structure 41-2nd. The interment of the seated individual likely signaled the dedication of Structure 41-1st, the construction of which involved extensive renovations that may have included the destruction of a masonry superstructure, the building of a new perishable superstructure, and the reorientation of the entire building from the west to the south (Mixter 2012; Mixter et al. this volume). The seated individual was oriented to face a southern direction, which may have emphasized this new architectural alignment.

Burial 11 was placed within a prepared grave ~25 cm deep in a 60-cm x 60-cm area. The apron-molded wall was carefully covered by a protective retaining wall of stacked chert river cobbles that formed the north side of the burial pit. The individual’s back was aligned with this wall, and the body sat on a partial *metate*, which represents the only burial good in the grave. The pit was not sealed by capstones after the burial, but instead was covered by construction fill during the extension of Structure 41-1st’s central platform. The fill consisted of large chert cobbles like those used to create and fill the grave, so the task of separating formal construction of the grave from construction fill was difficult. The fill in the burial cavity later settled, leaving large chert cobbles that had previously covered the body interspersed with the skeletal remains.

Mixter supervised excavation of Burial 11 during the 2011 field season (Mixter 2012), recording the orientation and position of each bone. Each bone fragment or cluster of fragments was numbered, photographed, drawn, and plotted three-dimensionally following Freiwald (2013; also see Nawrocki 2011). This excavation technique combines forensic and archaeological methods (e.g., Duday 2006; Duday et al. 1990; Dupras et al. 2011; Nilsson Stutz 2008; Tiesler et al. 2010) to reconstruct the taphonomic history of each individual buried at the site. It is especially useful when used with biological profiles in reconstructing complex Maya burial practices that involve multiple stages of funerary treatment (Novotny 2012; Tiesler 2010).

Freiwald and Billstrand completed the lab analysis during the fall of 2013 at University of Mississippi. The bones were washed so that surfaces could be observed and documented. The burial consisted of 998 bone fragments (667.95 grams), with orientations recorded for 67 identified bones and bone clusters and positions determined for 64 bones.

The seated position in this burial presents yet another variation of body position discussed in the lowland sample presented in Table 2. Burial 11 was placed in a seated position with the legs flexed at the knees, and the right leg crossed under the left (Figure 7). The arms were bent at the elbow and crossed at a 90° angle in front of the chest. The position of the bones and the size of the burial cavity suggest that the body was bent over rather than seated in an upright position.

During the excavation, the knees were the first part of the body visible at the top of the burial, along with the right side of the mandible and fragments of the top two cervical vertebrae, the atlas and the axis (Figure 8). These bones delimited the southern edge of the burial. The northwestern edge of the burial was formed by three aligned thoracic vertebrae, with the back of the spinal column on top and the uppermost vertebra oriented to the southeast. This is the same alignment as the legs, suggesting that the individual’s head was oriented to the southeast as well. The cranial fragments were found on the eastern edge of the burial near the left leg, including a temporal and frontal fragment.
Mandible fragments also were found in the vicinity of the skull near the lower legs.

Although the femora and the tibiae were the first bones visible to the excavators, they also formed the lowest level of the burial because they were inclined at a 45° angle, differing in elevation from the south to the north by as much as 10 cm. The femora lay parallel, oriented to the southeast, while the tibiae were crossed at the ankles with the feet touching. The right foot lay on its side, with the first digit (the 1st metatarsal and proximal phalanx of the big toe) on top, and other digits (the 4th and 5th metatarsals) situated underneath.

Both phalanges of the 1st digit of the left foot also were located near the right foot bones.

The right arm bones were still articulated, with the upper arm (humerus) adjacent to the body, and its posterior surface in parallel with the legs (Figure 9). The arm was semi-flexed at the elbow joint, and the ulna and radius lay across the rib cage. The left lower arm (the proximal radius and a probable ulna shaft) crossed over the left femur so that the hand rested between the upper legs, where left wrist and hand elements (the scaphoid and manual phalanges) were found. Rib and vertebrae fragments lay on top of the arms and legs, in approximate anatomical position by the location of the spinal cord.

Like Burial 1 at Seibal, the body is ventrally flexed. However, the body position is better described as seated than bundled. The
foot and hand bones formed the lowest level of the burial, along with the left lower leg (Figure 10), and the upper body and knees formed the upper level. In addition, the post-burial movement of the bones is not consistent with a bundled corpse. The left hand bones were approximately 10 cm lower than the lower arm bones, and the proximal left fibula fragment had fallen to a near-vertical position at the edge of the burial near the left knee joint. More obvious is the movement of the head, which lay on the left side of the body, demonstrating some open space or loose fill in this small grave.

The settling of grave fill displaced and broke some of the bones, including the mandible. The left side was broken and rotated 180°, while the right side was found several centimeters away. This occurred after the bone was dry, months or years after death. Movement of the bones also occurred within the space of the body as it decomposed, including the rotation of both lower legs so that each tibia rested under the corresponding fibula instead of at its side. Smaller bones, such as rib and vertebrae fragments, demonstrated movement within the space of the body cavity.

Most bones were incomplete, but it is possible that the individual was male. A frontal cranial fragment shows the presence of a brow ridge that is too fragmentary to score. The size and robusticity of the bones suggest a large individual with substantial muscle attachments, especially on the clavicle and the radius, which along with those on the tibiae and ulna, demonstrate marked strength and physical activity. Although the bones were too fragmentary, even for stature estimates even using partial bones (e.g, Steele and Bramblett 1988: 229-239), in situ measurements provide a minimum height estimate of 5’ 6” to 5’ 9” using the right ulna from its articulation with the humerus to the incomplete distal end (Steele and Bramblett 1988: 169).

The distal fragment of the pubic symphysis supports an average age of 36-44 years at death. The fine-grained symphyseal surface, relatively complete oval outline, and lipping on the ventral margin are comparable to Todd’s stages VII-VIII (also see Brooks and Suchey 1990; Bramblett and Steele 1988: 206-207). Osteophytes indicative of both age and activity are present on two proximal rib facets, distal manual and pedal phalanges, and a cervical vertebral centrum that also was concave and misshapen.

Burials 5 and 11 both were associated with construction events in Structure 41. These burial contexts were significantly different than those in the Group 1 patio, but each clearly were used to bury a carefully-selected group of ancestors. Like Structure 41, Group 1 was constructed during the Preclassic and in use during the Late Classic period (LeCount 2012; Mixter 2012; Rothenberg 2012). The solitary nature of the single individual in a seated position contrasts sharply with the Late Classic re-use of a relatively small area of patio space (seven 1 x 1 m units) for more than twelve individuals adjacent to the eastern structure in Group 1.

One difference may relate to the abandonment and later reoccupation of structures. Group 1 likely was continuously occupied, with similar burial practices from the Terminal Preclassic through the Late Classic periods (Freiwald 2012; Freiwald and Micklin 2013; Rothenberg 2012). In contrast, Burial 11 may have marked the reoccupation of Structure 41 with the interment of a single, but important ancestor in the same space used for the termination ritual associated with the building’s initial abandonment. Evidently, different types of funerary practices could demonstrate a family’s claim to a place on the Actuncan landscape.

**Conclusion**

The rarity and variability of seated burial practices makes a singular interpretation unlikely. It is possible that some individuals were sacrificed, but body position is not sufficient to interpret the cause of death. The position may be linked to elite status in some cases, but despite Burial 11’s location in an elite household, it included only a single metate. Interpretations may require biological, taphonomic, and contextual data to understand the meaning of each seated burial.

Body position and orientation were important markers of community burial practices, which kin-based groups may have manipulated to gain political advantage using
their ancestral associations (McAnany 1998). Burial traditions typically lasted for generations, or even centuries, and the same places were used repeatedly to inter important ancestors following the same funerary norms (Becker 1992; Chase and Chase 1994; Ek 2006). At Actuncan, the seated position in Burial 11 is notable because it differs from the standard burial practices at the site during the Late Classic period. More broadly, seated burials are uncommon and follow no regional or pan-lowland pattern, indicating that they represent special and possibly individualized phenomena.

McAnany (1998) suggests that ancestors created links to land claims, and may have played a role in the rank a lineage held as it competed with other groups, including the ruling family. The burial of an ancestor may have been necessary to renew a family’s ties to a specific location. McAnany and colleagues (1999) associate seated burials with authority, citing examples of bundled ancestors in Postclassic texts and seated figurines in Preclassic Mesoamerica. The use of this burial type at Actuncan appears to celebrate an unusual event – the reclaiming and reoccupation of a previously abandoned residence. The burial of this middle-aged male would have provided an important source of ancestral power for the household as local political power was re-centered at Actuncan during the Late to Terminal Classic transition (LeCount et al. 2011; Mixter et al. this volume). The case of Burial 11 provides one example of how choices of burial location and body position may reflect household level strategies related to claims of land and lineage at Actuncan, and perhaps more broadly in the Belize Valley and southern Maya lowlands.

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References Cited


Brown, M. Kathryn, David M. Glassman, Owen Ford, and Steven Troell

Chase, Arlen F., and Diane Z. Chase

Cheetham, David

Devlin, Zoë

Duday, Henri

Duday, Henri, Patrice Courtaud, Eric Crubezy, Pascal Sellier, and Anne-Marie Tillier

Dupras, Tosha L., John J. Schultz, Sandra M. Wheeler, and Lana J Williams

Ek, Jerome D.

Freiwald, Carolyn

Garber, James F., M. Kathryn Brown, W. David Driver, David M. Glassman, Christopher J. Hartman, F. Kent Reilly III, and Lauren A. Sullivan

Gillespie, Susan

Glassman, David

Goodman, A. H. and J. C. Rose

Hahn, Lauren D.

Harrison, Peter
LeCount, Lisa J., Angela H. Keller, and John H. Blitz  

Lucero, Lisa J.  

MacKie, Euan W.  

McAnany, Patricia A.  

McAnany, Patricia A., Rebecca Storey, and Angela K. Lockard  

McGovern, James  

McRae, Laura  

Mitchell, Patricia T.  

Mixter, David W.  

Mixter, David W. and Carolyn Freiwald  
Mixter, David W., Thomas R. Jamison, and Lisa J. LeCount

Nawrocki, Stephen P.

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Tiesler, Vera, Andrea Cucina; T. Kam Manahan; T. Douglas Price; Traci Ardren; James H. Burton

Tourtellot, Gair III

Ubelaker, Douglas H. and Jane E. Buikstra

Welsh, W. B. M.

White, Tim D. and Peter A. Folkens

Willey, G. R., W. R. Bullard, Jr., J. B. Glass, and J. C. Gifford

Yaeger, Jason
2000 Changing Patterns of Social Organization: The Late and Terminal Classic Communities at San Lorenzo, Cayo District, Belize. Ph.D. dissertation, Department of Anthropology, University of Pennsylvania
9 SOCIAL IDENTITY AMONG ANCIENT MAYA HOUSEHOLDS: PERSPECTIVES FROM NW BELIZE

Fred Valdez, Jr.

Archaeological investigations in NW Belize provide a perspective concerning ancient Maya households often overlooked and/or ignored. The Programme for Belize Archaeological Project (PfBAP) has studied and continues to research what are often referred to as hinterland communities. These small settlements represent specialized communities that can be distinguished from each other by settlement plan as well as associated material culture. New techniques of determining site function are being explored and reviewed for this discussion. While some settlements are small court groups, others are represented by minimal evidence, but demonstrate an important presence nonetheless.

Introduction

Archaeological investigations in NW Belize provide a perspective concerning ancient Maya households often overlooked and/or ignored. Research in the Rio Bravo region has allowed for an interesting view of ancient Lowland Maya society. This area of NW Belize has been defined as part of the Three Rivers Region (Cortes-Rincon and Valdez 2012). The region includes part of NE Peten and NW Belize that include the Rio Azul, the Rio Bravo, and the Rio Hondo. Archaeological sites within the NE Peten portion include Rio Azul, Kinal, La Honradez and the numerous minor sites between; La Milpa, Blue Creek, Gran Cacao, Dos Hombres, Chan Chich and more than 60 known smaller settlements are among the notable prehistoric remains in NW Belize (Figure 1). The Three Rivers Region has seen extensive archaeological investigations since 1983 on the Guatemalan side while NW Belize has been a focus of investigations since the late 1980s.

A significant interest of the regional research efforts has been to study Maya society from a “regional” or inter-site perspective rather than from a sometimes narrow site-centric perspective. While the efforts of the regional approach were to investigate the large centers, an emphasis has been placed on an attempt at understanding the smaller communities and the various social institutions between small and large settlement.

Regional Expressions and Activities

The Programme for Belize Archaeological Project (PfBAP) has studied and continues to research what are often referred to as hinterland (or rural) communities. These small settlements represent specialized communities that can be distinguished from each other by settlement plan as well as associated material culture.

Interests at providing a regional interpretation of the prehistoric civilization provides us the opportunity to re-interpret how the prehistoric Maya survived numerous centuries in an environmental setting that has often been described as inhospitable. The greater Maya region has long been understood as an area of great environmental diversity (Scarborough and Valdez 2003), but with little explanation of what this diversity may have
meant for Maya society and Maya Civilization. The Three Rivers Region may be viewed as a small version of the larger Maya world. Various environmental settings from scrub brush areas and bajos to stands of tall forest can be easily viewed and traversed in a casual tour. Indeed, one can easily walk through three or four different environments during the course of an hour’s walk. Aerial views of aguadas east of Dos Hombres, for example, vividly demonstrate some of the environmental variation in a relatively small area. Interestingly, prehistoric Maya sites or at least evidence of Maya activity is found in each of these environments, and these environments are generally “occupied” by the often overlooked small households. Although, as just mentioned, the forest had been portrayed as inhospitable, we now (past and present) it is now clear that this environmental diversity is quite providing. The providing aspects come from having the knowledge and/or expertise to exploit these environments. It remains, therefore, critical in our research among the ancient Maya to keep that context of the natural environment as an important backdrop for our interpretations.

The Maya certainly had and maintained an extensive and intensive knowledge of their surrounding environments. It seems highly likely that the Maya inherited this knowledge from their Archaic ancestors, as seen in other New World areas (Grazioso et al. 2013). While the Maya settlements of the Middle and Early Late Preclassic may have been exploiting local resources as a generalized strategy, it is by the Late to Terminal Preclassic that the Maya likely became specialized on particular resources. The specialization of exploitation and production may have led to an interdependence between sites of a given polity and helped to form a stronger “state.” Scarborough and Valdez (2009) have commented that this strategy/adaptation is termed resource-specialized sites. In this model there would be, within a given polity, a site (or several) specialized in stone tool production (such as El Arroyo in the PfB property); perhaps several pottery producing sites where some may have sub-specialized in bowl production while others focused on jars. Additionally, there would be “agricultural” communities where some produced foods while others concentrated (or specialized) in medicinal plants, fibers/cotton, herbs/condiments and so forth.

Many trees and plants in NW Belize, such as the chicle and allspice trees, serves as a reminder of the many botanical resources the Maya may have tended to and harvested. Some botanical items may have been intentionally produced/protected or harvested from a particular environment as a means of sustainable harvesting as opposed to cultivated/planted fields.

Could there be within a polity several sites producing the same materials? If so, how are these sites/ producers interacting? Are they collaborators or competitors? In most cases for the resource-specialized sites model, sites are producing similar materials, for example, stone tools, but likely to be different stone tools at each site, although some overlap is likely as seems the case in northeast Belize where Colha-Kichpanha-Rockstone Pond all have access to the chert zone. This scenario likely applies to pottery production where access to good clays and tempering material may be available to several communities and each produces particular jars or bowls. Although each is capable of producing the whole range of ceramic vessels, a particular community “specializes” in certain forms as a primary production (and trade) item. Each then takes their particular craft to market --- an important social, religious (?), and economic event. The communities can then exchange at markets their products as well as knowledge, ideas, etc. It is these specific products (stone tools, pottery, baskets) that tie into community identity. Why could or would such a system exist? One important component is that this “system” helps form interdependencies for goods and services between the polity’s communities. The system also allows for artistic variation, and by default, IDENTITY for both the individual and the community. The system or mechanism(s) may be managed/arranged by the larger centers or polity leaders. This interdependence overseen by the polity capital provides leaders with an authority for managing a unified polity. IDENTITY, both local and regional, are then expressed at community gatherings as well as at markets and rituals. One concern is, can we get
to detailed identity without perishables such as clothing and basketry?

As Marcus (1993) has highlighted, much attention in Maya archaeology has gone to large political and religious centers as the source affecting socioeconomic and sociopolitical organization, we would be, however, remiss to ignore other social units of the lowland settlers. These other social units are among the many small towns, villages, and hamlets (often archaeologically invisible), that served a fundamental economic adaptation although located away from the centralizing power.

Accepting the existence of the multiple economic units, at various distances from the large centers, also acknowledges a multifaceted economic and political interplay. These complex economic positions, and how these various communities interacted, is part of what we should see as identity. A multifaceted economy is a mechanism for understanding the economic foundations of Maya Civilization, rather than a rigid, often tiered construction. Part of the difficulty in reconstructing the ancient Maya economic interplay between the many social units is in the lack of systematic survey over large areas. Given the general ecological setting of the Maya Lowlands, a lack of comprehensive survey is obvious and understandable, but may be significantly remedied in the next decade with the advances of LiDAR and such technologies.

While there has been the much valuable data from both large centers and from outlying smaller units across the lowlands, research from the region has remained somewhat incomplete. Non-perishable material culture traded from great distances is at times obvious in artifacts of jade, obsidian, and basalt to name a few. Long distance trade from coastal areas into interior zones can be seen in marine shell (Figure 2), shark teeth, stingray spines and trade over extensive distances can also be evidenced from certain pottery styles, and if looked at carefully, in style of production execution such as pottery form(s) and architectural style(s), among others. As observed from Scarborough and Valdez (2003)

Our understanding of the small villages and towns undergirding Maya society is sorely incomplete. The lack of well-preserved surface debris (frequently hidden in vegetal ground cover), coupled with high rates of organic decay, prevents total surface survey coverage of any region in the Maya Lowlands. Because of these methodological constraints, we have emphasized a glorious history of ancient Maya tombs, palaces, and pyramids from the highly visible architectural centers. We have a much less textured view of the rest of the Maya economy and its associated hinterlands. (…which entails at least 90-95% of the population).

It then becomes critical that we take a careful and calculated look at the survey and settlement data being documented far from the large centers. If we can focus on these small settlements, which are often represented by minimal architecture and features, (such as that reported by several investigators from the PFBAP, see Cortes-Rincon and Valdez 2012), then we can compare or contrast them across a defined region, such as NW Belize. This approach might lend itself to defining a very different society from the current almost monolithic view often described. With this “new” perspective may come a view of a particular socioeconomic and sociopolitical organization that better fits the prehistoric lowland Maya. We may be able to recognize how individual communities may have self-
identified and how they were viewed regionally via an emphasis on internal production and external exchange/trade.

**Settlements Comments**

The Programme for Belize Archaeological Project continues to have a significant research interest at small site identification and documentation (Figure 3). The smaller settlements are not carbon copies of each other, but have a specific layout that likely reflects particular functions.

Conventional wisdom would suggest that small, closely spaced communities were independent and self-reliant only capable of recreating themselves generationally (Marx [1853] 1968; Southall 1988). However, many of these communities are now shown to interact through a set of socioeconomic interdependencies, knit together in a complicated areal/regional exchange system in which individual communities harvest or exploit specific resources either raw or refined—the latter entailing degrees of craftsmanship (lithics, pottery, etc.). Specialized material resources are exchanged as required, but intercommunity “special events” associated with ballcourts or astronomical alignment architecture are also found at one site or another, such as Chawak But’o’Ob (Walling 2011) and Quincunx (Zaro and Lohse 2005), allowing participation in greater intercommunity solidarity and exchange (Scarborough and Valdez in press).

All of this then is part of identity. Could the larger center’s rulers be replicating and/or mimicking the smaller centers/household
communities? While centers were important in infrastructure maintenance, including transport of goods and scheduling/calendars they were likely heavily dependent on negotiations with the hinterland producers. The “rural elite” that Bullard (1960) noted five decades ago and has been since reported at numerous small communities throughout the Maya Lowlands, likely coordinated production strategies for a community or a group of communities (Scarborough, Valdez, and Dunning 2003). The various established road systems, both visible and invisible today, must have served to help link production and scheduling of transport. Given the dispersed character of resources or raw materials and the labor required to produce from the raw materials, roadways or connecting sacbeob were forced linkages.

Marketplaces entertaining special events were present at all levels of Maya society, with activity proportional perhaps to the size of the site. Long-distance trade items or artifacts associated with attached specialists at the largest centers were not the engines driving the economic system(s) (cf. Costin 1991; contra Inomata 2001). When comparing or reviewing archaic states, the Maya example is not a less complex adaptation; it is simply different, one suited to a semitropical setting (Scarborough and Burnside 2010). New techniques of determining site function are being explored and reviewed for this discussion. While some settlements are small court groups, others are represented by the minutest evidence, but demonstrate an important presence nonetheless.

Small site function and differences between the settlements indicate varying practices of subsistence among the ancient Maya. We must consistently revisit the same concerns for interpreting possible aspects of identity at various levels.

Today, we tend to place a significant “emphasis on highly flexible road networks and schedules for the distribution of goods and services” which “assumes a production oriented-economy based on a dispersed, but populace landscape having adapted, in the Maya case, to the rhythms and tempos of a tropical rainforest setting” (Scarborough and Valdez in press). The prehistoric Maya managed to incrementally modify the environment producing a user-friendly set of resources, and thus transformed their socioeconomic system by way of a complex infrastructure mimicking aspects of a neotropical environment. Through learning and understanding the ecological tolerances over many generations, those social and environmental adjustments made the Maya who they became—and always in the “becoming mode” (Scarborough and Valdez in press). In this aspect we may see the heart of identity; how the Maya were identified and perhaps how they wanted to be identified.

An interpretation that sees an economy based on a highly integrative set of resource-specialized communities contingent upon heterarchical networks (Scarborough and Valdez 2003, 2009) represents a significant change from the view of ancient Maya economy as a regional exchange system based on wealth and/or staple finance (D’Altroy and Earle 1987; cf. McAnany 2010). A key point of this paper is that production was generally in the controlling hands of a hinterlands population. This is part of identity. At the most fundamental level, the rural household (drawing on the “house model” as the basic unit of socioeconomic identity (see Gillespie and Joyce 2000; Heitman and Plog 2005; Lohse and Valdez 2004), sets the stage for social complexity. The 90-95% of the population that made Maya Civilization possible.

Overview

Households may be the material repository for the many replicated activities of the family and they likely invest in a very few production tasks that provide their neighbors with labor intensive (perhaps tool-use specialized), resources. These products may have ranged from textiles to pottery, to stone tools, that provide for the community’s overall needs and perhaps those of other adjacent groups. The processed resources are generally the rather mundane products that households provide one another in an interdependency of necessary exchange (see Reina and Hill 1978 for ethnographic examples). While huge major centers, with a concentrated breadth of material, architecture, and “special event” trappings are at one location, the regional picture signifies a dispersed version of the activity traits and
material culture otherwise identifiable at a “center.” The significantly heterarchical ordering is grounded on a socio-ecological logic constrained by a tropical biophysical environment of tremendous diversity, although one highly limited by individual species richness (Scarborough and Burnside 2010a). This is not to say that minor and major centers were anything but hubs for many of the interdigitating regional system, however, it is unlikely that they functioned as truly centralized economic controllers.

Similarly, what may be sacbeob or fragments thereof, have been observed and documented in Rio Bravo area of NW Belize between many of the large sites in the region as well as near smaller settlements. The dense forest cover of NE Belize is such that connected segments are not yet defined and often very difficult to follow completely. Some are seen as part(s) of an ancient road, but some are questioned as to whether they are simply linear features. Below the Rio Bravo escarpment, near the Hill Bank Research Station in northern Belize is a sacbe extending between a small recently mapped site and presumably Lamanai on the New River Lagoon (Aylesworth, personal communication 2011). Since the Hill Bank sacbe has not been followed to its terminus it is only identified as heading towards Lamanai, but not confirmed to connect the two prehistoric settlements.

Given the economic underpinnings of the Maya as articulated in previous publications (Scarborough and Valdez 2009; Scarborough, Valdez, and Dunning 2003), it is asserted that roads were a significant investment throughout the region in antiquity. Equally important, and particularly in light of the huge expanse of bajos, I can suggest that canoe traffic was highly developed for the rapid movement of goods and services. Like roadways, identifying canalization for navigational ends remains difficult, perhaps doubly so, because of rapidly infilling sediments associated with a millennium of wetland abandonment and degradation of these engineered landscapes (Scarboorough and Valdez in press).

It is the combination of settlement choices due in part to available resources and the ability to move produced goods (either raw materials or finished products), to markets as quickly as possible that ties the small producers and the large centers together. An interdependence may have been formed well in the prehistoric past that goes beyond the contemporary memory of the individuals involved in exchanges and trade.

References Cited

Bullard, William R.

Cortes-Rincon and Fred Valdez (editors)
2012 Research Reports from the Programme for Belize Archaeological Project, Volume Six. Occasional Papers, Number 14. Mesoamerican Archaeological Research Laboratory, The University of Texas at Austin. (170 pp.)

D’Altroy, Terence, and Timothy Earle

Gillespie, Susan D., and Rosemary A. Joyce, eds.

Grazioso, Liwy, Palma J. Buttles, and Fred Valdez
2013 Ocupacion premaya y los primeros mayas en las tierras bajas orientales. In SAA, Latin America Proceedings.

Heitman, Carolyn, and Stephen Plog

Lohse, Jon C., and Fred Valdez, Jr., eds.

Marcus, Joyce

McAnany, Patricia A.

Reina, Ruben E., and R.M. Hill, II
Scarborough, Vernon L., and William R. Burnside

Scarborough, Vernon L., and Fred Valdez


Scarborough, Vernon L., Fred Valdez, and Nicholas Dunning (eds.)
Social identification is the perception of oneness with, or belongingness to, some human aggregate. Archaeologists demonstrate the identity of Maya elites of urban centers by examining their energy expenditure in burial preparation, house and platform construction, access to luxury items, and cranial and dental modifications among other attributes and comparing it to the non-elites. Although non-elites are commonly defined to include some urban residents, all hinterland residents are considered to be non-elites. This paper proposes that some hinterland residents also identified as elites. Specifically I hope to demonstrate how a small number of hinterland residents used the symbols and material culture of “Elite” social identity to align themselves with the elites of the urban centers and used this identity to gain and maintain power within the organization of the rural community.

Social Identity Theory

According to Social Identity Theory, people classify themselves and others into various social categories that are defined by prototypical characteristics abstracted from the members (Tajfel and Turner 1985). Social classification orders the social environment, allowing the individual a systematic means of (a) defining others, and (b) defining him- or herself in the social environment (Ashforth and Mael 1989). This second function, self-conception, is comprised of a personal identity – one’s own idiosyncratic characteristics, and a social identity which encompasses all the salient group characteristics. Social identification is largely relational and comparative.

“Elites”

Generally speaking, the term “Elite” refers to any preindustrial hierarchical society where there exist individuals or groups that are differentially and invidiously ranked (Webster 1992). In most cases, there are a limited number of positions of high value, and those in these positions may be properly said to be elites (Webster 1992).

Maya Elites

In terms of social classification for the Maya, two groups that have been recognized archaeologically and ethnohistorically are “commoners” and the aforementioned “elites.” I will first address the concept of the Maya elites.

The Classic and Postclassic epigraphic data reveal terms used for rulers (ajaw, k’ubul ajaw, kaloomte), and sublords (b’aah sajal, sajal, aj kul, aj kulel, aj k’ubun) (Marcus 2004). Those individuals with these titles certainly can be thought of as elites simply for having a title, but also their association with other indicators of high status, such as public art, large and elaborate religious and/or residential structures, elaborate tombs, dress and adornment (Webster 1992). Those possessing titles occupied the positions of highest prestige, and dominated decision making. These are what Webster (1992) has called “Primary Elites.”

There were also many members of society who would have held an elite status but their position would have been derivative and limited relative to Primary Elites, such as full time royal architects or sculptors, or a successful warrior. These are what Webster (1992) called “Secondary Elites.”

Archaeological Demonstrations of Maya Elite Social Identity

If social identification is the perception of oneness with some human aggregate, how is this demonstrated archaeologically? Traditionally, the identity of Maya urban elites – Primary and Secondary – has been demonstrated in large part by looking at their energy expenditure in constructions, access to luxury items, and cranial and dental modifications, and comparing it to those of non-elites. A number of categories have been used as indicators of status, and therefore indicators of elite social identity (Table 1).

For architecture, some have looked at the presence of large and elaborate residential and religious structures, or if they are arranged...
Table 1. Indicators of Maya Elite Social Identity.

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Treatment of the Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large/elaborate residential and religious structure</td>
<td>Elaborate Burials</td>
</tr>
<tr>
<td>Specific plaza plans</td>
<td>High labor expenditure</td>
</tr>
<tr>
<td>Stone constructions</td>
<td>Grave goods</td>
</tr>
<tr>
<td>Monumentality</td>
<td></td>
</tr>
<tr>
<td>Higher elevation</td>
<td><strong>Miscellaneous</strong></td>
</tr>
<tr>
<td>Vaulted roofs</td>
<td>Exotic Goods</td>
</tr>
<tr>
<td></td>
<td>Cranial/Cranial Modification</td>
</tr>
</tbody>
</table>

Figure 1. Map of the Three Rivers Region.
around specific plaza plans (Coe 1984; Flannery 1983). Architecture made of stone, located at a higher elevation, being more monumental, (Abrams 1987; Kurjack 1974; Price 1978; Sanders and Webster 1983; Willey and Leventhal 1979) have also been indicators for elite status, as have the presence of vaults (Willey et al. 1978).

Treatment of the dead (Chase and Chase 1992) is another category. Elite individuals tend to be treated more elaborately than those who are not, and there tends to be higher labor that went into the burial effort (Chapman et al. 1981; O’Shea 1984). The location of the burial (Chase 1986; Flannery and Marcus 1983; Marcus 2004; Sharer 1978) is seen as being a significant indicator of elite status, as is the contents of the graves (Chase and Chase 1992).

Additional categories include the presence and quantity of exotic goods (Andrews IV 1969; Coggins 1975; Leventhal et al. 1987) and modifications of the skull and teeth (Becker 1973; Haviland 1971; Sharer 1978).

Commoners, the Hinterlands and the Medicinal Trail Community

With that context and framework regarding social identity, elites, and their archaeological identification, I will now turn my focus to the commoners, particularly those in the hinterlands. In agrarian societies, hinterlands are the remote or less developed areas of a region, country, or territory, and generally associated with subsistence agriculture (Lucero 2001, 2008; Schwartz and Falconer 1994; Zaro and Lohse 2005).

Medicinal Trail is one of these hinterland communities, located in the Belize portion of the Three Rivers Region, approximately 5 km east of La Milpa (Figure 1). This community consists of extensive settlement and landscape modifications such as terraces, depressions, and linear features thought to be related to water management and intensive agriculture (Hyde 2011). The settlement of the community varies greatly in terms of size and formality. At one end of the spectrum, we find poorly organized informal clusters of low mounds (Figure 2), and then at the other end, we find quite formal residential groups (Hyde 2011; Hyde and Valdez 2007). Specifically, there are two formal courtyard groups at Medicinal Trail, Groups A and B, and they are approximately 200 m apart from each other, on the same ridge top (Figure 3).

Both Groups A and B are located on basal platforms. Group A is the largest group so far identified in the community and consists of seven mounds organized around three contiguous courtyards, aligned more or less north-south and has an area of 880 m² (Hyde 2011). Excavations also uncovered two more structures below the surface of the Northern Courtyard. The largest structure at the group is the eastern structure of the Middle Courtyard. Group B is located approximately 200 m north-northeast of Group A, and has an area of just 270 m², and consists of four mounds, surrounding a shared central space with the eastern structure (B-1) being the largest and pyramidal in shape (Hyde 2011; Martin 2009).
Figures 4 and 5. Exposed architecture at Group A, demonstrating high labor investment.

limestone blocks used in their construction, the plastering of the plaza courtyards and the interiors of the structures (Hyde 2011; Figures 4
Figure 6. Vault stones from Structures A-1 (left) and A-6 (right).

Figure 7. Ritual activity from Structure A-4.
and 5). The largest structure at the group is A-4, located on the eastern side of the Middle Courtyard, and is approximately 3 m above the courtyard surface, though considerably higher on the backside. At least two structures had vaulted roofs (Hyde 2011; Figure 6).

In the Late Classic, Structure A-4 appears to be the focus of ritual activity. Structure A-4 is the largest structure at Group A and is located on the east side of the Middle Courtyard. Although not pyramidal in shape, it is presumed to be, at least in part, a temple-shrine due to its prominent size and location, its placement on the east side of the Middle Courtyard, numerous burials—discussed below—the presence of a cache of obsidian blades at the top of the staircase—possibly related to bloodletting—and evidence for on-floor burning outside the doorway (Becker 2003; Hyde 2011; Figure 7).

In the Late Preclassic there was a ceremonial precinct under the Northern Courtyard that consisted of a round structure and a T-Shaped structure about half a meter apart from each other (Hyde 2011: Figure 8). The round structure is approximately 3.5 m in diameter, 40 cm tall, and consists of three to four courses of cut stone masonry that taper slightly inward as it moves from bottom to top. No postholes, plaster surface, or masonry architecture were found on top of the round structure suggesting that the platform was exposed and therefore not likely residential (i.e. Aimers et al 2000). I believe the round structure was used for ritual performances for the community.

The T-Shaped platform was built in at least two phases. The eastern and western halves were constructed differently and the platform is approximately 30 cm longer north-south on the eastern half, giving the platform a “T-Shape.” Based on internal excavations the western half appears to have been constructed as a complete rectangle and the eastern side was attached to it at a later date.

The T-Shaped structure is also likely to have had a ceremonial function. The T-Shaped structure may have been a seat for the individual that oversaw or sponsored the ritual performances (Hyde 2011, 2012). I interpret the original rectangular platform as having been a bench, and at Medicinal Trail, the Group A head of household may have been seated on this bench to oversee the various rituals and ceremonial activities taking place on the round structure.

The symbolic nature of the “seat of power,” and the associated rituals, were enhanced with the later addition to the bench, creating the T-Shape, a form reminiscent of the T-shaped Ik glyph (T503), which means “wind,” “breath,” and “life.” In addition to being located in numerous elite iconographic contexts from buildings, ceramics, benches, and other features throughout the Maya area, the Ik’ symbol has often been found to be a label on tinklers, rattles, and other musical instruments, further demonstrating a ritual-ceremonial context for the T-shaped structure.

So far the only burials and caches recovered from the community are from the formal households. Six burials have been recovered from Group A: Burials 1-3 are associated with the Late Preclassic ceremonial precinct, and Burials 4-6 are Late Classic and
Burial 2 with head placed between Sierra Red vessels.

Figure 9. Burial 3 cist (left) and the exposed individual (right).

Figure 10. Burial 3 cist (left) and the exposed individual (right).

have all been recovered from Structure A-4. Additionally, there have been five caches recovered from Group A, all dating to the Late Preclassic and are all essentially identical to one another.

Burial 1 was located in the round structure accompanied by two ceramic vessels – one placed over the individual’s head, the other placed at the waist with the individual loosely flexed around it (Hyde 2011, 2012). This
individual is of indeterminate sex and is likely an important founding member of the household. The vessels associated with this burial were too eroded for type to be determined, however, the ceramics from the fill matrix around it are Chicanel, meaning a Late Preclassic date.

Burial 2 is located directly east of the T-shaped structure. Burial 2 contained a 10-14 year old individual of indeterminate sex, whose cranium was placed between two Late Preclassic Sierra Red vessels (Hyde 2011, 2012: Figures 8 and 9).

Burial 3 is the most elaborate and was located southwest of the T-shaped structure (Hyde 2011, 2012: Figure 10). This female was placed in a cist, with a piece of modified spondylus shell in her mouth, and ears spools also made from spondylus shell (Kalamara Cavazos 2009; Hyde 2011; Figure 11). The teeth of the woman interred in Burial 3 had undergone modification (Kalamara Cavazos 2009; Hyde 2011) resulting from filing and represent types A1, B4, B5 and probably B6 of Romero’s system of classification (Romero 1970).

Burials 4-6 were all recovered from Structure A-4 (Figure 12). Burial 4 was located on the south side of the structure platform and had a metate fragment placed over it (Hyde 2011). Burial 5 was placed in a niche room at the north end of the structure, with numerous ceramic sherds placed on the ledge of the back of the room (Hyde 2011; Hyde and Valdez 2011). Burial 5 exhibited cranial modification in the form of tabular erect (Stacy Drake, personal communication, 2013). Burial 6 was located below the floor inside of Structure A-4 and that excavation is ongoing.

Between Burial 3 and the T-Shaped structure were Caches 2-4, each of which consisted of two Late Preclassic Sierra Red vessels placed lip-to-lip in a triangular arrangement, slightly overlapping one another, possibly a reference to the ajaw glyph (Figure 13). Though no artifacts were recovered from within the caches, the vessels are nearly identical to ones in Burial 2 (Hyde 2011, 2012).

The entire Late Preclassic ceremonial precinct at Group A was buried by a later Late Preclassic plaster floor (Floor 2). The floor was essentially undisturbed, except for two caches associated with the T-Shaped structure: one over the northwest corner, and the other at the southeast corner of the original bench (Figure 13). These intrusions each contained two Late Preclassic Sierra Red vessels, essentially the same as those recovered in Caches 2-4 and Burial 2. Cache 1 consisted of two nested vessels, while Cache 5 consisted of two placed lip-to-lip. Inside Cache 5 was one piece each of worked jade and coral (Figure 14).

Group A appears to conform, at least somewhat, to the Plaza Plan 2 as defined by Becker (1971, 1991, 1999, 2003). They are characterized by the presence of relatively tall, square structures on the east side of the plaza and are interpreted as residential compounds for lineage heads. In each of the eastern structures excavated by Becker, he uncovered at least one high-status burial. Like Structure A-4, their pattern of burial interment, plus evidence of
Figure 12. Burials 4, 5, and 6 associated with Structure A-4.

Figure 12. Triadic arrangement of Caches 2, 3 and 4.
Figure 13. Jade and coral recovered from Group A.

Figure 14. Structure B-2. Image by Arch Aerial (www.archaerial.com).
ceremonial activity such as on-floor burning, has led Becker to define eastern structures of PP2 as shrines (Becker 2003).

**Discussion**

In terms of the architecture, Group A exhibits large and elaborate residential structures made of stone, located at a higher elevation, being more monumental, and has vaulted roofs on at least two structures, and appears to conform to the Plaza Plan 2. There is also evidence for religious or ceremonial structures and precincts.

In terms of treatment of death, the burials are located in or around the ceremonial structures of either the Late Preclassic or Late Classic. Burial 3, the cist burial, is somewhat elaborate, especially in terms of labor effort. Grave goods are limited, with Burials 1 and 2 being accompanied with 2 ceramic vessels each. Burial 4 was accompanied by a *metate* fragment and Burial 5 with numerous ceramic sherds purposefully placed on the ledge next to the individual. It is possible the lip-to-lip vessels in the triadic arrangement are also part of Burial 3.

And, in terms of exotic goods, there have been numerous obsidian blade fragments (Figure 7), modified jade and coral (Figure 13), an alabaster spindle whorl, and the aforementioned *spondylus* shell (Figure 11) that has been recovered.

**Group B**

Excavations at Group B have not, as of yet, been as extensive as at Group A, however, some preliminary findings can be discussed. The entire group is situated on an artificial plaza platform (Figure 3). The architecture of Structure B-2 is elaborate and labor intensive (Figure 14): plaster floors inside the structures (and across the plaza, which had multiple flooring episodes); structures made of finely cut stone, a vaulted roof, and plaster covered walls (Hyde 2013). Structure B-1 is a pyramidal building on the east side of the plaza, and so the group conforms to the PP2 even more than Group A (Hyde and Martin 2009). The structure had a large looters trench through its front center (Figure 15), however excavations below the trench by Lauri Martin uncovered a cist burial (the analysis of which is ongoing) and four obsidian blades sequentially removed. At the base of Structure B-4 is, what I am currently calling Problematic Deposit 1, an Early Classic deposit which consists of 1000s of chert flakes and ceramic sherds and approximately 15-20 obsidian blade fragments, likely from Pachuca given their green color (Hyde 2013).

**Ethnohistoric and Ethnographic Data**

The epigraphic data from the Classic and Postclassic tell us nothing of the lives, organization, or structure of the hinterland populations, but we can look to the ethnohistoric and ethnographic records for insight. The term *ah kuch kab* repeatedly shows up in records from the Yucatan (McAnany 1995). The term has a number of meanings, including council member (Farris 1984; Roys 1943; Tozzer 1941), lineage head and collector of tribute (Barrera Vasquez et al. 1980; Ciudad Real 1984), a *principal* (noble) (Coe 1965), and a wealthy commoner (Coe 1965; Friedel 1983).

Another term from the Colonial records is *açmen winik*, which has been translated to mean “a man between *principal* (noble) and plebian, a man of middling status” (Martinez Hernandez 1929:69, cited in Marcus 2004). Marcus (2004:261) interprets these individuals as commoners who had increased their wealth through achievement or appointment to some bureaucratic office, and it may be that their wealth is derived from owning land. At any rate, their increased wealth allows them to stand out relative to the mass of subsistence farmers.

In the highlands among the Quiche, are the terms *chuchkajaw* or *c’amal*, which also
mean lineage head and these individuals are both a religious and political leader (Carmack 1981; Tedlock 1982). The Quiche lineages are associated with a particular territory and residential space expressed ritually through ancestor veneration (Bunzel 1952; Carmack 1981; Fox 1987).

Therefore, there are titles for non-elite lineage heads and persons of intermediate status. Though they were not, nor could not, aspire to nobility, their houses and burials are likely to fall between “elites” and the predominately “commoner” population. In the hinterlands then, these large formal household groups likely represent important Maya commoner lineages associated with a particular territory and residential space expressed ritually through shrines like the round structure and the Plaza Plan 2 layout. Their economic and socio-political status was elevated above most of the community’s inhabitants, providing them with limited social power. This diversity of household size and form reflects a hierarchical organization among the inhabitants of the rural villages, in which those living in the relatively few formal plaza groups likely possessed some social authority over the rest of the community. In other words, the two formal groups represent a lineage, or lineages, occupying the limited positions of highest value in the hinterland community and may also be thought of as elites.

I use the term “Hinterland Elites” to refer to these households and the limited social power is manifest by way of overseeing secondary, localized community-based religious and political leadership duties. Additionally, they manage subsistence-related organizational tasks (Lucero 2001). This is in contrast to the regional or primary leadership duties of the Primary Elites in the major centers.

Using the symbols and material culture of the Urban Elites, on a smaller scale and of much more modest means, the Hinterland Elites define themselves, relative to the rest of the rural inhabitants, though their architecture, treatment of the dead, access to exotic materials, dress, adornments, and physical modifications.

**Conclusion**

The presence in the hinterlands of any one of the traits listed does not equal high status, or Elite Social Identity. When viewed collectively however, the size, formality and elaborateness of the architecture, the arrangement of the plaza, the treatment of the dead, the presence of exotic materials, dental and skull modification – relative to the rest of the community – does appear to suggest high status, and by proxy, a distinct social identity. Add to this the ethnohistoric and ethnographic terms of açmen winik, ah kuch kab, chuchkajaw and c’amal and you have titles for members of society that are not part of the Primary or Secondary elite, but also not among the landless commoners that likely predominated in the hinterlands, thus the classification Hinterland Elite. Lineages were ranked within elite communities, and they were ranked within hinterland communities (Carmack 1981).

I suspect the Hinterland Elites are land owning farmers and the dominant lineage/s of the community. They are titled, and relative to the rest of the community, exhibit elaborate architecture and great care in the treatment of the dead, modifications of the skull and teeth and have access to exotic goods. Their status and identity draws from the same assortment of symbols and material culture as those of the Primary and Secondary Elites of the urban centers. Although their “elite identity” was probably not acknowledged by the urban elites, by distinguishing themselves from those in their immediate community, Hinterland Elites likely used this identity to gain and maintain power within the organization of the community.

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References Cited

Abrams, Elliot M.

Aimers, James J., Terry G. Powis, and Jaime J. Awe

Andrews, E. Wyllys IV
1969 The Archaeological Use and Distribution of Mollusca in the Maya Lowlands. Middle American Research Institute Publication 34, Tulane University, New Orleans.

Ashforth, Blake E. and Fred Mael

Barrera-Vasquez, Alfredo, Juan Ramon Bastarrachea Manzano, and William Brito Sansores

Becker, Marshall Joseph

Bunzel, Ruth

Carmack, Robert M.

Chapman, Robert, Ian Kinnes, and Klavs Randsborg

Chase, Arlen F. and Diane Z. Chase

Chase, Diane

Ciudad Real, Antonio de
1984 Calepino Maya de Motul. Universidad Nacional Autónoma de México, México City.

Coe, Michael D.

Coe, William R.

Coggins, Clemency

Farris, Nancy M.
Flannery, Kent V.

Flannery, Kent V. and Joyce Marcus

Fox, John W.

Freidel, David A.

Hyde, David M.


Hyde, David M. and Lauri McInnis Martin

Hyde, David M. and Fred Valdez, Jr.
2007 Overview of Activities at the Medicinal Trail Site for the 2006 Season. In Research Reports from the Programme for Belize Archaeological Project, edited by Fred Valdez, Jr., pp. 15-22. Occasional Papers 8, Mesoamerican Archaeological Research Laboratory. The University of Texas at Austin.

Kalamara Cavazos, Angeliki
2009 The Investigation and Analysis of an Ancient Maya Burial at Medicinal Trail. MA Thesis, Department of Anthropology, University of Texas at Austin.

Kurjack, Edward R.
1974 Prehistoric Lowland Maya Community and Social Organization—A Case Study at Dzibilchaltun, Yucatan, Mexico. Middle American Research Institute, Publication 38. Tulane University, New Orleans.

Leventhal, Richard M., Arthur A. Demarest, and Gordon R. Willey

Lucero, Lisa J.


Marcus, Joyce

Martin, Lauri McInnis

McAnany, Patricia A.
1995 Living with the Ancestors. University of Texas Press, Austin.

O’Shea, John M.

Price, Barbara J.

Romero, Javier

Roys, Ralph L.

Sanders, William T. and David Webster

Schwartz, Glenn M. and Steven E. Falconer

Sharer, Robert J.

Tajfel, Henri and John C. Turner

Tedlock, Barbara

Tozzer, Alfred

Webster, David

Willey, Gordon R., Richard M. Leventhal, and William Fash
1978 Maya Settlement at Copan. Archaeology 31:32-43

Zaro, Gregory and Jon C. Lohse
11 MODELING FAMILY LIFE IN THE LOWLAND MAYA LATE CLASSIC

Laura J. Levi

From lineage to household to house, discussions of ancient Maya family life have followed a trajectory that parallels major discourses in the wider discipline. In this paper, I revisit the ethnographic and ethnohistoric literature to offer a more empirically-grounded perspective. I argue that the diversity archaeologists see in lowland Maya residential remains speaks to a very real diversity in prehispanic domestic forms – one, moreover, that persists across Mesoamerica to the present day. Using the archaeological case of San Estevan, I then point to specific socio-political, symbolic, and material processes that would have converged to create two very different kinds of families during the Late Classic period.

Debating the Ancient Maya Family

Much has been written about whether ancient Maya residential arrangements should be interpreted as localized patrilineages, Levi-Straussonian houses, or households. Often what seems to be riding on the success of one or another of these formulations is not an appreciation for domestic groups, per se, but an understanding of whole communities and politics. Yet we are probably overreaching when we assert that particular sociopolitical formations produce characteristic family forms. Lineage and house models, informed more by social typology than actual domestic practices, ultimately founder on the hyper-coherent depictions of society they tend to generate (Levi 2002). The household approach was introduced in a deliberate effort to avoid such totalizing frameworks (Netting et al. 1984:xvii-xix) but, as a result, neglected to attend to the ways family life could be tied to broader sociopolitical processes (Cleveland 1998). Household studies emphasized behavior at the expense of expressive culture, organization rather than structuration, and economic transaction in lieu of political stratagem. However, the most obdurate problem was a definitional one. In the earliest literature, households were identified as corporate groups whose memberships shared in production and consumption activities (Wilk and Netting 1984). They were understood to be autonomous entities that, for heuristic purposes, could be studied as undifferentiated wholes (Stone 2001). Even more worrisome, the emphasis on corporate-ness excluded from consideration a fabulous array of domestic arrangements the world over.

Domestic Groups in Mesoamerica

Perhaps nowhere is variation in family life more widely reported on than in Mesoamerica. A quick scan of the ethnographic literature reveals that Mesoamerican domestic groups vary according to their size, composition, built environments, economic holdings, and resource allocations (e.g., Nutini et al. 1976). Group size may range from single individuals, to nuclear, extended, and multiple family units. Such groups may be comprised only of kin or may include several non-kin individuals. They may inhabit one dwelling or many. They may span one or more yards. And while most all are property-owning entities, there appear to be many different ways that property and people intersect. In this regard, one salient dimension of contrast is between those groups that share a common budget (i.e., households) and those that do not. The allocation of resources, financial or otherwise, will vary accordingly.

More astonishing than this arc of diversity is the fact that it characterizes almost every community (e.g., Nutini et al. 1976). Extant written records of this extend to the earliest years of the Spanish Colonial period. For Central Mexico, Pedro Carrasco (1976) reported on how Tepoztlán families in the 1540s exhibited great variability in terms of their domestic personnel, number of dwellings, budgets, and tribute postures. Matthew Restall’s (1998) study of 18th century notarial documents showed a similar range of variation for communities in the Yucatan and was particularly illustrative of the multiple lines of ownership partitioning heritable property within certain otoch, or co-residential groups.
Yet out of this welter of difference emerges a curiously consistent family ethos – one that invokes themes of co-residence, sharing, and inequality. Take the lowland Maya *otoch* as a starting point. *Otoch* is the Yucatecan term for home and it is distinct from the term for dwelling or *na*. Because of this distinction, Restall (1998:355) argued that *otoch* refers to a social unit. However, it is clear from his discussion of the documentary evidence that the term also references the house-plot occupied by such a unit (Restall 1998:356-357). It would appear that *otoch* simultaneously indexes a group of people as well as the place where they reside. Similar “enchainments” (Gell 1998:141) of co-resident people and places have been noted elsewhere in Mesoamerica (e.g., Sandstrom 2000). Not surprisingly, June Nash was forced to conclude that “residential proximity trumps genealogy in the creation of relatedness” among Tzeltal families in Amanteango del Valle (Nash 1985 [1970]:99).

Underlying the importance of residential proximity is the widespread belief that sharing in the day-to-day triumphs and travails of family life is a requirement of domestic group membership. Co-residents are expected to “work for a common thing” (Taggart 1976:139), “participate in the same ceremonial events” (Nash 1985 [1970]:115), and exhibit “corporate sharing of social networks” (Lomnitz and Pérez-Lizaur 1978:183). Even so, inequality can be an ever-present reality in many families (Acheson 1996; Lomnitz and Pérez-Lizaur 1978, 1984; Taggart 1972, 1975, 1976). For example, Restall (1998:362) found that “asymmetrical residential relations were central to the economic and productive function” of the Colonial period *otoch*. Similarly, William Hanks (2000:31) concluded that reciprocity and asymmetry together functioned as cultural schema in the structuring of experience for contemporary Maya domestic groups in the Yucatan.

**A Late Classic Lowland Maya Case**

When approaching prehispanic Maya residence, it pays to be mindful both of the diversity of forms the domestic group might assume and the common expressions of relatedness that may have sustained them all. To begin to understand the variability evident in the archaeological record, I have found it worthwhile to recall that families are relational entities that form, transform, break apart or fade away all within a complex interactional field. In the pages that follow, I will attempt to draw out some of the relationships that I believe produced two broadly-delineated residential variants at the Late Classic lowland Maya community of San Estevan, Belize (Figure 1). Critical among these were relationships to domestic group head, to property, and to polity.

**The Archaeology of Family Life at San Estevan**

Members of San Estevan’s first class of residential arrangements are small-to-moderately sized architectural units (Figure 2). They contain from one to five structures. For multi-structure units, no great size disparities distinguish their constituent dwellings. They are simple in design, with residential areas achieving definition primarily through the presence of a single, centrally-situated plaza. Typically, their individual buildings were long-lived: many were founded in the Late Preclassic and Early Classic periods and most all spanned the entirety of the Late Classic. They are distributed throughout the settlement area across diverse microenvironments, but often in close proximity to *chultuns*, or underground storage
facilities. They also are associated with higher-than-expected frequencies of unslipped and striated jars (Levi 2004).

The members of San Estevan’s second class of residential units provide a striking counterpoint. They possess from six to 20 structures, with an average of 10 structures per compound (Figures 3 and 4). They are sprawling, architecturally complex, and characterized by marked differences in the scale of their constituent dwellings. They often possess multiple plazas. They were the only residential units at San Estevan to include shrines. Their construction histories were confined to the latter portion of the Late Classic period and they always are found at the margins of the well-drained uplands that border one or another of San Estevan’s seasonal wetlands. Finally, there is a surprising dearth of storage facilities: they have never been found in
association with chultuns and show lower-than-expected frequencies of unslipped and striated jars (Levi 2004).1

A Question of Household Economics?

Clearly the differences between these two residential patterns cannot be explained by lineage and house models because neither accommodates the prospect of dramatic and enduring variability in family forms. But what about the household approach – underwritten by assumptions of economic instrumentality and corporate functioning? Here, I’ve struggled with the issue of “goodness-of-fit” particularly as regards consumption and production. Taking storage facilities as a reflection of consumption practices, for example, the occupants of Large Composite Groups appear to have been the community’s profligate consumers, putting little aside to buffer against shortfalls. In contrast, San Estevan’s remaining domestic groups would seem to have been inveterate hoarders, lining up at the opposite end of the consumption continuum.

The production side of the equation makes even less sense. It might be possible to consider San Estevan’s smaller domestic groups, with their abundant storage facilities, as adopting strategies of overproduction. This is often viewed as economically “irrational” behavior because stored food will ultimately spoil and, when not needed, must be sold or exchanged at far below market value. Nevertheless, strategies of overproduction are common worldwide and may persist for generations, especially in contexts where producers have little confidence in their political leaders or in their future prospects (Forbes 1989). On the other hand, the inverse of overproduction, a deliberate and persistent strategy of underproduction, doesn’t appear to be common anywhere. So, on the surface, it would seem that the members of San Estevan’s Large Composite Groups adopted a supremely untenable economic posture; or at least one that requires a great deal more clarification.

An Empirically-Derived Alternative

So, how are we to understand San Estevan’s Large Composite Groups? To start, I suggest that the domestic groups occupying them may have pursued strategies of labor accumulation (Levi 2004). Globally, one of the most common sources of food shortages among farmers is not insufficient land, but inadequate supplies of labor (Panter-Brick and Eggerman 1997:190-191; see also Wilk 1991 for the modern Maya). In a labor accumulation strategy, domestic group membership is maximized to make the most of land resources. In addition to encouraging married children to remain “on the farm”, these groups often expand their memberships through adoption and the extension of fictive kin ties, and by altering inheritance and tenure practices.

In Mesoamerica, today, there is a particular domestic group variant that arguably
reflects these practices. Found across the region, nevertheless, it has been poorly studied and is far less well-understood than the conventional household. Typically, this kind of domestic group incorporates several nuclear and extended families and its membership includes both kin and non-kin. As a whole, the group is defined by various combinations of co-residence, close political and economic exchanges, and affective ties. Yet constituent families do not pool their resources. Labels for them proliferate. For the Yucatec Maya, Robert Redfield and Alfonso Villa Rojas (1971 [1934]:91) called them Great Families because of their generational depth and sizable memberships. In Central Mexico they have been referred to as Grand Families for similar reasons (Lomnitz and Pérez-Lizaur 1978, 1984). Elsewhere they have been called “non-residential extended families” because members always are distributed across multiple dwellings (Nutini 1968), and “toponymic groups” because members often express their affiliation through shared ties to particular tracts of land (Sandstrom 2000; see also Watanbe’s [2004:160-162] discussion of Zinacantan).

My contention is that these non-pooling domestic groups emerge through a fundamentally different set of relationships that I will call labor contracts. Labor contracts may be written or unwritten, spoken or implied. Today’s widespread share-tenancy arrangements among close kin in Mesoamerica (e.g., Finkler 1980; Colin 2005) hint at the embeddedness of labor contracts in Mesoamerican family life as well as the longevity of the practice in the region. But, exactly how the creation of share-tenancies through labor contracts would help to forge domestic groups requires further elaboration.

The Labor Contract

Let me build the case for the role of labor contracts in domestic group formation, and their relevance to prehispanic San Estevan, with the help of a few examples. I should caution that no one instance maps the phenomenon in its entirety, primarily because no one investigator thought to simultaneously draw out the recruitment strategies, resource allocations, status distinctions, and storage practices internal to the groups that were investigated.

First, on the subject of storage, consider the large co-residential groups encountered by Michael Smyth in the northern Yucatan (Smyth 1989a, 1989b, 1990, 1991). Despite their size, the maize produced and consumed by these groups was treated only to the most ephemeral kinds of short-term storage, tossed in bins, husked, but still on the ear. This contrasted dramatically with small households in the area that nevertheless possessed extensive long-term storage facilities within the confines of the house lot.

In a second case, an ethnographic study of post-marital residence in San Bartolomé, Chiapas, the focus was on how members were recruited into such groups (Salovesh 1976). The study made clear that San Bartolomé exhibited a diversity of domestic forms, but one was particularly complex. Referred to locally as sitio groups, these were large, multi-structure compounds that housed multiple-family units. The individual families within such a group may have been, but were not always, kin to the sitio head. To gain membership, married couples entered into a formal arrangement with the head. Contributing “cash, goods, and services … in exchange for a place to live,” they also were obligated to provide cooperation and support in their sitio head’s political and ceremonial concerns (Salovesh 1976:211). When the head was no longer able to work, they provided for his care.

The San Bartolomé case certainly exemplifies a modern situation where large domestic compounds coalesced around explicit, long-term contracts. However, the best documented instance of this that I am aware of comes from the ethnohistoric record and helps clarify some of the sources of inequality that can be endemic to such groups. Working with census data compiled in the mid-sixteenth century at the Central Mexican community of Tepoztlán, Pedro Carrasco (1976) described a particular kind of domestic group whose members occupied separate dwellings in a compound. The ties among compound members formed as a result of “kinship, close location, or economic cooperation,” however, the constituent families did not pool their resources (Carrasco 1976:46). For nuclear and multiple family units that shared a common budget, the census
described the head as one who “feeds” his dependents (Carrasco 1976:52-53). To the contrary, in the case of non-pooling compounds, the census detailed the amount of land owned by the head, “how much he cultivated for himself, and how much he gave to his dependents to cultivate for their own use” (Carrasco 1976:54-55). In return for rights to land, dependents were required to provide services to the head, “often in the form of farm labor” (Carrasco 1976:55). Additionally, dependent families were allocated a portion of the head’s tribute burden and their tribute contributions were enumerated separately from those of the head.

Carrasco identified compound heads as landlords and their dependent families as tenants. More specifically, these dependent families functioned as sharecroppers. While, in several instances, they had no genealogical ties to compound heads, in over 50% of the recorded cases, a compound head’s co-resident tenants included married brothers, married sons, married nephews, married sisters, or married uncles (Carrasco 1975:55-56).

**Pooling Versus Non-Pooling Families at Late Classic Period San Estevan**

How do these cases speak to residence at San Estevan? From the outset, I think we must anticipate that all of San Estevan’s domestic groups were simultaneously political, economic, and social units. They were tribute bearing entities whose tribute postures influenced the allocation of land, labor, and other resources within the group. In some instances these things were pooled and, as I suggested earlier, pooling families probably resided in the single and multi-structure units that possessed abundant storage facilities in the form of jars and extramural chultuns. Given the political uncertainties of the Late Classic, I would argue that these groups tended to practice strategies of overproduction.

By contrast, I would suggest that the domestic groups occupying San Estevan’s large, architecturally complex residential compounds were internally diverse, non-pooling units committed to strategies of labor accumulation. Over time these groups attained their sizable memberships through the mechanism of labor contracts. The absence of pooling and the variable contracts and tribute burdens of their members produced overt inequalities within each group. The need to naturalize status distinctions may explain the prevalence of group shrines; while the dissonance of inequality would have limited the amount of food member families stored in and around the compound. In return for access to land or other kinds of productive capital, members obligated a certain amount of their labor to compound heads. The subordinate status of a head’s dependents was not assured, however. As is the case with share tenancies the world over, tenants have the ability to leverage their landlords in a variety of ways depending on the terms of their contracts (Finkler 1980; Robertson 1980). This would be especially true should dependents assume a portion of their landlord’s tribute burden. In a majority of instances therefore landlords will have a vested interest in their dependents’ well-being. This, combined with the ability of dependents to control a portion of their labor and its products, probably accounts for the size and overall prosperity exhibited by San Estevan’s compounds.

**Concluding Thoughts**

In order to account for some of the residential variation characterizing San Estevan’s Late Classic community, I first explored a series of ethnohistoric and ethnographic studies to identify some of the shared beliefs and practices underlying Mesoamerica’s diverse array of family forms. Next, I presented the archaeological case: two broadly-defined patterns of residence at San Estevan that are distinguished on the basis of numbers of structures per residential unit, layout and areal expanse, and associated storage facilities and ritual buildings. I suggested that the two patterns could be linked to differences in affiliative ties forged by the occupants of these places. Specifically, I argued that whether or not a domestic group’s resources were pooled had a transformative effect on social, symbolic, and material relations among family members. I then attempted to show how wider political relationships and economic circumstances helped to structure these internal dynamics in ways not readily accommodated by lineage, house, or household models.
While the arguments I have made would benefit from additional archaeological exploration at other sites in the lowlands, nevertheless, I think the basic approach has merit. As archaeologists, in order to more realistically understand ancient Maya residential diversity we first need a far better grasp of the potentialities inherent in family life. Second, we must be alert to the myriad ways domestic groups could manipulate their memberships in light of the fluid political and economic realities they confronted. And, finally, it is essential that we explore how these groups were incorporated into broader sociopolitical and economic processes.

1Analysis of San Estevan’s Late Classic ceramic assemblage showed no statistically significant differences in serving vessels, unlike the case with unslipped and striated jars. This would suggest: 1) that family feasting practices were largely comparable in scale and frequency across the community; and, 2) that the disparities in jar frequencies pertain to differences in storage practices.

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References Cited
Acheson, James M.

Carrasco, Pedro

Cleveland, David A.

Colin, Jean-Philippe

Finkler, Kaja

Forbes, H.

Hammond, Norman

Hanks, William F.

Levi, Laura J.


Lomnitz, Larissa Adler and Marisol Pérez Lizaur

Lomnitz, Larissa A. and Marisol Pérez-Lizaur

Nash, June

Netting, Robert McC., Richard R. Wilk, and Eric Arnould

Nutini, Hugo G.

Nutini, Hugo G., Pedro Carrasco, and James M. Taggart (editors)

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Restall, Matthew

Robertson, A. F.

Salovesh, Michael

Sandstrom, Alan R.

Smyth, Michael P.


Stone, Glenn D.

Taggart, James M.


Watanabe, John M.

Wilk, Richard R.

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12 HOUSEHOLD AND ELITE LABOR INVESTMENTS AT THE DOS HOMBRES TO GRAN CACAO ARCHAEOLOGY PROJECT

Marisol Cortes-Rincon, Sarah Boudreaux, Erik Marinkovich and Michael L. Brennan

Ongoing research at the Dos Hombres to Gran Cacao (DH2GC) Archaeology Project is shedding light on a long history of complex cultural, economic, and political activity. This paper draws on multi-scalar archaeological findings, to advance a preliminary perspective of the economy in the study area in which part-time household craft production and inter-household interdependence had a significant role. Surviving structures can illustrate social hierarchy based on structure size and access to resources. The authors use these results to reconstruct labor investment requirements and assess inter-site competition for resources. Furthermore, this paper will disseminate the results of recent interdisciplinary research, addressing topics such as ideology, settlement patterns, resource specialization, and spatial analysis.

Introduction

The study of Classic period Maya regional economic systems, through the interpretation of structural remains, raises methodological issues relevant to the study of settlement configurations and politics in complex societies. This is particularly crucial for complex societies that tend to have multifaceted settlements, political and economic systems. Recent research has revealed a great deal of variability in lowland Maya social, political, and economic organization (de Montmollin 1988; Driver 2007; Hageman 2001; Hageman and Lohse 2003; Lohse 2001; Walling 2004). One important issue that requires attention is the inconsistent terminology of settlement scale and its impact on comparative regional analysis. The rationale is to define settlement units at various scales, units whose precise formulae should be agreed upon by Mayanists working in different parts of the culture area. Another issue concerns the utility of idealized settlement-scale hierarchies and their suitability to guide the analysis of variability in mapped settlement distributions. The overall emphasis for this study is to develop a regional scale-sensitive analytical model that contributes to and takes into account the economic variability in the settlement records of ancient complex societies.

Numerous studies have demonstrated variability in settlement patterns of supporting residential zones around administrative centers, as well as among those various sub-regional divisions of the Maya lowlands currently recognized. Much of this observed variability, especially in hinterland settlements, appears to be a result of varied environmental response strategies focused on adapting to the ecological diversity that characterizes the Maya lowlands.

Northwestern Belize Region

The Programme for Belize Archaeological Project (PfBAP) region includes at least four urban centers and more than 70 towns, villages, and hamlets (Figure 1). PfBAP, directed by Dr. Fred Valdez Jr., has promoted archaeological research by producing large data sets since its inception in 1992. PfBAP is located on a 260,000 acre nature preserve in the Three Rivers Region of northwestern Belize (Scarborough and Valdez 2003). The dense rainforest covering the acreage inhibits the amount of information that can be gained from aerial photography and other remote sensing technologies. This impediment is the reason most research projects on the property begin with systematic pedestrian surveys which are laborious and time consuming. These problems can be exacerbated when investigating remote unmapped hinterland sites. To date, there have been a few large scale hinterlands survey projects in PfBAP: Dos Hombres to La Milpa Survey (Hageman 2004); Dos Hombres Radial Transect Survey (Lohse 2001); Peripheral Zone Survey at La Milpa and Dos Hombres (Robichaux 1995); and Southern Settlement Transect (Sunahara and Meadows 2005).

Study Area: Dos Hombres to Gran Cacao Archaeology Project

The DH2GC archaeology project is a long-term undertaking which aims to address such topics as religion, site and social hierarchy, settlement patterns, resource specialization, and
agricultural economics (Cortes-Rincon 2011, 2012). The sites located within the defined parameters of the DH2GC area illustrate social stratification via architectural and material cultural analysis. Comparisons amongst each household confirm the dialectics between commoners and elite populations (Cortes-Rincon 2013). Ground mapping techniques help to establish the following within a site: 1) placement of architectural features; 2) dimension of features; 3) site function and complexity; and 4) site regional hierarchy. Using survey and material cultural data, this study seeks to investigate settlement patterns by using both heterarchy and hierarchy approaches. We carried out volumetric analysis of cultural features to extrapolate the procurement of raw materials, allocation of resources, and labor distribution between the sites of Dos Hombres and Gran Cacao. The authors will briefly discuss the specialization among social and residential groups and the access to natural resources for Resource-Specialized-Communities (RSCs) as defined by Scarborough and Valdez (2003). A preliminary ranking for settlement in the study

For this study, we chose to investigate settlement patterns by using both heterarchy and hierarchy approaches. We carried out volumetric analysis of cultural features to extrapolate the procurement of raw materials, allocation of resources, and labor distribution between the sites of Dos Hombres and Gran Cacao. The authors will briefly discuss the specialization among social and residential groups and the access to natural resources for Resource-Specialized-Communities (RSCs) as defined by Scarborough and Valdez (2003). A preliminary ranking for settlement in the study
area and similar sites in the PfBAP region will be provided. This study is conducive to a heterarchical analysis due to a multitude of factors including political, economic, demographic, and environmental considerations that determined the location and structure of settlements.

Various researchers note the importance of site boundaries in cultural systems (Crumley 1979, 1995); both social and natural boundaries, at several scales, are pertinent to this discussion. Settlement patterns in the hinterlands prove to be problematic due to the almost continuous rural settlement which makes drawing of political boundaries problematic (King and Shaw 2003; Walling 2004). In a large scale, it is difficult to ascertain the sustaining area of a major center and on a smaller scale when one tries to identify the boundaries of a rural community. In some places significant natural features facilitate the identification of settlement perimeters.

Architectural indicators of diversity can be found in a variety of structural forms; among these are ritual ballcourts and range structures, which in the Maya Lowlands have been interpreted as points of integrative activities within Maya political systems. Ballcourts are interpreted as venues for the resolution of disputes between political and social factions at the middle and highest levels of the sociopolitical scale (Ashmore 1989, Orr 1997; Scarborough and Wilcox 1991). The presence of ballcourts at various levels within a settlement hierarchy would suggest that methods of conflict resolution were distributed across both the environmental and socio-political landscape (Orr 1994; Walling 2004). Range structures have been interpreted as council houses where political factions have resolved disputes and coordinated internal and external political activities (Ardren 1997; Fash 1983). The presence of range structures at multiple levels within a site hierarchy would suggest a diffused power structure in which important decisions were made at several levels in a political system. Similarly, various architectural and artifactual indicators should define the degree of economic heterogeneity. For example, widely distributed production facilities for chert tools, such as quarries and processing centers (Potter and King 1995; Hester et al. 1984; Lewis 1995) or agricultural goods, such as terraces, irrigation systems, and raised fields (Turner 1983) within a settlement scale would suggest relatively minor economic interdependence between sites, as opposed to a settlement system in which production facilities were highly concentrated.

Similarities in the layout of central plazas have been interpreted as evidence for shared ideology and political affiliation among Prehispanic ruling groups in the Peten (Ashmore 1989), the southwestern Maya periphery (de Montmollin 1995), and the Maya highlands (Carmack 1981). These similarities are dependent upon the relative placement, configuration, and orientation of features such as elite residences, temple pyramids, ballcourts, and causeways. A high degree of similarities in central plaza layouts within intra-site hierarchies than between inter-site hierarchies will be interpreted as evidence for a high degree of elite emulation and political centralization within the study area.

Much of the research undertaken in the past DH2GC field seasons encompassed seven major activities: 1) establishment of the baseline; 2) mapping of new sites and informal clusters; 3) mapping of all cultural remains within the 150-m-wide transect, including residential units, terraces, midden scatters, water features, and chultuns; 4) ecological survey on the baseline carried out by Dr. Nicholas Brokaw; 5) test excavation in middens; 6) test units were also excavated in plazas, patios and courtyards to identify the nature of building in open areas; and 7) the definition of utilized resource zones within the survey transect area. The data collected from the 2009-2013 field seasons provide a baseline for dating the public and architectural activities in the study area (Cortes-Rincon 2009-2012).

The distance between Dos Hombres and Gran Cacao is about 12-km at a 60° azimuth from the northeast corner of the main plaza of Dos Hombres (Figure 2). A datum was established approximately 100-m northeast of the main plaza and was marked by a rebar stake with the grid coordinates: North 0 (N0). Starting at N0, at a 60° azimuth, every 50-m along the baseline is marked with a stake and a 75-m-long perpendicular trail was cut in both directions—at 150° and 330° azimuth. Therefore, the survey
transect is 150 meters wide with a potential length of 12-km upon completion. For reference purposes, each stake is marked with its grid coordinates. This streamlined system made mapping and tying structures and features into the grid straightforward. For example, N150E75 is located 150 meters north from North-0 and 75 meters east from N150.

Natural features have been recorded during the course of research that facilitates the identification of settlement boundaries. The edge of an upper bajo with transitional vegetation was recorded northeast of Dos Hombres at N0 to N225. From N250 to N350, the landscape is a mix of hills and transitional vegetation. A true bajo was recorded at N400 and terminates at N700. From N750 to N1000, the landscape is composed of a karstic knoll with upland vegetation and transitions into a full bajo which continues until N2000 (Brokaw et. al. 2011; Cortes-Rincon 2009-2012). In this transect, most settlements are located in an ecotone – meaning at the junction of two or more environmental zones (Gill 2001). Communities settled within ecotones flourish due to an environmentally diverse abundance of natural resources such as upland forest and limestone deposits. These areas frequently slope into the bajo margins which were used for agricultural terracing, channels, clay sources, and water. Diverse environments increase the strategies and choices available to ancient inhabitants, especially for agrarian practices. Agricultural production is inherently interconnected with other cultural systems; although, it should be noted that the organization of intensive agricultural production is not yet clearly understood for the Maya Lowlands.

Hierarchy

Rank size ordering is useful to reveal a distribution of settlement on the landscape. A quantified site ranking system for the Three Rivers Region was first developed by Adams
Table 1. Regional Site Category and Site-Ranking Scores

<table>
<thead>
<tr>
<th>SITE</th>
<th>SITE CATEGORY</th>
<th>Guderjan / Adams</th>
</tr>
</thead>
<tbody>
<tr>
<td>La Milpa</td>
<td>Major center</td>
<td>49</td>
</tr>
<tr>
<td>Dos Hombres</td>
<td>Small center</td>
<td>22</td>
</tr>
<tr>
<td>Gran Cacao</td>
<td>Small center</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 2. Criteria for Household Sub-ranking System

<table>
<thead>
<tr>
<th>Rank</th>
<th>Description</th>
</tr>
</thead>
</table>
| HH1  | • consists of one to two structures without a platform  
|      | • or one structure on a platform |
| HH2  | • consists of three to four structures without a platform  
|      | • or two structures on a platform  
|      | • or a courtyard group with three to four structures |
| HH3  | • consists of five to six structures without a platform  
|      | • or a courtyard group with five to six structures  
|      | • or three or four structures on a platform  
|      | • or a total of two courtyards present in a group of three to four structures |
| HH4  | • consists of five to six structures on a platform  
|      | • or five to six structures on a platform with one courtyard.  |
| HH5  | • consists of five to six structures on a platform with more than one courtyard.  
|      | • or a total of two courtyards present in a group of five to six structures |

*HH stands for household. (After Boudreaux 2013:131)

and Jones (1981). The methodology behind this ranking system assumes that a site’s size and configuration correlates to population density which, by extension, can reflect political influence (Adams and Jones 1981). Adams’ system is straightforward, one simply adds the total number of courtyards to the total number of acropolises and multiplies the sum of that equation by two (Adams and Jones 1981:309); this will provide the site score and rank. This ranking method was later modified by Guderjan (1991a:104). Guderjan modified Adams’ system in order to include indicators of influence and authority, such as ballcourts, stelae, altars, and other large monumental buildings (Guderjan 1991a:104). The combined ranking system was used to develop a hierarchy for the sites located in the PfBAP and DH2GC project area. On a regional level, the classification for the PfBAP is listed on Table 1.

Informal Household Clusters

Hammond (1975) defined informal household clusters as an accumulation of structures similar in size and function. These structures are usually built atop platforms, clustered around a patio or courtyard, and lack indicators of authority. Informal household clusters within the DH2GC transect generally conform to these guidelines except for a few solitary dwellings recorded thus far (Cortes-Rincon 2011, 2012). These platforms average 8 to 10 square meters in surface area, are generally less than a meter in height, and blend in with the natural topography (Cortes-Rincon 2011, 2012). These clusters were probably occupied by a household unit or extended family. Mound to mound variability within a cluster is interpreted as status differences within a family. To date, informal household clusters account for approximately 80% of the architectural features documented within the DH2GC transect.
Table 3. Hierarchy and Heterarchy Ranking System.

<table>
<thead>
<tr>
<th>Transect Location</th>
<th>Ranking Guderjan &amp; Adams System</th>
<th>Household Sub-Ranking Category</th>
<th>Vegetation Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>N150E75</td>
<td>1</td>
<td>HH2</td>
<td>Transitional to Upland Flora</td>
</tr>
<tr>
<td>N250W75</td>
<td>1</td>
<td>HH4</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N350W125</td>
<td>1</td>
<td>HH4</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N500E75</td>
<td>1</td>
<td>HH1</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N675E275</td>
<td>1</td>
<td>HH2</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N650E75</td>
<td>1</td>
<td>HH1</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N750</td>
<td>1</td>
<td>HH2</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N750E100</td>
<td>1</td>
<td>HH1</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N800</td>
<td>1</td>
<td>HH2</td>
<td>Middle Bajo Flora (Bajo-Full)</td>
</tr>
<tr>
<td>N950</td>
<td>6.5</td>
<td>Small Ceremonial Site</td>
<td>Ecotone (upland slope combined</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>with other eco-zones)</td>
</tr>
<tr>
<td>N1150W105</td>
<td>1</td>
<td>HH1</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N1270W40</td>
<td>1</td>
<td>HH1</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N1270E85</td>
<td>1</td>
<td>HH1</td>
<td>Bajo-Partial / Upper Bajo</td>
</tr>
<tr>
<td>N1270W90</td>
<td>1</td>
<td>HH1</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N1300W175</td>
<td>1</td>
<td>HH3</td>
<td>Upper Bajo Flora</td>
</tr>
<tr>
<td>N1330W281</td>
<td>3</td>
<td>Informal Cluster-Elite</td>
<td>Upland Flora</td>
</tr>
<tr>
<td>N1450W25</td>
<td>1</td>
<td>HH1</td>
<td>Upland Flora</td>
</tr>
</tbody>
</table>

The Adams/Jones and Guderjan systems are better suited for ranking larger sites and are limited in hierarchical studies of smaller settlements, such as informal household clusters. Most sites on the DH2GC project fall under the informal household clusters category and register as a “1” when analyzed using the aforementioned system. DH2GC data illustrates a lack of uniformity in the structures’ configuration or chosen placement across the landscape (Cortes-Rincon 2012, 2013). However, within this ranking system these groups appear homogenous (see Tables 2 and 3). To address this issue, a household sub-ranking system was created to classify minute differences between small scale settlements (Boudreaux 2013). By utilizing this sub-ranking system, differential analysis between small scale settlements can be conducted at a micro-regional level.

**Heterarchy: Environmental Resource and Specialized Manufacturing Communities**

Scarborough and Valdez (2003:11) proposed three types of environmental resource specialized communities (SRSCs) for the Three Rivers Region: bajo, terrace, and aguada communities. In the DH2GC project area, all of these categories are represented. Bajo communities are located at N750W10, N750E100, N1270E85 and N1300W75 (see Table 3). Terrace communities are located at N250W75, N350W125, N950, and N1330W281. The latter group has elite architecture, a cave, a chultun and has the most extensive terracing system on the transect. The documented aguada communities are located at the N350W125, N550E75, N675E275, N950 site, and N1600W50; these communities have water reservoirs, small to medium basins, and channels.
Evidence of lithic drill bit production is found at the N250W75 household group (Forbis 2013) as well as modified jute shell which exhibited evidence of drilling. The N750 patio group also has evidence of lithic manufacture, general utility bifaces (GUBs), obsidian prismatic blade fragments, and masonry work as evidenced by limestone flakes. Analysis of debitage and pressure flake scars indicates that the obsidian tools were refurbished locally for continued use. Most of the obsidian is from El Chayal as per Becker’s geochemical analysis (2013).

**Small Ceremonial Sites: N950**

Small ceremonial sites represent the apex of the hinterland settlement hierarchy. These are distinguished by having a ceremonial function—some form of political, religious, and/or economic control—marked by the presence of at least one non-residential structure, usually greater than 5 m in height, facing a formally defined plaza (Hammond 1975). The site at N950, located roughly 1.5 km from Dos Hombres, exhibits many of the necessary criteria to qualify as a small ceremonial site. It is situated approximately 55 m above sea level atop a modified prominent knoll. Settlement is concentrated around the knoll. The N950 site has a similar layout to a Plaza Plan 2 (PP2) as defined by Becker (Becker 1971) – which includes a shrine on the eastern side of the plaza – structure FN36. Shrines are vaulted-roof superstructures with veneered stonework; this level of specialized masonry would have required both skilled masons and a structured workforce. Other sites in the PfBAP that exhibit a similar PP2 layout are: Structure B-V-1 from Block V and a courtyard group on the northeastern side of Block IX on Transect B at Dos Hombres (Lohse 2001:353, 357); Structure D-3 at Group D at Dos Hombres (Aylesworth 2005:76); Structure A-1 at Group A and Structure B-1 at Group B at Betan Chinam (Aylesworth 2005:103), El Grupo Barba (Hageman 2003:350-376), La Milpa East and La Milpa South (Tourtellot et al. 2003:43). Interestingly, La Milpa West has a PP2C layout – with a shrine on the west side of the plaza (Becker 1971; Tourtellot et al. 2003:43). Both Group D at Dos Hombres and the N950 site have Late Preclassic beginnings culminating in a Terminal Classic occupation (ca. AD. 100-900). These smaller to medium ceremonial sites are more common in the Early Classic; most have an elaborate burial located within or adjacent to the shrine structure. Documented burials within the shrines were found at Structure D-3 from Group D at Dos Hombres (Ayclesworth 2005) and at Barba Group (Hageman 2003). It suggests that localized high status individuals were buried within their lineages in increasing numbers during the Early Classic, while the ruling elite were typically buried at larger site centers. This reflects a centrifugal ideological process which is supported by the ritualistic components of the sites. In a sense, it is a reproduction of ideology for inhabitants of smaller hinterland communities. Documentation of caves and other subterranean features is currently part of a graduate research focus based on ideological utilization/modification of the landscape (Ports 2013). During the 2013 field season, a cave (subterranean feature #3) was excavated and two...
burials were exposed; one adult and a child. Documented evidence of burning episodes was noted within this feature which is indicative of ritualistic activities carried out within the cave (Ports 2013). Ceramic analysis was carried out by Boudreaux and Dr. Sullivan. The evidence thus far indicates that this burial dates to the Tepeu 2-3 (Boudreaux 2013).

The landscape of N950 has extensive modifications such as water basins, reservoirs, channels, terraces, and chultuns (Figure 3). There are three large water reservoirs on the southwestern part of the plaza and a canal that served to direct water to the floodplains below. On the northeastern side of the plaza, six water basins are interconnected by channels—funneling water to a smaller elite residential group at the bottom of the knoll. This group is located 38 m above sea level and has a small round altar located on the west side of structure FN42. This season, we excavated the patio between structures FN43 and FN44. We documented a capped cyst burial in the western side of the patio. Based on ceramic analysis, this intrusive burial is from the Late Classic – Tepeu 2 (Boudreaux 2013). A sacbe was recorded within the vicinity of this courtyard group, approximately 100 m from N950 (Cortes-Rincon 2012, 2013). Preliminary survey efforts have concluded that this feature, designated FN78, is roughly 140 m long and intersects another sacbe, FN 99, at its current terminus (Marinkovich 2013; Swavely and Gustas 2013). The sacbeob serve as a nexus between N950, N1200E50, N1300W175, and N1330W281. At this time, the full extent of both features is unknown and will be investigated in the upcoming seasons (Marinkovich 2013).

There is a limestone quarry on the western side of the knoll. Samples were taken from the quarry for geochemical analysis during the 2013 field season to determine if this resource was utilized for nearby stone monuments or architectural material. On the northeastern part of the site, we encountered a linear alignment of eight large semi-rectangular cut stones. Three of the stones appear to be stelae while the others are too degraded to discern. Samples were also taken from the possible stone monuments and the burial cap stone to ascertain raw material sources. Based on preliminary analysis, the burial cap stone does not appear to be local.

Based on ceramic chronology, N950 was established as a small residential unit with an eastern shrine at the end of the Preclassic and was occupied continuously until the Terminal Classic. This community’s physical attributes and micro-regional influence expanded over time and became a focal point for ritualistic activities. Additionally, the close proximity of this group to the upper bajo, associated with agricultural activities, and the labor intensive structures, suggest that the settlement group may have provided preferential access to highly productive agricultural lands for a certain lineage.

**Population, Labor, and Hinterland Settlement Discussion**

Disproportionate labor and material requirements for monumental architecture is clearly evident between larger sites such as Dos Hombres and smaller settlement areas. However, this disparity is less apparent between small ceremonial centers and surrounding communities in the hinterlands. Volumetric analysis is calculated to estimate the total labor, raw material requirements, and days to carry out a project to completion. The needed workforce is compared to the estimated population within the study area in order to ascertain if labor requirements could have been supported on a localized or regional level.

Construction quality decreases as one moves away from Dos Hombres. Based on volumetric analysis, construction of structure FN2 (N150E75) would have required a minimum of nine people per day over a 30 day period; FN36 (eastern shrine at N950) would have needed 46 people per day over a 30 day period (Cortes-Rincon 2013). At N350W125, a total of 32 people could have built the three water reservoirs over a 30 day period; the combined water volume from these features would have supported an estimated 406 people per year. Comparatively, one of the three water catchment features at N950 could have been constructed by 20 individuals over a 30 day period whilst supporting an estimated 216 people per year (Cortes-Rincon 2011, 2012). Based on 122 structures currently accounted for,
our population estimates indicate that there were 384 people in the mapped section of the transect. Volumetric analysis of the four (out of 10) water catchment features indicate annual estimated support of 1054 individuals. Annual water surplus could have been allocated for additional purposes such as agriculture, ritual, and or elite support.

Concluding Remarks

The Maya were not a homogenous society and therefore no single typological model can account for all settlement variability. Instead, using the combined aforementioned site and household ranking systems, settlements are separated into distinctly unique clusters, which correlate to a series of functionally diverse types (Tables 2 and 3). Fundamental differences in settlement patterns in the study area suggest basic differences in household economics and community organization. It is increasingly apparent that the analysis of lowland Maya social complexity must include, as an integral part, an appreciation of local processes of development at the rural household level before the regional system can be clarified. The understanding of artifact types and distributions will help elucidate the organizational differences and similarities that exist within the area— as can already be seen from the obsidian data. The next step, which is currently afoot, is the analysis of procurement, production, and distribution of artifacts. These results will increase our ability to appreciate and explore settlement variability in conjunction with the complex political and economic arrangements that existed in ancient Mesoamerica— especially in the hinterlands.

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References Cited

Adams, R. E. W., and R. C. Jones

Ardren, Traci A.

Ashmore, W.

Aylesworth, Grant R.

Becker Marshall Joseph


Beckwith, Walter Isles

Boudreaux, Sarah N.

Brokaw, Nicholas and Sheila Ward, Stanley Walling
2011 The Ancient Maya and Modern Forest. Unpublished manuscript.

151
Carmack, R.

Cortes-Rincon, Marisol

2012a Dos Hombres to Gran Cacao Archaeology Project Inter-site Organization and Settlement Patterns. Presented at the annual meeting of the for American Archaeology 74th annual conference, Memphis, Tennessee.


2010 Original unpublished field notes from the Dos Hombres to Gran Cacao Archaeology Project. Manuscript on file at Humboldt State University.

Cortes-Rincon, Marisol and Sarah Nicole Boudreaux

Crummy, Carole L.


de Montmollin, Oliver

Driver, William David

Fash, William

Forbis, Adam

Gill, Richardson Benedict

Guderjan, Thomas H.


Hageman, Jon B.
Hageman, Jon and Jon Lohse  

Hammond, N.  


Hester, Thomas R., and Harry J. Shafer.  

King, Eleanor M., and Leslie C. Shaw  

Lewis, B.  

Marinkovich, Erik  

Orr, Heather  

Ports, Kyle  

Potter, D. and E. King  

Robichaux, Hubert R.  

Scarborough, Vernon and Fred Valdez Jr.  

Scarborough, Vernon L., and David Wilcox, (eds.)  

Sunahara, Kay S., and Richard K. Meadows  

Tourtellot, Gair, Francisco Estrada Belli, John J. Rose, and Norman Hammond  

Turner B.L.  

Walling Stanley  
Despite the exponential and valuable growth of gender studies (primarily focused on the lives of women) in Maya archaeology over the last quarter century, many Mayanists still hold a range of unexamined assumptions about sex, gender, and sexuality that shape our interpretations of the archaeological record. In this paper, I focus on some of the implicit assumptions about sex and sexuality in the past that have been highlighted by Rosemary Joyce and others. When we model the lives of ancient men and women on our own culturally-specific and relatively recent ideas about sex and sexuality, we transform the ancient Maya into versions of ourselves. By building interpretations of the archaeological record through an uncritical, normative framework derived from approximately 150 years of Euro-American ideas about sex and sexuality we essentialize and thus colonize the sex roles and sexuality of the ancient Maya. In this paper I suggest that there are less ethnocentric, more critically engaged approaches to sex and sexuality among the ancient Maya that draw from a range of cross-cultural archaeological-historical studies, and ethnohistorical research in Mesoamerica.

Introduction

"Without doubt, when it comes to gender and sexuality, the study of one will eventually lead to the other" (Voss 2009:31)

The title of my paper is related to a book on the colonial Maya by Pete Sigal (2000) entitled From Moon Goddesses to Virgins: The Colonization of Yucatecan Maya Sexual Desire. In Sigal's book he discusses colonization itself; here I am writing metaphorically about the present and the imposition of modern western ideas about sex and sexuality on the ancient Maya. A major point that Sigal makes while discussing tarantula vaginas and transsexual floating penises is that many preconquest and conquest-era Maya ideas about sex are "almost incomprehensible to a Western imagination. For the Maya...sexual behavior did not exist as a discernible category of sexuality but rather as an element of ritual" (Sigal 2000:249). In terms of the theme of the 2013 Belize Archaeology and Anthropology Symposium, social identity, I argue that concepts of sexual identity from our world should not be thoughtlessly transferred to the ancient Maya.

Many people have noted that "representations of the past have the potential to lend the illusion of time depth, and thus cultural legitimacy, to contemporary social phenomena” (Perry and Joyce 2001:63). This has been true recently, for example, in the use of broad, historically inaccurate statements about sexuality and marriage in both the United States and Belize as same sex-marriage in the U.S. and Belize’s sodomy law have been publicly debated. Like anthropologists and historians, archaeologists have a responsibility to speak out against these inaccuracies so that we do not create presentist arguments about the past using our own taken-for-granted assumptions.

Yes archaeologists also frequently make the ancient Maya into versions of ourselves, and the Maya world conveyed in many accounts looks remarkably like our image of 16- to 19th century rural Euro-American society. In this vision, men and women lived in units focused on the nuclear family. Labor was sharply divided between men and women, with men dominating the public realm. Women were admonished to be modest and sexually conservative. Men dominated women sexually and in other ways and same-sex relations were disparaged to the point of being punished by death. All of these ideas have been questioned and destabilized by scholars including Mathew Restall, Pete Sigal, Rosemary Joyce, Stephen Houston, and many others. Such scholars have shown the importance of Spanish traditions in the documents from which many of these ideas were derived and they have discussed previously ignored sexual references in Maya art and literature.

Some researchers have gone further than others. For Rosemary Joyce, Maya sex, gender, and sexuality were free-floating and above all fluid (Joyce 2000a, 2001, 2002a, b, 2004, 2006). Scholars studying sex point out the startling fact that humans are born in 5 to 9 biological sexes (not just two) which were recognized in some contexts (Fausto-Sterling 2000a). These diverse bodies were, and are still, gendered by cultural practices into men, women, and sometimes
other-gendered people, and gender and sex roles vary cross-culturally. In Joyce’s narrative, Maya sexual activities were more varied and freer than we have usually thought, perhaps even making mainstream contemporary sexual attitudes seem prudish. Joyce’s work is an important critique of the very conservative sexual attitudes some archaeologists ascribe to the Maya, but it is also another example of the use of the ancient Maya to discuss ourselves and perhaps a subtle critique of current conservative ideas about sexuality generally.

**Basic Concepts**

Here, “sex” refers to human biology. About 98.3% of newborn babies can be assigned to either the male or female sex, but roughly another 1.7% are called intersexed (Fausto-Sterling 2000b:51-53). Some cultures recognize this variation, whereas many do not. For example, contemporary North Americans tend to surgically operate on intersexed babies, demonstrating our commitment to a two-sex model of human biology which makes sex itself a cultural construction, not a fact of human life. Gender is typically defined by the roles cultures assign to males and females. A key point here is that many cultures around the world, including many New World ones, have more than two genders. The third sex “Berdache” or two-spirit person is the best-known example. These were typically biological males who dressed in a way distinct from both men and women and often performed various specialized social and religious roles. The historical and ethnographic presence of gender systems with more than two genders has provoked archaeologists in many parts of the world to seek and sometimes find these people in the archaeological record (e.g., in California Chumash archaeology) (Hollimon 1997). In Maya studies, Rosemary Joyce (e.g., Joyce 2000b:177 and other articles) has argued that gender in ancient Mesoamerica was somewhat fluid and thus needed to be fixed through ritual and more commonplace means like clothing and jewelry.

Europeans, Americans, and increasingly the rest of the world, explicitly link sexual behavior to psychosocial identity expressed in the categories heterosexual or homosexual which designate categories of people, not just behaviors. But, as many scholars have pointed out, this idea is not common until what is called sexology emerged in the 1870’s (Gilchrist 1999:56). Sexology postulated “that sexuality was an essential, enduring determinant of a person’s character or identity” (Voss 2006:367). The result was classifications and typologies of behaviors and people (e.g., “inverts” which became homosexuals etc.) and these have come to be considered universal and transhistorical by many people. In fact, evidence shows that most cultures throughout history have not placed sexual behaviors at the core of personal identity. Age, status, ethnicity, lineage, and occupation were usually much more important. Sexual behaviors and preferences were typically not more important in categorizing people than other preferences in music, literature, or food. The Maya clearly recognized, discussed, and depicted a variety of sexual behaviors but they do not seem to have used them as the basis for the permanent classification of individuals as we do.

So, this idea that one is born with a particular sexual orientation that is unlikely to change is a relatively recent and unusual idea, but it forms part of the foundation upon which we build our ideas about people in the past. Although most archaeologists are too sophisticated to look for exactly our categories (e.g., “gay” men in the ancient Maya world) we do tend to assume that individuals were exclusively heterosexual in the past and often go to great lengths to explain away evidence that contradicts this. Many of the ideas that archaeologists bring to their interpretations boil down to sex essentialism, “the idea that sex is a natural force that exists prior to social life and shapes institutions”. Sexual essentialism… considers sex to be eternally unchanging, asocial, and transhistorical (Rubin 1984: 275)“ (Voss and Schmidt 2000:3). Accordingly, many of us treat sex and sexuality as constants that do not need much study, rather than as historically and culturally contextual ideas and behaviors as important and culturally determined as politics or economics.

Kellogg (1998:336-337) has reviewed sexist presentist arguments in the context of archaeological theory, including how we link artifacts to identities. It turns out that you do not
have to look far in archaeology to find normative and essentialist ideas about gender and sex. A good example of normativity is the concept of “archaeological signatures” of men and women in the past, for example in graves. The flawed premise is that there are two dichotomized biological sexes which correspond to two genders that all cultures recognize and mark with artifacts. So, for example, archaeologists simply have to look for weapons to identify men and weaving implements for women. This has the effect of reifying our ideas about sex and gender rather than investigating them.

Evidence for Maya Sexual Ideas and Practices

Depictions of erotic physical activity are rare in Maya art, although Houston et al. (2006) catalogue everything from masturbation to frottage (rubbing), inter-species sex, orgies, and erotic fisting. Joyce (2000a) has argued that there are differences between the expression of male sexuality and female sexuality in monumental art. In a nutshell, male sexuality is emphasized, while women's is repressed. On Copan Stela C the loincloth is ornamented with an image of male sexual organs (Joyce 2000a:66). In a good overview of her position on Maya gender, Joyce (2001:131) goes even further: “This phallocentric construction of the male body in Classic to Postclassic Maya societies suggests an almost homoerotic sensibility.”

Sexual depictions involving two males are more common than those involving two women in Maya art. Nevertheless, many authors have cited colonial documents from the Maya area to suggest that preconquest male-male sex was abhorred, and even punishable by death. Scholars who have seriously assessed these sources, however (e.g., Houston et al., Sigal, and Restall) have concluded that Spanish influence is clear in these accounts. This is most obvious in the concept of sin which has no real pre-Conquest parallel. Similarly, the Mayan word suhuy may have been mistranslated to “virginal” and instead may have meant pure, or noble (Sigal 2000:137). Linguistic, ethnohistoric and ethnographic evidence suggest that male-male sex was often considered a sort of play or release (Joyce 2000c:278) without much approbation unless carried to excess.

Houston et al. (2006:210-211) cite Tzotzil words for such practices and graffiti at Kinal Guatemala from the Classic period shows same-sex sexual activity (Houston et al. 2006: Fig 68a). Jones (1998:333-334) discusses reports by a Spanish Dominican friar that among the Petén Itza at Tayasal there were “houses of abomination.” The friar claimed that glyphs or pictures depicted sexual acts that took place there, including sodomy. The same sort of place is mentioned in a 1702 letter to the crown by a presidio chaplain among the Petén Itza. He described a walled compound in which boys had sex with cross-dressed “minsters of the demon” who also made tortillas for the Maya priests. Cross-dressing men with both sexual and religious roles is known among many Amerindian societies including the preconquest Aztecs so, a third gender role of this sort is plausible but not yet demonstrable for the Maya. But, of course if we do not think about third genders, (and I would argue that generally we do not) we are unlikely to find evidence of them.

Some of the sexually related Maya imagery was quite public. Relief carvings from the site of San Diego, Yucatan depict enema insertion, erratic (probably drunken) dances, disheveled hair, and what may be autoerotic asphyxiation in Houston and Inomata’s (2009:55) words, “with a decided undertone of homoeroticism.” Barrera Rubio and Taube’s (1987) interpretation is that this was a community house for young men.

Sigal’s work shows that sex is most clearly referenced in relation to ancient Maya religion, warfare, and politics—areas that we decidedly do not expect references to sex. Sigal gives examples from, for example, the Ritual of the Bacabs where Maya nobles and priests "ritually raped the gods, thus asserting themselves as the active partners to the passive gods" (Sigal 2002:25). Ritual masturbation is also mentioned in a curing ceremony in Ritual of the Bacabs (Sigal 2000:228). The moon goddess, an exceptionally powerfully deity who in the colonial period was hybridized with the Virgin Mary, is shown in the Dresden Codex having sex with a number of deities, including a female death figure (Sigal 2000:102-103). The
promiscuity and bisexuality of the moon goddess provides a counterpoint to ideas about modesty and chastity in the lives of real ancient Maya women. Many scholars have also noted the androgynous beauty of the young corn god. This is appropriate since “from a purely biological perspective, the corn plant has male and female parts” (Bassie-Sweet 2002:171). The beauty of this male Maya god has a counterpoint in the Aztec god Tezcatlipoca who had bisexual and trickster aspects (Klein 2001).

**Net Skirts and Third Genders**

Many authors have discussed the bi-sexed and sometimes bisexual nature of Mesoamerican gods. Bassie-Sweet (2002:169) relates this to “the male/female principle” in which “a human being was considered to be both male and female with the right side of the body male and the left side female.” Just as contemporary highland Maya shamans are called mother-fathers, Gustafson (2002:161-162) suggests that “Mother-father kings” combined male and female symbols in ritual. Much of this discussion has focused on the net skirt costume worn by male rulers. Reilly (2002) compares Maya rulers, male and females, to the two-spirit people found throughout the Americas. Joyce (2000b:192) suggests that “texts from Yaxchilan suggest that the Classic Maya considered lineages to have been founded by a male/female duality, which may have been represented in ritual action by specially costumed males.” Looper (2002:201) goes further to suggest that a mixed gender status may have been temporary in ritual for rulers but also a permanent state for some people.

Houston et al. (2006:51-52) object to the idea of a permanent third-gender role for some Maya people: “…the supposed claims for ‘cross-dressing’ or ‘third gender’ portrayals have no support because they misinterpret the garb of the maize deity being intrinsically female; in fact, these costumes relate to a particular category of deity, not to a blurring of genders.” I agree that cross-dressing kings or deities do not mean there were permanently cross-dressing people, but these supernatural and political concepts must have had some impact on ancient Maya ideas about gender, perhaps opening a space for non-heteronormative behaviors. Among the Aztecs, the god Titlacuan was known as a bisexual seducer and is also shown in a nettied garment.

Disagreements about ancient Maya sexuality are probably inevitable in a thorough examination, but in my opinion, most archaeologists have been reluctant to explore Maya sexuality in a truly relativistic way. An example is the interpretive contortions inspired by the Maya imagery in Naj Tunich cave in Guatemala. One scene shows two men bloodletting or masturbating (Strecker 1987) near Drawing 18 which depicts an embracing couple (Figure 1). In a 1988 paper on the relationship between sacrifice and sexuality Stone (1988:84) interpreted the couple as an old god and the moon goddess. In her later book Stone (1995) revised the right-hand figure to a male based on the physique, indications of a male hipcloth, and a male headwrap, but she also argued that this image must have been satirical.

Figure 1. Drawing 18 from Naj Tunich cave in Guatemala is one of the most controversial images in Maya archaeology (after Stone 1995: Figure 6-28).
based on Colonial Maya analogies. The image just as easily supports Houston’s (2009) interpretation that it represents intercrural sex between an older male and a cross-dressed or hermaphroditic partner, an idea for which we can also find ethnohistoric analogies (Trexler 1995).

Dowson (2009) has written about similar attempts to find virtually any way to argue that the two men buried in an Egyptian tomb in the style of man and wife were not erotically involved, despite multiple lines of evidence that they were, including multiple intimate images and inscriptions. In any case, it is clear that sexual activity provided powerful religious metaphors for the ancient Maya. Stone, in a comment published in Strecker (1987:37) noted “...the vague boundaries that separate themes of fertility/sexuality and sacrifice in Maya thought and art (Stone 1985)....The act of blood sacrifice from the penis has inherent sexual overtones related to fertility.”

Sex, Status, and War

Sodomy is a topic that Maya scholars have been reluctant to address, but the most important meanings of sodomy to the Maya were related not to eroticism but to war. Winners were conceptualized as the active partner, losers the passive partner. This was not seen as an inherent quality of any person or group, but a state a person or group would enter as a result of warfare. Sigal (2000:224) concludes that “nobody had a static sexual identity during times of war”. Passivity was also linked to excess because the active role of men required control, and excess was considered dangerous and weak (Sigal 2000:224). Houston et al. (2006:198) have commented on how little emotion is shown in elite Maya art: “In visual terms the Classic Maya unquestionably found an ideal in unexpressed emotion and rigid self-control insofar as they associated these properties with the principle illustrations of their lords and royal courts.” Sigal (2000) also describes class-based contrasts, in which the lower classes were considered closer to animals in their lack of self-control. Sex was powerful and too much of it was dangerous and shameful.

Shame and honor formed a spectrum and in the Classic period the elite captive is the most shamed. Part of this shame is sexual: captives are shown bound and nude, often with explicitly rendered or erect genitalia. Houston et al. (2006:206) characterize this as representing “the loss of volition in sexual acts, a form of aggressive eroticism or erotic aggression, often homoerotic, that denied any consent to the subordinate partner.” At Tonina, a female captive is shown on an altar (Fig 6.4) with her breast exposed, grappling with a man. Houston et al (2006:207) suggest this may represent the rape of a captive by her captor, and one that may have been done in public.

Sex and Age

Human bodies change through the life cycle and for many cultures this is of central importance to sexuality. So, the Classical Greeks considered both prepubescent boys and women as sexual partners for adult men because of their physical similarities. In the classical world, in fact, men and women were considered different developmental versions of a single sex (Gilchrist 1999) and this idea persisted quite late in Western history. Holliman’s (1997, 2006) model of California Chumash burials became more complex when she realized that members of an undertakers guild included older women, celibates, and third gender males. What did they have in common? Their sexual activity was not reproductive. The relevant category was neither sex nor gender based, and it changed through the life cycle. What we see cross-culturally is that many peoples simply are not as interested as we are in marking distinctions based on sexual activities. Other factors, especially, age, class, and ethnicity are much more important.

Sigal has shown that homoerotic sexual humor was a major, public, part of the language of Zuyua (Books of Chilam Balam) which was used in determining leadership roles for youths in Yucatec Maya aristocracy and that “Mayan traditions included representations of pederasty and same-sex eroticism in descriptions of the rituals of political and social ascension.”(Sigal 1997:1-2). Bassie Sweet (2002:170) notes that “in contemporary rituals...the senior male ritual specialist refers to his junior male assistant as his wife...and in the Popol Vuh, Xbalanque, who plays the role of an assistant to Hunahpu, is
named with the "x" diminutive or "female marker."

**Conclusions: The Past and the Present**

In terms of social identity and sex, archaeologists seem to want the ancient Maya to be idealized versions of ourselves, whether that be heterosexual, monogamous, and married or, in a contrasting view, sexually fluid, gender-bending, and non-homophobic. My view is somewhere in-between. There is good evidence that distinctions between the sexes mattered and were marked, and that gender and sexual roles were relatively clearly demarcated as well. So, I do not see quite the level of sexual and gender fluidity that Rosemary Joyce sees. Nevertheless, neither do I think that the ancient Maya were as strongly obsessed by sexual behavior as we are, for example in our use of sexuality as a primary marker of identity. Many lines of evidence suggest that varied sexual expression was recognized and tolerated by the Maya, but what was intolerable was excess. Here, I have tried to show that sexual behavior was strongly linked to stages of the life cycle, ritual, and power. In terms of social identity, I doubt that labels like “straight” “bisexual” “gay” or “lesbian” would make sense in an ancient Maya context but I do think that people were aware of and able to access a range of sexual expressions at different times in their lives and in different contexts.

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**References Cited**

Barrera Rubio, A. and K. Taube

Bassie-Sweet, K.

Dowson, T. A.

Fausto-Sterling, A.


Gilchrist, R.

Gustafson, L. S.

Hollimon, S. E.


Houston, S. D.

Houston, S. D. and T. Inomata

Houston, S. D., D. Stuart and K. A. Taube
2006 The Memory of Bones: Body, Being, and Experience among the Classic Maya. University of Texas Press, Austin.

Jones, G. D.

Joyce, R. A.
2000a Narratives of Gender among the Classic Maya. In Gender and Power in Prehispanic Mesoamerica,


Voss, B. and R. A. Schmidt
2000 Archaeologies of Sexuality: An Introduction. In
Archaeologies of Sexuality, edited by B. Voss and
Images of crocodiles, appearing in both naturalistic depictions and more stylized representations, are an important theme in ancient Maya art. Crocodilians occur as part of Maya iconography in a variety of forms, themes, media, and contexts. They are present, to varying degrees, from the Middle Preclassic period (ca. 800 BCE) to the Contact period (ca. 1550 CE) of Maya culture history, and dozens of images of crocodiles have now been documented from 21 different Maya sites. We explore when, and how, crocodile imagery was employed, how the iconography changed over time and space, and discuss some of the reasons why the crocodile appears to have been so significant to the early Maya.

Introduction

The crocodile, a large, reptilian predator, appears widely in the art of ancient Mesoamerica, including representations in Izapan (Norman 1973; Quiratre 1973:20-21; Smith 1984:36), Toltec (Joralemon 1976:60; Stocker et al. 1980:753-4) and Aztec art (López Luján 1994; Matos Montezuma 1988). The reptile is particularly well documented from Olmec art (Joyce 2001; Stocker et al. 1980; Taube 1996), where the crocodilian “Olmec Dragon” (God 1) is viewed as a major Gulf Coast deity in the Early-Middle Preclassic period (Joralemon 1976). The famous Atlihuyan figure from Morelos, attributed by most to the Olmec, depicts a shamanic personage wearing the skin of a crocodile.1 In the Olmec culture, and others, there are strong suggestions that this large reptile was associated with the earth and fertility, as well as with the sky, rain, and water in general, and was an important “spirit companion” or shamaic alter-ego (Freidel et al. 1993:260-267; Houston and Stuart 1989:13; Thurston 2011:18). As we shall see, these same themes and associations with crocodiles appear to have been fundamental to the ancient Maya as well.

Based on zooarchaeological data, a strong case can be made that the ancient Maya regarded crocodiles (Crocodylus sp.) as both a potentially dangerous, as well as a highly revered, creature (Thurston 2011). There are suggestions from the faunal remains, found at dozens of early Maya sites, that crocodiles, which prefer aqueous, tropical, lowland habitats, carried abundant, and important, cosmological associations (Thurston and Healy 2013). Indeed, Garber and Awe (2009:155) have argued that crocodilian imagery is a pervasive theme in ancient Maya art, and an important component in Maya symbolism. As we will document, crocodiles (and composite creatures with crocodilian features) appear as part of Maya iconography on a wide variety of media, including large scale, public architecture and public monuments (stelae and altars), as well as on smaller, portable and likely private works of art, like painted ceramics, and carved figures of bone, shell and stone, and found in a variety of archaeological contexts (including caches and burials).2

The Artistic Evidence

There are numerous artistic representations of crocodiles known today from archaeological sites, and collections. Using published sources, with drawn images and/or photographs, we identified 66 depictions from at least 21 Maya sites (Thurston 2011: Tables 5.1-5.7). We recorded the sites from which the images were derived, their context (specific location at a site), and medium (raw materials).3 The category of art (e.g., carved stone monument, ceramic vessel, shell figurine, architectural embellishment, etc.) was noted, along with a brief description of the image, the estimated date of manufacture, and published reference. What we discovered from this exercise is that sites with representations of crocodiles span the Northern and Southern Lowlands and even occur, in more limited examples, in the highlands. We also compared the images of crocodilians by time period, to elicit patterns and changes over time and space. From this, we conclude that the ancient Maya created artistic representations of crocodiles for thousands of years. What follows is a summary of our findings.
Preclassic Period

Five Maya depictions of crocodiles date to the Preclassic period. Two of these are monumental in scale (both from Kaminaljuyu (KJ), along with two effigy figurines (one of slate, one of marine shell; both from Cahal Pech), and one ceramic vessel (from Lamanai) (Awe 1992:309; Garber and Awe 2009:155; Pendergast 1982:99) (Figure 1). The earliest known Maya image of a crocodile occurs on a carved stone monument (Stela 9) from Kaminaljuyu, a highland site (Houston et al. 2006:139). The monument is estimated to date between 700-500 BCE (Middle Preclassic) (Parsons 1986:16). A second early carving (Monument 2) from the same site is dated to about 500 BCE (Parsons 1986:29). Both are assigned Earth Monster symbolism by the original investigators, although the context of Monument 2, in a basin-like plaza at KJ, allows for an alternative interpretation. The combination of poor drainage in the plaza and heavy seasonal rains may have created the effect of a floating beast (Finamore and Houston 2010:226-227). The Preclassic representations from Cahal Pech and Lamanai were from clear ritual contexts. The KJ monuments were, presumably, elite or royal commissions.

Early Classic Period

The Early Classic was a time when crocodile imagery began to develop more fully in the Maya subarea. Fourteen depictions have been identified from six sites (Kaminaljuyu, Copan, Tikal, Yaxha, Altun Ha, and Lamanai). Of these specimens, three of the vessels are unprovenienced. Five of the fourteen specimens are figural in nature (three-dimensional, carved in the round) including pendants of jade (n=4), and a lone pendant of bone (Figure 2) (Coggins 1975:147; Moholy Nagy 2008:49, Fig. 103; Pendergast 1990:264). Most of these depict the distinctive, elongated head of the crocodile, but one example (from Kaminaljuyu, again) is of a full body of the animal (Kidder et al. 1946:59, 69). It appears that most of these pendants had holes drilled for suspension, so they could be worn as jewelry or ornaments, and all were recovered from ritual contexts (four from burials, one from a cache). Three carved stone monuments (two stelae and an altar) are present, found in the epicenters of Yaxha and Copan, a continuation of the pattern seen in the Preclassic (Bau dez 1994:122-125; Taube 1989:2). However, architecture with crocodilian imagery is new to this time period, and was found at both Copan, in the form of a stucco embellishment, and at Lamanai, as carved stone, stair outsets (Fash 1991:84; Pendergast 1981:38). The
remaining four Early Classic examples of crocodilian art are all found on, or in the form of, ceramic vessels.

The crocodile imagery on ceramics from the Early Classic period is varied. One example, a very naturalistic portrayal, is an effigy vessel in the form of a crocodile (Kerr 2009:K5842) (Figure 3). In another case, the handle on a lid of a cylindrical tripod vessel is similarly modeled into a crocodile with a human figure astride it (Kerr 2009:K6216). The other two vessels have painted crocodile images. One has a rather stylized crocodile tree represented and the other a headless saurian (Coggins 1975:149; Taube 1988:455).

Many of these Early Classic images are naturalistic (effigy vessel, pendants) with unknown symbolic properties. Some can be assigned significance related to the earth (crocodile tree, Papagayo Structure, Yaxha stelae), and one example (lidded tripod cylinder vessel) may have celestial properties. Finally, the crocodile images carved on the stair outsets of the structure at Lamanai are the first artistic depictions by the Maya of a personage wearing the skin of a crocodile, in this case as a headdress.

Late Classic Period

The overwhelming majority of crocodile images we identified are derived from the Late Classic, with 25 depictions from 10 sites, and six unprovenienced examples, for a total of 31 examples. This was an era of great artistic expression by the Maya, and a time of sustained growth in the Southern Lowlands. The period has long been regarded as the apex of early Maya development, building on foundations established in the Early Classic (Schele and Miller 1986:27; Sharer 1994:336). Virtually all pieces with clear provenience in our sample were discovered at sites located in the Southern Lowlands. Although crocodile images were noted at the highland site of Kaminaljuyu in both the Preclassic and Early Classic, none are noted for the Late Classic period, when many highland Maya polities suffered a political decline (Sharer 1994:147).

Crocodilian imagery in the Late Classic is found on a large scale, and in more public places, with a number of carved stone monuments, including both stelae and altars (n=10), and on architectural detailing in the form of stone and plaster sculpture and murals (n=9). Sites with monumental imagery include Copan, Quirigua, Bonampak, Yaxchilan, Tonina, Palenque and Tikal (Baudez 1994:32, 74, 84, 101-103, 183-184, 205, 259; Freidel et al. 1993; Garcia 2006:1-2; Gordon 1902:Plate XVI-1, 3; Graham 1982:162, 169; Graham and Mathews 1996:103; Houston et al. 2006:187-188, Looper 2003:172, 188, 191; Miller 1986: 87-88; Schele and Freidel 1990:169, 322-323, 332; Schele and Miller 1986:45-46; Sharer 1990:28, 54, 57, 60; Stone 1983:57-58, 66, 104; Stuart 2003:1; Tate 1992:62-64; Taube 1988:170; Taube 1989:2; Tozzer and Allen 1910:320).

Late Classic painted ceramic vessels with crocodile imagery comprise yet another significant portion of the representations although, sadly, the majority of these are unprovenienced (Garcia 2006:3; Robiscek and Hales 1981:Vessel 108, Vessel 120; Taube 1988:455). Sites with vessels having crocodile imagery include Naranjo, Tikal, Becan, and Jaina (Finamore and Houston 2010:251; Freidel et al. 1993:67-69; Houston et al. 2006:95; Martin and Grube 2000:51; Miller and Martin 2004:83). Figurines (when provenienced) tend to be found in more private locations, like burials, and were carved from bone and shell, in addition to molded ceramic figurines (n=4) (Joralemon 1975:66; Kerr 2009:K8750; Miller and Martin 2004:140).

The remaining two objects of this period recorded by us do not fit easily into a category.
One, a beautiful chipped, obsidian eccentric, is surely a sacred object, as it would have been too fragile to be used as a cutting tool despite its razor sharp edges (Iannone 1993:Fig. 62; Kerr 2009:2822) (Figure 4). Sadly, this remarkable work of art is without provenience. The second unusual specimen, from Tikal Burial 116 (Temple I) is a long bone with an elaborate canoe scene carved onto its surface (Freidel et al. 1993:91). Both of these objects appear to depict a sinking (?) canoe in the form of a crocodile with passengers on its back.

Interpretation of many of these Late Classic images is more difficult than most examples from the Preclassic and Early Classic, as there is a growing tendency toward more stylized depictions. The Maya Cosmic Monster, a celestial beast with crocodilian features, makes its first appearance in the Early Classic in our sample. In the Late Classic, however, it is the most numerous of crocodilian depictions (n=13). The crocodile also features prominently in creation iconography and with inscriptions (n=5). Earth Monster iconography is also present now (n = 5) and includes depictions of “world trees”. Crocodilian headdresses and costumes are also featured in Late Classic art, typically worn by elite personages (n=6). Two images of this era are more naturalistic in their portrayal of a crocodile, one being a bone carving, missing its head, with text carved onto its reptilian belly (Miller and Martin 2004:140). The other is a remarkable blue-painted musical instrument, a modeled ceramic ocarina in the form of a crocodile (Finamore and Houston 2010:228-229) (Figure 5).

**Terminal Classic Period**

Only a single crocodile depiction can be dated confidently to the Terminal Classic. This is a clay brick with a very naturalistic rendering of a crocodile from the site of Comalcalco (Finamore and Houston 2010:230-231; Miller and Martin 2004:155) (Figure 6). The appearance of appliquéd dermal scutes on this specimen has been likened to cacao beans. If so, this image may be related to agriculture and Earth Monster iconography. This specimen is one of several clay bricks from the site of Comalcalco which have a variety of designs (Andrews 1989:12).

**Postclassic Period**

In quantity of representations of crocodiles (n=11), the Postclassic period trails both the Late Classic and Early Classic in our sample. There were nine examples drawn from six sites, with two additional examples from an unknown site, represented in the Dresden Codex (Thompson 1972). The majority of these examples come from the Northern Lowlands (e.g., Tancah, Coba, Chichen Itza, and Mayapan), the region which flourishes following the collapse of many sites in the Southern Lowlands in the Terminal Classic period. However, two sites from the Southern Lowlands (Lamanai and Santa Rita Corozal) also have Postclassic crocodile images.

Five of the Postclassic depictions are examples of architectural embellishments. Unlike those in previous time periods, these are all found on the inside of structures located in the site epicenters, heavily limiting public access and viewing. Four of these are painted murals, while the fifth is a set of carvings of composite reptilians with crocodile features found on balustrades and columns of a temple group at Mayapan (Chase and Chase 1988; Houston et al. 2006:89-91; Masson 2000:243; Miller 1982: Plate 8; Pugh 2001:253; Taube 1989:4, 6-9). A single, carved stone monument (altar) is also
described from Mayapan, depicting an individual riding (or lying?) on the back of a damaged crocodile (Proskouriakoff 1962:334; Taube 1989:3). As noted, two images of crocodiles can be found painted in the Dresden Codex (Garcia 2006:6-8; Taube 1989:3). The remaining Postclassic images are more difficult to categorize. One is a pair of ceramic figurines of a bi-cephalic (two headed) crocodile, another a ceramic maskette (from Lamanai) with the face of an individual wearing a crocodile headdress (Pendergast 1981:38; Taube 1989:4; Thompson 1970:215), and the last is a depiction of a crocodile on an embossed gold disk recovered from the Cenote of Sacrifice at Chichen Itza (Taube 1989:6).

The focus of some Postclassic images (n=3) is the Maya creation myth, involving the sacrifice of a crocodile. The Earth Monster is also featured prominently (n=3) in Postclassic Maya art. The Cosmic Monster still appears in Postclassic iconography (n=2), although not with the same frequency it did in the Late Classic. Postclassic depictions also illustrate the crocodile as a costume worn by human figures (n=2). The final depiction, on the monument from Mayapan, is of a person astride a crocodile. This may be related to the earlier depictions from the Classic period of humans riding in a
crocodile canoe which would then link the images to the Cosmic Monster.

**Contact Period**

The continuation of crocodilian imagery in Maya art in the Contact period, after the arrival of the Europeans, is surely indicative of the profound cultural significance of this animal. Two pieces of art from the Historic or Contact era are known, both from the site of Lamanai (Pendergast 1984:7; 1985:3). Interestingly, the lagoon site of Lamanai has crocodilian imagery in every time period, stretching from the Preclassic to the Contact period, perhaps not surprising given its aquatic location, and the possible translation of the site’s name as “submerged crocodile” (Pendergast 1981:31).

Both Contact period examples from Lamanai are ceramic figurines which provide evidence (by context) of ritual activity involving the crocodile image into the 16th and even 17th centuries CE. The first is a composite creature with deer antlers and a fish-like tail, relating it to the Cosmic Monster imagery, even though it is rendered with only one head. The second figurine is very similar in design (and symbolism), but with the usual two heads. Both have a human face visible in the open mouth of the crocodile (Figure 7). The cache containing the latter figurine likely postdates the desecration of a Contact period Catholic visita church, and is possibly an indication of a revival of traditional Maya ceremonial activity which persisted into the 17th century CE (Pendergast 1984:7).

**Contexts**

From an examination of the archaeological contexts for these images of the crocodile in Maya art, it is clear that the majority are found in what can be termed “ritually significant places” (Figure 8). These include, particularly, locales associated with the elite, such as images displayed on monuments found in site epicenters (n=19), on monumental architecture (n=14), and in the form of objects found in high status burials (n=9). The amount of crocodile imagery from caches was surprisingly low—only four depictions. Very few examples of crocodile art (n=4) were discovered to have been recovered from structural fill, and no examples of crocodiles have been found, to date, in middens or non-elite house mounds. Overall, this is an intriguing pattern, suggesting ritual or symbolic significance to these items and the likeness of the animal which is displayed.4 Sadly, all too many derive from what we term “unknown” contexts.

**Category**

Examination of the different sub-categories of art in which crocodilian images were depicted revealed several insights: Carved stone sculptures of crocodiles are the most common sub-category (n=18), followed by images on ceramic vessels (n=11), figurines (n=10), and architectural carvings/stucco modeling (n=9) (Figure 9).5

**Public vs. Private Art**

Also considered was whether the imagery was portrayed by the Maya in forms which were meant to be displayed in public, to a wide audience, or in private, to a few individuals or to the owner of the artwork alone, or even to no one at all (e.g., cached offerings). Some images, such as monuments erected in large, central plazas, and art work adorning the exterior of architecture, was classed as public in nature. However, images, such as murals, placed on the interior of temples, for example, were meant to be seen by a much more restricted number of individuals, perhaps just priests or rulers, and were classified by us as private.

Crocodile images on personal adornment, such as beads and pendants, are considered as
Figure 8. Crocodile images in study displayed graphically by context and frequency (after Thurston 2011: Fig. 5.4).

Figure 9. Crocodile images in study displayed graphically by category of art and frequency (after Thurston 2011:Fig. 5.6).
private in nature. Items hidden in caches, such as eccentric flints, were deemed private objects. Figurines were the most difficult to classify. Context was crucial for these. Most appear to have had a private use, with many having been placed in hidden locations, burials, caches or construction fill, when the location is known at all. It is possible, of course, that figurines may have been displayed, originally, in some more public manner before final deposition, but it is impossible to know this for sure.

Ceramic vessels, both painted and effigy forms, were regarded as public in nature, albeit likely for a restricted (elite) audience. Although some were found in burial contexts (most specimens in our study lack provenience), their original use life indicates a more public connotation. Some likely served as elite intersite gifts, presented at public audiences, or were used in ritual feasting events.

The images from the Dresden Codex (and the written contents of the codex) were considered to be private, as they contained esoteric ritual information about the planet Venus and other celestial objects. This is presumed to have been highly specialized knowledge controlled by a small segment of Maya society, such as priests (Sharer 1994:600).

In sum, a little more than half (n=34, 54%) were judged to be items of public display, while just under half (n=26, 40%) were private in nature. The use of three images (5%) was considered to be unknown—an unprovenienced shell figurine, an unprovenienced ceramic figurine from Santa Rita Corozal, and a censer from Copan without context.

**Symbolism**

There are a number of possible meanings which can be attributed to the crocodile imagery which appears in ancient Maya art. Elsewhere, these are discussed in greater detail than is permitted here (Thurston 2011:135-182). However, the images can be usefully subdivided into six major categories of symbolic meaning: Earth Monster; Cosmic Monster; Naturalistic images; Costume regalia; Creation mythology; and Stylized (unknown or unclear imagery) (Figure 10).
When classified using these categories, ancient Maya representations of the crocodile as the Earth Monster was most prevalent \((n=18)\), followed by the Cosmic Monster \((n=16)\). They occur in almost equal representation in our sample. Cosmic Monsters included any bicephalic or composite crocodilian beings, and Earth Monster forms included images of humans standing on the backs of crocodiles and depictions of the so-called “saurian tree” (Figure 11). Naturalistic representations are the next most frequent \((n=10)\), followed by crocodile images which occur as costume elements worn by people \(\text{i.e.},\) headdresses \((n=9)\) (Figure 12). Stylized images \((n=6)\) included those depictions which were often more difficult to categorize, such as a very stylized pendant from Altun Ha. Those placed into the Creation category \((n=7)\) include images of crocodiles linked to Maya creation legends \(\text{such as a mural from Mayapan, or stucco images on House E at Palenque}\). The range and variety of meanings attributed to the crocodile in Maya art is likely a reflection of the creature’s significance, and long history of interest among the early Maya.

**Conclusion**

The dozens of images from at least 21 Maya major sites indicates that crocodiles were animals of considerable importance to the ancient Maya, and for a very considerable length of time \(\text{ca. 2000 years}\). Furthermore, given the array of sites, across most of the Maya subarea, from the Southern Highlands to the Northern Lowlands, there clearly was a widespread interest by the Maya culture. As depicted in the art, the crocodile was often portrayed as responsible for the creation of the earth, but predominantly embodied the heavens and earth, and may have had connections to the Underworld as well. Furthermore, crocodiles can be considered especially noteworthy as possible alter-egos, or ways, such as when their distinctive hides were used as costumes. The
sauroian is executed in iconography on many different categories of Maya art, from the grand scale on temple pyramids and monuments, to a smaller scale, on portable objects like pendants, figurines and ceramics. They occur also in multiple types of media (e.g., raw materials like pottery, jade, slate, limestone, sandstone, shell and bone) (Figure 13).

Chronologically, the reptile's image was most prevalent (in our sample) during the Late Classic, and especially at sites which are located in close proximity to the crocodile’s natural habitat. Finally, its large size and ferocity as a predator likely made the crocodile a powerful symbol, not unlike the jaguar, among the early Maya and in Maya iconography (Benson 1988, 1998).

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1This representation of a crocodile skin worn by a shamanic figure is repeated, centuries later, in a remarkably similar manner by the Late Classic Maya on Altar T at Copan (Baudez 1994:101; Joralemon 1976:34).

2Crocodilians are presented in a number of ways in ancient Maya art. While naturalistic representations are, typically, quite obvious, more complex, composite reptilians can be more difficult to judge. Often, the Maya combined crocodilian features with other animals or beings to create a stylized, or mythical, creature. In this study, we relied on identifications made in the published sources we cite, with the proviso that the creature in question retained more than one identifiable characteristic (such as obvious, sharp teeth, elongated, tapered snout, protruding eyes without eyelids, long, scaled body, thick, elongated tail, clawed feet, etc.). In cases where the composite image could not be determined to be a crocodile (or crocodilian) with some degree of confidence, it was excluded from this analysis.

3In order to categorize artistic data for formal analysis, we defined a number of terms. For example, “iconography” refers here to the visual images and symbols used in a work of art or the study/interpretation of these. An “image” is a representation of the external form of the person or thing in art (“representation” and “depiction” are used here as synonyms). The “medium” is a “vector, agent, support, host, and tool of images” (Belting 2005:51). It refers in our study to the raw materials (e.g., stone, pottery, shell, etc.) or the techniques (e.g., carving, painting) used to construct the image. “Context” is the location where a particular image was archaeologically recovered (e.g., cache, burial, building fill, site epicenter, plaza, etc.) (Thurston 2011:99-100).

4A note of caution is warranted here. The data may be skewed due to an all too common bias in Maya archaeology for the large-scale excavation of site epicenters, and elite areas in general. Furthermore, elite style burials, especially sealed tombs, typically provide better preservation of artifacts and images from destruction due to their sturdy construction. These factors, common occurrences in Maya archaeology, may artificially elevate the preservation of elite mortuary offerings. Finally, the high prevalence of images of “unknown” provenience (n=16) must be taken into consideration.

5The engraved brick from Comalcalco was identified by us as “permanent”, as it would have originally been part of a structure.

References Cited

Andrews, George F.
1989 Comalcalco, Tabasco, Mexico: Maya Art and Architecture. Labrinthos, Culver City, CA.

Awe, Jaime J.

Baudez, Claude

Benson, Elizabeth P.


Chase, Diane Z. and Arlen F. Chase
1988 A Postclassic Perspective: Excavations at the Maya Site of Santa Rita Corozal, Belize. Pre-Columbian Art Research Institute, Monograph 4. San Francisco.

Coggins, Clemency C.
1975 Painting and Drawing Styles at Tikal: An Historical and Iconographic Reconstruction. Ph.D.
dissertation, Department of Fine Arts, Harvard University, Cambridge.

Fash, William L.

Finamore, Daniel and Stephen D. Houston (editors)

Freidel, David, Linda Schele, and Joy Parker

Graham, Ian

Graham, Ian and Peter Mathews
1996 *Corpus of Maya Hieroglyphic Inscriptions, Volume 6, Part 2: Tonina*. Harvard University, Peabody Museum of Archaeology and Ethnology, Cambridge, MA.

Harrison, Peter D.
1999 *The Lords of Tikal: Rulers of an Ancient Maya City*. Thames and Hudson, London.

Houston, Stephen D. and David Stuart

Houston, Stephen D., David Stuart, and Karl A. Taube
2006 *The Memory of Bones: Body, Being, and Experience among the Classic Maya*. University of Texas Press, Austin.

Iannone, Gyles

Joralemon, Peter D.


Joyce, Rosemary A.

Kerr, Justin

Kidder, Alfred V., Jesse D. Jennings, and Edward M. Shook

Looper, Matthew G.

López Luján, Leonardo
1994 *The Offerings of the Templo Mayor of Tenochtitlan*. University of New Mexico Press, Albuquerque.

Martin, Simon and Nicolai Grube
2000 *Chronicles of Maya Kings and Queens: Deciphering the Dynasties of the Ancient Maya*. Thames and Hudson, London.

Masson, Marilyn A.

Matos Moctezuma, Eduardo

Miller, Arthur G.

Miller, Mary Ellen

173
Miller, Mary Ellen and Simon Martin  
2004  *Courtly Art of the Ancient Maya*. Thames and Hudson, London.

Moholy-Nagy, Hattula  

Norman, V. Garth  

Parsons, Lee A.  

Pendergast, David M.  


Proskouriakoff, Tatiana  

Pugh, Timothy W.  

Quirarte, Jacinto  

Robiscek, Francis and Donald M. Hales  

Schele, D.  

Schele, Linda and David Freidel  

Schele, Linda and Mary Ellen Miller  

Sharer, Robert J.  


Smith, Virginia G.  

Stocker, Terry, Sarah Meltzoff, and Steve Armsey  

Stone, Andrea  
1983  *The Zoomorphs of Quirigua*. Ph.D. dissertation, Department of Art History, University of Texas, Austin.

Stuart, David  

Tate, Carolyn E.  
1992  *Yaxchilan: The Design of a Maya Ceremonial City*. University of Texas Press, Austin.

Taube, Karl  


1996  *The Rainmakers: The Olmec and Their Contribution to Mesoamerican Belief and Ritual*. In
Healy and Thurston


Thompson, J. Eric S.


Thurston, Elizabeth B.

Thurston, Elizabeth B. and Paul F. Healy
2013 Crocodiles and the Ancient Maya: An Examination of the Zooarchaeological Data. Manuscript, Department of Anthropology, Trent University, Peterborough.

Tozzer, Alfred M. and Glover M. Allen
1910 Animal Figures in the Maya Codices. Papers of the Peabody Museum of Archaeology and Ethnology 4(3). Harvard University, Cambridge, MA.

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15 RECOVERING MUSIC FROM PACBITUN, BELIZE: NEW EVIDENCE FOR ANCIENT MAYA INSTRUMENTS

Kong F. Cheong, Terry G. Powis, Paul F. Healy, Roger Blench and Linda Howie

Investigations at the ancient Maya site of Pacbitun (Belize) in 1986 and 1987 unearthed a range of well-preserved musical instruments from Late Classic period elite and royal burials. Excavations in 2010 recovered additional, ceramic, sound-producing instruments associated with Late Classic interments in the North Group of the Epicenter at Pacbitun. In this paper the Classic Maya sound devices are described, including insights to their archaeological context, production, and meaning. A report is provided on the analysis of the construction and acoustics of the Pacbitun aerophones. Finally, a discussion is offered about the function of, and likely roles played by, music in ancient Maya society.

Introduction

Archaeomusicologists have observed that the ancient Maya of Central America manufactured a range of sophisticated musical instruments. The majority of early, sound-producing, Maya instruments which have survived in the archaeological record were made of fired clay, with some bone, shell and even copper examples (Hammond 1972a, 1972b). There were, undoubtedly, other types of musical instruments made by the early Maya from more perishable materials, like gourds or wood, which scholars have identified, more tentatively, based on scenes of Maya musicians with instruments painted on frescoes and vases (Miller 1986, 1988; Reents-Budet 1994) and on modeled figurines of musicians (Miller 1975). The exact role and societal function of these instruments has been debated widely by Mayanists. There are indications that they were used in Maya rituals, as accompaniment to dances, spectacles, celebrations, and warfare. The frescoes at Bonampak are the only representations of complete musical ensembles and the contexts of their performance have been much debated. Recent (2010) excavations at the ancient Maya site of Pacbitun (Fig. 1) have produced a dozen additional ceramic instruments, complementing the unusual assemblage uncovered at the site in the 1980s (Cheong 2011, 2012a, 2012b, 2013; Cheong et al. 2011, 2013; Cheong and Snetsinger 2012; Healy 1988; Healy et al. 2004a, 2008; Powis 2011, 2012). This paper, following a brief introduction to the ancient Maya and their music, focuses on the past and recent discoveries of ceramic musical instruments from the site of Pacbitun, with analyses of production, construction, acoustics, roles and possible meaning.

The Site of Pacbitun

The ancient Maya site of Pacbitun was a medium-sized, civic-ceremonial center located in the Cayo District of west-central Belize. This eastern Maya lowland site occupied the intersection of two ecological zones, specifically the upland pine ridge of the Maya Mountains and the lowland tropical rainforest of the Belize River Valley. It has been hypothesized that the founders of Pacbitun chose this advantageous location to allow them the diversity in exploitable resources from these two contrasting ecological zones (Campbell-Trithart 1990; Healy 1990b). The epicenter, or central precinct, of Pacbitun was constructed on an east-west orientation, atop a limestone knoll, at an elevation of approximately 240 m above sea level (Bill 1987:23; Healy 1990b:247). Evidence shows that the site epicenter was first...

The settlement of Pacbitun can be divided into three concentric circles with the epicenter or central precinct (0.5 sq km) being the central focal point, surrounded by the core zone (one sq km) and, finally, the periphery zone (covering about nine sq km) (Healy et al. 2007:17). The epicenter is comprised of 41 major masonry constructions, which functioned as Paabitun’s religious and political base (Healy 1988:28, 1990a:109, 1990b:247, 1992:229; Healy et al. 2004b:208, 2007:18, 2008:24; Helmke 2006:70; Hohmann 2002:79; Wagner 2009:36). This was likely restricted to the elite class, with few exceptions as it was the home of the site royalty and the administrative complex of the site.

The Eastern Court of Pacbitun is a plaza located directly behind Structure 1 and Plaza A, the main plaza, on the northeastern sector of the epicenter. The Eastern Court, Plaza A, and the E-Group complex at the site occupy the highest ground at the site, while the remainder of the Epicenter is located at least six meters lower. The plaza floors of both the Eastern Court and

Figure 2. Map showing the location of the North Group and Eastern Court at Pacbitun (modified from Healy 1990b:250).
that of Plaza A exhibit stark similarity in their construction sequences, ceramic chronology and even the thickness and construction material used (Cheong 2013). These resemblances indicate that both were built up concurrently throughout the occupation of the site. This meant that both loci were important for the epicenter inhabitants, Plaza A clearly more important, with stelae, altars, and temple pyramids. The Eastern Court is bounded by the back side of Structures 1, 4, and 5 on the west, the North Group to the north, and Structures 11, 41, and the entrance to the Mai Causeway, on the east (Healy 1990b:251).

Archaeological investigation at Pacbitun in recent years has been refocused on the site epicenter (Powis 2009, 2010, 2011, 2012, 2013) and the North Group (Cheong 2013) is of interest in regard to the most recent discovery of ceramic musical instruments. The North Group is situated on top of the Eastern Court’s Tzul phase Early Classic period (A.D. 300-550) floors (Cheong 2013). It consists of a restricted access courtyard created by Structures 34, 35, 36, 37, and 40 along with Structures 38 and 39 (Figure 3). This plazuela likely functioned as a residential group for an extended family of secondary elites who were related, by some unspecified degree, to the ruling elite of the site. This suggestion is based on the red-painted plastering of some structures, similarity in mortuary furniture and practice, the relative abundance of exotic remains and the elaborateness of their caching practices (Cheong 2013:101-111). The vertical drop beyond the North Group, off the Eastern Court, is as much as six meters, leading to a relatively flat area with the site’s water reservoir located 20 meters north of the North Group. This location next to the site’s main water source allowed the inhabitants of the North Group to have good access and might indicate that they were among the earliest group to settle at Pacbitun. The recovery of ceramic musical instruments from EC-Burial-2 indicate that the inhabitants of the North Group participated in the activities and/or maintenance of Plaza A, where processions and ritual ceremonies were performed. Procession and ritual ceremonies entailed musicians and their instruments, as music and pageantry would have enhanced the performance of the ruling elite. This assertion will be discuss further later in this paper. Excavations of the North Group were conducted in June, 2010, by the senior author (Cheong 2011, 2012a, 2012b, 2013; Cheong et al. 2011, 2013).

Musical Instruments from Pacbitun

Excavations in 1986 and 1987 at the Maya center of Pacbitun, located in the upper Belize River Valley, produced 16 well preserved ceramic instruments. All were recovered from elite or royal burials from Structures I and 2 on Plaza A (Healy 1988). These have been dated, by context and associated artifacts, to the Tzib phase of the Late Classic period (AD 700 – 900).

Burial 1-1 was a Late Classic period cist grave of an elite woman, likely between the age of 20-40 years (Healy 1988:29; Healy et al. 2008:24). She was buried with a rich
assemblage of ceramic, lithic, and shell artifacts. These included a necklace of 2500 shell beads, a jade bead, a pottery hand drum, and a ceramic red painted, composite, flute-and-rattle instrument measuring 16.8 cm long (Fig. 3c) (Healy 1988:29; Healy et al. 2008:24).

Burial 2-1 was also a Late Classic period cist grave of a woman (Healy et al. 2008:25). She was buried with more than 20 finely painted vessels, carved jade jewelry (including a human head pendant), a large chipped ceremonial flint blade (36 cm long), five ceramic, tubular air spring flutes (Fig. 3a), eight anthropomorphic and zoomorphic effigy ocarinas (Fig. 3b), and a blue painted, composite flute-and-rattle instrument (Healy 1988:29-30; Healy et al. 2008:25). A similar air spring flute is known from Xunantunich to the northwest of Pacbitun (Pendergast and Graham 1981:17, 19).

Burial 1-9 was an elaborate, vaulted, masonry tomb in Structure 1, with the remains of an adult male (Healy et al. 2004a, 2008:27). This individual was buried with 18 ceramic vessels, jade and pyrite jewelry, a slate-back
mosaic mirror, imported marine shell ornaments, and a set of five bone tubes, probably a set of tuned, single-note bone whistles, graduated in length from 7 to 15 cm long (Fig. 3d) (Healy et al. 2008:27-28). Similar bone tubes have been found at sites like Zaculeu, Altar de Sacrificios, Piedras Negras and Holmul (Healy et al. 2008:27).

Renewed excavations at Pacbitun, in 2010 (Cheong 2011, 2012b; Powis 2011), unearthed an additional 12 ceramic instruments in the form of effigy ocarinas and small whistles (Fig. 4) (Cheong 2011:25, 2013). These were found in a sub-elite burial, EC-Burial 2 (Fig. 5), in the North Group of the Eastern Court (EC) in the Epicenter of Pacbitun (Cheong 2011:29:30, 2012b). The individual interred appears to have had special ties to the royal court of Pacbitun (Cheong 2011:45, 2013). The individual was buried in a supine position with the head to the south and the legs extended toward the north, which is a practice typical of the Belize Valley (Robertson 2010: 168-169; Welsh 1988:52, 55). The remains of the individual were badly preserved (Cheong 2011, 2012b, 2013; Cheong and Snetsinger 2012; Cheong et al. 2011). However, based on analysis of fragmentary bone and partial dentition, it is likely that the individual was an adult of undetermined sex. It is quite possible that the instruments were positioned adjacent to the cranium of the individual in EC-Burial 2.

The instruments all have an impressed front, while the air chambers appear to have been hand-modeled; all date to the Tzib phase of the Late Classic period (AD 700 – 900) (Cheong 2011:117; 2013). A double whistle (Fig. 4d and 6g), once painted blue, has two elongated tubular chambers, each with one fingerhole. The top part of this double whistle has a vertical
molded image of a male individual with a headdress composed of long (quetzal?) feathers. Free-standing appliquéd legs were attached. It measures 8.2 cm tall, 5.6 cm wide and 11.5 cm long. Another instrument, an ocarina (Fig. 4a), found incomplete, represents a standing male figure with a cloth headdress and wearing a robe. It was once painted blue. There were two fingerholes on the back.

The assemblage of small, individual aerophones consists of eight seated human figures (Fig. 4e-i and 6a-f). Each figure has an open mouth, with the left arm placed on the hip and right arm to the side. The figures are long-haired and adorned with large, round earspools. A wristlet is depicted on the left arm of these seated figures. The measurements for these whistles are 5.2 cm tall and 3.9 cm wide. Traces of blue paint remain on some of the whistles. Seven of the eight whistles are complete, or have been reconstructed, while one is incomplete. Five of these complete whistles are still playable and produce sound with varying degrees of loudness depending on how hard they are blown (Cheong 2012a, 2013; Cheong et al. 2013). The question arose as to whether these might have formed a tuned set. Distributed one-note instruments are known from elsewhere in the Americas but, so far, no parallel has been reported from any Maya site.

All eight of these seated figure whistles, interestingly, appear to have been impressed from the same mold and are identical in every aspect, except for their progressively diminishing detail. In other words, the first whistle figure made from the mold has the sharpest detail, while subsequent ones, from that same mold, are less refined due to residual clay
embedded in the features of the mold, causing a blurring of detail. Thus, the eight figure whistles can be placed into a production sequence from the first, most exact example, to the last, least detailed example. It appears that an assembly line sequence can be observed.

A slightly larger ocarina, measuring 10.2 cm tall and 5.5 cm wide, depicts a so-called “grotesque figure” also originally painted blue (Fig. 4b and 7). According to Willey (1972:52), the features of this type of ocarina are categorized as grotesque because of the fat face, deep set eyes, and bared upper front teeth, which give it an overall ferocious appearance. While it may be labeled grotesque, the figure is also well dressed and seems to be wearing a headdress with short, feline (or bat-like?) ears at the top of the head. Its overall appearance resembles one of the Ewok characters from the Hollywood movie Star Wars Episode VI: Return of the Jedi. This grotesque ocarina has two stops located in the back, from which a range of tones can be produced. Although reconstructed, there were some body pieces missing, resulting in gaps in the resonating chamber. As such, this ocarina is no longer functional.

The most intriguing ceramic instrument from this burial was in the form of a jaguar, with a prominent snout (Fig. 4c and 8). It measures 19 cm tall and 14 cm wide. This is an ocarina with two finger holes on its side, making it capable of producing multiple notes. It was also once painted blue and was mold made. The hollow box, on which the figure wearing the jaguar headdress is seated, forms the ocarina portion of the instrument. The jaguar figure, although also hollow, does not have any ducts connecting to the box where the mouthpiece is attached. However, it is speculated that this flat snout, jaguar figure could have once held clay balls or small stones, making it (then) into a composite ocarina and rattle hybrid.

Similar artifacts have been found elsewhere at Altar de Sacrificios, San Jose and
Tikal (Halperin 2007:284, Fig 8.18; (Thompson 1939: 212, plate 23 a and c; Willey 1972:53). A virtually identical ocarina (Fig. 9) was excavated by Eric Thompson from the site of San Jose, Belize. Found in the 1930s, it might well have been impressed from the same mold, if not made in the same instrument workshop (Thompson 1939: 212, plate 23 a and c). Almost every detail, even what appear to be “flaws” in the mold, can be seen on both the Pacbitun and San Jose specimens. Both were found in burial contexts. Thompson (1939:212) dated the instrument to San Jose IV and early San Jose V, which correlates to the early Spanish Lookout phase of Barton Ramie, Tepeu 2 and 3 of Uaxactun (Willey et al. 1965:26), and the Tzib phase at Pacbitun, all in the Late Classic period (AD 700 – 900).

Willey observed that the figure in the back, below the jaguar figure, is actually seated on a throne (Willey 1972:53). In the center of this throne (or vertical panel) is an Ajaw sign, which surely emphasizes the importance of the function of this object. Similar figures seated on a throne with the Ajaw glyph have been recovered from the sites of Altar de Sacrificios (Willey 1972:53) and San Jose (Thompson 1939: 212, plate 23 a and c). These were dated to the Chixoy, Boca, and Jimba phases of the Late to Terminal Classic period (AD 700 – 900) (Willey 1972: xiv, 53).

Production Origin and Petrography Analysis

Preliminary petrography analysis of the clays used to produce a selection of these Pacbitun musical instruments was recently conducted. The pastes of the seated figure whistle, the grotesque figure ocarina, and the jaguar figure ocarina-rattle hybrid were analyzed. The fabrics (Fig 10) of both the seated figure (Fig. 4i) and the grotesque figure (Fig. 4b) can be characterized as a micaceous clay containing abundant silt-sized inclusions of mica, a smaller quantity of silt-sized to fine-sand-sized inclusions of quartz, slate and feldspar, and very rare fragments of finely crystalline calcite, tempered with mudstone. In contrast to the slate fragments that occur naturally in the clay (these contain silt-sized minerals), the mudstone fragments are nearly exclusively comprised of clay-sized minerals.

Identification of the mudstone fragments as a tempering material that was intentionally added to the clay by the potter is based on the bimodal size distribution of inclusions, with all inclusions larger than the size of fine sand being nearly exclusively mudstone, their uneven distribution across the thin section, and their angularity. The mudstone inclusions are angular to subangular whereas the mineral and rock inclusions that occurred naturally in the clay are subrounded to rounded. The occurrence of both the slate fragments in the clay and the mudstone temper, link this fabric broadly to the Santa Rosa Group formation, which outcrops throughout the Maya Mountains region. However, outcrops of slate do occur within five km of Pacbitun. In fact, the fragments of slate that occur in these fabrics are consistent with the slate ‘cobbles’ found in the soil in the vicinity of the site. A local provenance or origin of manufacture is
suggested by not only by the occurrence of the slate in the clay, but also by the general mineralogy of the clay component. This is consistent with a Mountain Pine Ridge, igneous rock parentage and the presence of finely crystalline calcite in the clay which derives from limestone. Pacbitun itself occurs on a limestone plain and so the mineralogy of these instruments is also consistent with the local geology.

The fabric of the jaguar ocarina-rattle hybrid (Fig. 8) exhibit traits that were clearly not produced at Pacbitun. This fabric (Fig. 10) can be characterized as sandy-textured clay containing abundant angular to subrounded inclusions of biotite and plagioclase feldspar, and a smaller quantity of quartz, amphibole, pyroxene and metamorphic rock fragments, tempered with crushed volcanoclastic material. At least some of the volcanoclastic material appears to be what would be considered “fresh ash”, as indicated by the abundant and very angular lunate and sickle-shaped volcanic glass fragments typical of ash fall deposits. However, the fabric also contains an abundance of welded tuff, which exhibits the typical internal structure of ‘compacted’ or ‘collapsed’ glass fragments and pumice (ash foam). The fragments of tuff are also very angular, suggesting they derive from a freshly crushed parent rock.

The metamorphic rock component of this fabric, the presence of a considerable amount of amphibole and pyroxene and the rarity of microcline, the type of feldspar that is dominant in igneous rocks of the Mountain Pine Ridge area. All indicate a non-local provenance or origin of manufacture for this instrument. Taken
together with the nature and abundance of the volcanoclastic component, the geological characteristics of the fabric suggest a source area associated with volcanic rock formations that occur in western Guatemala.

Based on this preliminary analysis, the fabrics of the small seated figure whistles, and the grotesque figure whistle, both were produced from local clays, while the jaguar ocarina-rattle hybrid was made from an entirely different, non-local paste. It is significant that both of these local and non-local fabric types from Pacbitun are inconsistent with the descriptions of the three whistle figurine fabrics reported by Anna Shepard for the site of San Jose (Thompson 1939), as well as with the paste descriptions reported for the large wind instrument assemblage recovered at Lubaantun (Hammond 1975). Therefore, the petrographic study has not only identified Pacbitun as a ceramic musical instrument production locality but also identified an additional production locality situated at a considerable distance from Pacbitun. This demonstrates that although ceramic musical instruments are produced locally at Pacbitun, some instruments were traded in from long distances away. A more detailed report on the petrography is in preparation, but it is clear now that most of the instruments from Pacbitun were locally manufactured.

Acoustics Analysis

The Maya today, and almost certainly in the past, used a pentatonic scale, where there are five notes to the octave. Ethnographic evidence suggests that they used partial finger-hole coverings to “bend” the notes, which was probably used to ornament the music and imitate natural sounds, such as birdsong. The functional instruments were all blown using a similar air pressure and the sounds recorded on a Zoom digital recorder. The resultant .wav files were then replayed against a music synthesis program, in this case, Sibelius. All of the seated figure whistles and the double-whistle give a note which is two octaves above middle C. It is unlikely that the whistles were tuned to a specific pitch and clear that they did not form part of a tuned set. A more detailed study of the acoustic range of the Pacbitun instruments is in progress.

The Role and Function of Maya Music

The major problem in the reconstruction of the musical practice of the ancient Maya is that none of the instruments found in excavations, or depicted, are played by any modern Maya group. Moreover, no modern Maya have social and political structure which approximate to those of the past. Hence it is extremely difficult to use ethnographic practice to interpret ancient Maya music. It is however likely that some features of musical construction are similar, even where the instruments are different. Maya music was almost certainly heterophonic (meaning all performers played the same tune with rhythmic and melodic variation). It was probably based on a rhythmic pulse, rather than a fixed number of beats to the bar, as in Western music.

Today, music serves primarily as a form of entertainment, though this is a recent development, even in European culture. Miller (1988:318) describes the musicians depicted at Bonampak as a “band” or troupe of Maya musicians. This is likely but not certain as many iconographic representations in Europe put together musicians who would not normally play together for symbolic purposes. It is the case that Maya music will have been primarily ceremonial, underlying the functioning of the court, and ritual, intended to accompany religious ceremonies, and possibly with links between individual melodies and the purpose of the ceremony.

Most probably, music was played in ritual performances to entertain and appease the gods. Processions also were an important part of life among the early Maya, especially those performed by (and for) the ruling elite. These may have been public spectacles, performed for site rulers, their deities, and perhaps for the general public. We also know that “elite residences contained numerous musical instruments… suggesting that these political elites engaged in musical performances on various occasions” (Inomata 2006:207-221). Indeed, the growing data from Aguateca (Guatemala) suggests that not only were elites engaged with musical instruments, but it is possible that even rulers may have played instruments in central roles of performances and mass spectacles. The quality of ritual practice
was very important because, according to Dirks (1992:219-220), ceremony was (and is) an arena for the construction of power and, also, a site for the struggle between authority and counterclaims.

Although there is no evidence from mural paintings or depictions on painted vases that women played musical instruments, this cannot be excluded. The discovery of ceramic musical instruments excavated from the domestic space of women at the site of Aguateca, Guatemala (Stockli 2007:24-25, 28-29), for example, and also from burials of two aristocratic women at Pacbitun, suggests a role and connection with woman as well as men.

Elaborate terracotta whistles and ocarinas are so common throughout the Maya subarea, and are so strongly associated with high status burials, that it must be the case that the images represented had some iconic or spiritual symbolism. Based on painted vases, fresco-covered wall murals, and stone carvings, we know that music was an integral part of Maya processions. Sanchez (2007:36-39) has identified at least four types of processions which the early Maya performed, and all have some form of musical accompaniment: 1) calendrical processions; 2) military processions; 3) political processions; and 4) supernatural processions.

In the Maya public sphere, musical instruments were probably employed in celebratory occasions, festivities, dances and performances. A surviving Maya play, Xapoj Tun, better known as Rabinal-Achi, is one such performance. It is performed today with accompanying music produced by Pre-Columbian musical instruments, like a trumpet and slit-gong or tun (Yurchenco 1985:48). A slit-gong or slit drum is usually referred to as a teponaztli in the ethnomusicological literature. All modern performances are re-inventions of archaeological finds, as slit-drums did not survive in ethnographic practice in Mesoamerica. A tun is a hollowed out log, with two tongues, played with two rubber-tipped drumsticks (Yurchenco 1985:48).

Conclusion

In conclusion, musical instruments from the site of Pacbitun provide a glimpse of the musical practices of its ancient Maya inhabitants. Like all societies, the ancient Maya had their own musical arts, similar to other complex societies of Mesoamerica and South America, in terms of variety of musical instruments, technology, and knowledge of production. The early Maya created musical instruments capable of refined tuning. Their knowledge of acoustics, and of the harmonic series, is illustrated by the precision of the interior construction of the ceramic flutes and ocarinas. But we have no clear evidence for their actual music. Today, throughout the Maya world, European-type instruments have completely replaced the indigenous instruments of antiquity. The best evidence that we have for the music of the early Maya is probably among the refugee groups, such as the Lacandon and, unfortunately, their music has not been studied in any detail.

The early Maya likely used music for social and ceremonial purposes, as well as for entertainment and personal enjoyment. Evidence from Aguateca, hints that women and children also played musical instruments and that these were not reserved only for the ruling elites, or employed only by males. Finally, there is a much more to be discovered about the ancient Maya and their music. Information about Maya music is dispersed across various literatures, and should be consolidated and synthesized, so that we have a more complete understanding. The new information from Pacbitun contributes to this evolving database about ancient Maya music.

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References Cited

Bill, Cassandra R.

Campbell-Trithart, M. J.

Cheong, Kong F.


Cheong, Kong F. and Andrew Snetsinger

Cheong, Kong F., Terry G. Powis, Paul F. Healy and Roger Blench

Cheong, Kong, Terry G. Powis, and Paul F. Healy
2011 Music and the Maya: Late Classic Ocarinas and Flutes from Pacbitun, Belize. Paper presented at the 76th annual meeting of the Society for American Archaeology, Sacramento, CA.

Dirks, Nicolas B.

Halperin, Christina T.

Hammond, Norman


Healy, Paul F.


1994b The Ancient Maya Center of Pacbitun. In The Ancient Maya of the Belize Valley: Half a Century

Healy, Paul F., Christophe G.B. Helmke, Jaime J. Awe, and Kay S. Sunahara

Healy, Paul F., Vanessa Rodens, and Pamela J.A. Downe

Helmke, Christophe G.B., Nikolai Grube, Jaime J. Awe, and Paul F. Healy

Hohmann, Bobbi M.

Inomata, Takeshi

Miller, Mary E.


Miller, Mary E. (editor)

Pendergast, David and Elizabeth Graham

Powis, Terry G.


Reents-Budet, Dorie
1994 Painting the Maya Universe: Royal Ceramics of the Classic Period. Duke University Press, Durham, NC.

Robertson, Catriona M.

Sanchez, Julia L. J.

Shook, Edwin M.

Stockli, Matthias

Thompson, J. Eric S.

Wagner, Teresa B.
Welsh, W.B.M.  

White, Christine D., Paul F. Healy, and Henry P. Schwarz  

Willey, Gordon R.  
1972  The Artifacts of Altar de Sacrificios. Papers of the Peabody Museum of Archaeology and Ethnology, 64(1). Harvard University, Cambridge, MA.

Yurchenco, Henrietta  
Plan of lower Burns Avenue showing location of Special Deposits
Excavation on Burns Avenue by Utility Company

Ceramic vessels uncovered in trench on Burns Avenue
CAHAL PECH MAYA OF BURNS AVENUE: A REPORT OF SALVAGE EXCAVATIONS IN SAN IGNACIO TOWN, BELIZE

Jaime J. Awe, Josue Ramos, Antonio Beardall, Gonzalo Pleitez and Sylvia Batty

During the excavation of two trenches, for storm drainage and utility lines, down the center of Burns Avenue, construction workers unearthed four ceramic jars more than a meter below the surface of the modern road. Subsequent salvage excavations by Institute of Archaeology personnel recovered more than a dozen other ceramic vessels and a variety of cultural remains. This paper presents the data recorded by our Burns Avenue salvage operation, and examines the significance of these materials within the context of the Cahal Pech polity.

Introduction

On the 15 January 2012, the Institute of Archaeology received information that “some pots” had been discovered by a construction crew working in downtown San Ignacio. The construction team was in the process of excavating two long trenches down the center of Burns Avenue as part of infrastructural works associated with a downtown rehabilitation and beautification project under the auspices of the Ministry of Tourism and Culture. When the senior author visited the construction site, he confirmed that the ceramic vessels were of prehistoric Maya manufacture, and that the mostly destroyed context of discovery was likely an ancient Maya house platform. Taking into consideration that the trenches would extend another 80 meters southward, an agreement was made with the contractor for Institute of Archaeology personnel to monitor the rest of the excavation, and to be on hand to salvage any other remains of cultural significance that were exposed by the construction crew. This paper presents the results of our salvage operations, and provides an interpretation of the data recovered along the southern section of lower Burns Avenue in San Ignacio Town.

Investigations

Our salvage operations on Burns Avenue lasted 10 weeks. During that time, we supervised and monitored the excavation of two trenches that would serve as the location for storm drainage and for utility lines through the main thoroughfare and business district of San Ignacio Town (Fig. 1). The first trench (Trench 1) was excavated along the center of the road. It measured 83 meters from north to south, 1.80 meters wide and descended to 1.95 meters at its deepest point. This trench began from in front of the Serendib Restaurant and terminated in front of the Belmoral Hotel (Fig. 2). The second trench (Trench 2) was excavated along the western side of the road and extended 80 meters north south, by 1.24 meters wide and to an average depth of 1.3 meters. Trench 2 began from in front of Mr. Greedy’s Pizzeria and ended at the southeast corner of Shivam Store (Fig. 2).

Within the two 80-plus meter trenches, we identified and investigated 12 loci with cultural remains. These are listed in alphabetical order, from A to L, and their locations along the road are noted in Figure 2. Four of the loci (F, I, J, K) with special deposits were recorded in Trench 1, and the other eight (A, B, C, D, E, G, H, L) were in Trench 2. Below we describe the deposits in the order of their discovery (A to L).

Description of Special Deposits

The locations of Special Deposits A and B are an approximation as the cultural remains in these deposits were provided to us after they had been extracted from their original contexts by the construction crew. Special Deposits A and B each contained two jars that were recovered within Trench 2, just in front of the Tropicool Hotel. The first jar from Deposit A is slipped red and has fire clouding along the shoulder of the vessel (Fig. 3). Other decorations include four concentric, pre-slipped, incised lines, and one wavy line along the neck and shoulder of the vessel. The second jar (Fig. 4) is unslipped, but highly burnished, and has what appears to be a thin brown wash over the vessel exterior. Vessel 2 is also decorated with a horizontal line of...
gouges along the neck, and four vertical sets of
gouges spaced evenly around the body. The
form and decoration of Vessel 1 share
considerable affinity with Starkey Hill Incised
pottery from Barton Ramie (see Willey et al.
1965 Fig. 194c, e; Gifford 1976:104-105, Fig.
44n-p) while Vessel 2 is similar, in form and
decoration, to Sapote Striated (Gifford
1976:105-107, Figs. 45-46). The jars in Special
Deposit B include a vessel (Fig. 5a) with similar
decorations to the Starkey Hill Incised jar found
in Special Deposit A, and a second, unslipped,
striated and gouged-incised jar (Fig. 5b) that we
also identified as Sapote Striated. These
parallels suggest that the vessels from both
deposits can be assigned to the Late Preclassic
Barton Creek phase in the Belize Valley ceramic
sequence (Gifford 1976).

Special Deposit C was found in Trench 2
and contained a fragmented, red-slipped, bowl
with a bolstered rim and a pre-slipped groove
encircling the interior of the vessel (Fig. 6a-b).
The bowl is similar, in both form and decoration,
to Laguna Verde Incised vessels at Cahal Pech
(Awe 1992), Barton Ramie (Willey et al. 1965;
and Gifford 1976) and Caracol (Chase and
Chase 2006:45; Fig. 4b). Other Late Preclassic
parallels exist with a Laguna Verde Incised:
Grooved-incised Variety vessel reported at
Seibal by Sabloff (1975:85; Fig. 144).

Special Deposit D was discovered in
Trench 2, just in front of the J & D Variety store.
The deposit consisted of a ceramic cache
containing nine bowls aligned in an east-west
pattern (Fig.7). Small flecks of limestone in the
sandy loam matrix above the vessels indicated
that the cache had been placed just below the
floor of a building platform. The six vessels on
the west side of the deposit were arranged in lip
to lip fashion, while the three on the east were
placed upside down. The number of vessels
(N=9) in the cache clearly reflect an association
with underworld myths and ideology. The nine
bowls are all unslipped and have fire-clouding
on the exterior and interior of the vessels. The
form and paste of the vessels also share
similarities with Early Classic, Hewlett Bank
Unslipped, pottery from the Hermitage Phase at
Figure 2. Plan of lower Burns Avenue showing location of Special Deposits.
Figures 3a-b. Special Deposit A: Starkey Hill Incised jar.

Figures 4a-b. Special Deposit A: Sapote Striated jar.

Figures 5a-b. Special Deposit B: Starkey Hill Incised jar.
Figures 6a-b. Special Deposit C: Laguna Verde Incised vessel.

Figures 7. Special Deposit D: Cache with Nine Hewlett Bank Unslipped bowls.

Barton Ramie (Gifford 1976:190-191; Fig. 108). While this may be true, however, it is important to note that slipped and unslipped bowls like these have a long history of use in lip-to-lip caches in western Belize. At Cahal Pech, they first show up in Preclassic contexts and continue to be used, with little or no modification, into the Late Classic period. This same pattern has been recorded at Caracol (Chase and Chase 2006:49-51, see S.D. C8-B3; and Chase and Chase 2010:6) and at Altun Ha (Pendergast 1990: Figs. 2e and 19a). Given the Late Preclassic date of
most of the Burns Avenue remains, it is therefore likely that the vessels from Special Deposit D may be coeval in date.

Special Deposits E and F were discovered in Trench 2 and 1 respectively. The former deposit contained a cluster of rocks and the latter had a cluster of ceramic sherds. The cluster of rocks in Special Deposit E had an east west orientation, it averaged about .50 meters in width, and extended beyond the eastern and western sides of Trench 2. It is possible that this feature may have been associated with a house platform or, alternatively, could have been associated with more modern construction in the area. Diagnostic pottery within the cluster of sherds in Special Deposit F included several small fragments of Savana Orange, Sierra Red, Laguna Verde Incised, and Chan Pond Unslipped, plus a large fragment of a Sapote Striated jar with strap handles (Fig.8).

Special Deposit G contained human remains that were likely associated with two burials. Unfortunately, most of the original grave was destroyed by the backhoe and only the lower torso of the individual in Burial 2 (Fig.9) was excavated in situ. All the preserved remains of the first individual were retrieved while screening dirt scooped up by the excavator’s (backhoe) bucket. The human remains from Burial 1 also came from a higher elevation than Burial 2, indicating that Burial 1 likely postdated Burial 2, or that it was interred shortly after Burial 1 was deposited in the ground. Skeletal remains associated with Burial 1 included fragments of the crania, a humerus and several meta-carpals. Due to the limited number of skeletal remains, the sex of the individual in Burial 1 was impossible to determine. The size of the humerus, however, suggests that the individual was an adult.

Burial 2 was located in Trench 2, approximately 1.3 meters below road surface. Like Burial 1, Burial 2 had been mostly destroyed by the backhoe. The only remains that were found in situ were those of the lower legs, some fingers, and fragments of the pelvis (Fig. 9). In spite of this condition, the position of the bones clearly indicated that the body had been laid in a flexed position with feet to the south and hands between the legs. The actual preserved remains included the femurs, tibias, fibulas, tarsals and meta-tarsals of an adult individual. Because of the missing elements of the skeleton, sex could not be identified, but the size of the humeri indicated adult age. A few rocks, below the feet and along the lower legs of the individual suggest the possibility that the grave had been encircled by a line of small stones. Just north of the bones, we recovered a few potsherds, some shells of freshwater snails (*jute or Pachychilus sp.*), a fragment of a *mano*, plus an antler (Fig. 10a) and a partial deer cranium with some teeth.

Two characteristics of the Burns Avenue burial were particularly peculiar, the flexed position of the skeletal remains and the orientation of the bones. Flexed burials are atypical for Preclassic and Classic period times in the Belize Valley (Awe 2013:34, Freiwald 2011) and generally do not appear until

Figure 8. Special Deposit F: Sapote Striated jar.

Figure 9. Special Deposit G: Burial 2.
Postclassic times (Hoggarth 2012; Hogarth et al. in press). Head oriented to the south is also the standard orientation for Belize Valley burials, and this is true from Preclassic times to the Terminal Classic period. Given the consistent, long-term, pattern of burial orientation and position at Cahal Pech and the Belize River valley, the only feasible explanation for the atypical orientation of the Burns Avenue burial is that it represents an intrusive Postclassic interment. This possibility is further suggested by the fact that potsherds recovered around the burial included fragments of both Late Preclassic (Starkey Hill Incised (Fig. 10b) and Postclassic types (Agustine Red).

Special Deposit H included four ceramic bowls that were located just in front of Flayvas Bar and Grill Restaurant. The vessels were located at 1.4 meters below road surface and had been deposited in lip to lip fashion (Fig. 11). All four vessels were unslipped with a reddish brown paste, and had fire clouding on the interior and exterior. The bases of the vessels were rounded, and they had an average height of 12 cm and an average diameter at rim of 17 cm. In form, colour, paste and size, the vessels were identical to those discovered in Special Deposit D.

Special Deposits I, J and K all consisted of ceramic sherd clusters. The first two deposits were both found in Trench 1, at an average 1.4 meters below road surface. The ceramics in these deposits consisted predominantly of Late Preclassic pottery, with a few pieces dating to the Middle Preclassic period (Fig.12a-c). Diagnostic ceramic types included Sierra Red, Laguna Verde Incised, Sapote Striated and Savana Orangbe. In contrast to Special Deposits I and J, Special Deposit K was also located in Trench 1, about 30 cm below the surface of the road. The pottery in this deposit was poorly preserved and the most diagnostic fragment was a scroll foot from an Agustine Red vessel (Fig.12d) and a fragment of either an anthropomorphic figurine or censer. The possible figurine or censer fragment consisted of the lower face of a human effigy (Fig. 13a-b). The chin is rounded, it has an open mouth, and an aquiline nose with large nostrils. The figurine is not slipped and the paste has a bright orange red colour. Comparisons with similar
Figures 12a-c. Ceramics found in Special Deposits I and J (a-b. Laguna Verde Incised; c. Savana Orange).

Figure 12d. Ceramics found in Special Deposits I and J: Agustine Red.

materials from other sites strongly suggest that the fragment more likely represents part of a vessel that was similar to Chen Mul Modeled effigy censers like those found at Lamanai (Pendergast 1981, Figs. 20 and 27) and Tipu (Graham 1987) and which were common during Late Postclassic times at Mayapan (Milbrath and Peraza Lope 2013:203-228).

Special Deposit L is technically a feature rather than a special deposit. The feature consisted of a retaining wall that extended east to west across the entire width of Burns Avenue. The wall (Fig. 14) was built of roughly shaped limestone blocks that were two courses (and 30 cm) high. Above the low retaining wall was a thin layer of ballast. These features suggest that the wall may have been associated with a building platform that was capped by a plastered floor. Adjacent to the wall, we discovered a concentration of shells of fresh water snails, an obsidian blade and blade fragments, flecks of charcoal, plus a number of potsherds (Fig. 15 a-b).

Figures 13a-b. Late Postclassic effigy head from Special Deposit K.

Stratigraphy
The excavations in the area where Special Deposit L was located provides one of the best locations for examining the stratigraphic sequence in which the Burns Avenue deposits were located (Figure 14). The first 20 cm
represents both the surface and foundation of the modern road surface. The strata below the road is almost 80 cm thick and consists of a dense sandy loam deposit, with a few small and worn fragments of ceramics. Although we did not conduct any micro-stratigraphic analysis, the texture of the sandy loam deposit, and the worn nature of the potsherds, suggest that they were deposited in the area by alluvial activity. Beneath the sandy loam, at approximately 100 to 150 cm, is where the majority of Late Preclassic deposits were located. This includes the building platform and all the cache deposits containing the whole ceramic vessels. The only exceptions to this pattern were Burials 1 and 2, but both these deposits appear to have been intrusive features that were introduced into an earlier context.

**Discussion**

The discovery of more than 20 whole and partially complete ceramic vessels, many of them in cached deposits along an 80 meter long stretch of Burns Avenue, suggests the presence of several ancient Maya buildings below the surface of the modern road. Given the fact that
many of these Burns Avenue vessels are identical to pottery from the Barton Creek Phase at Barton Ramie, and from the Cahal Pech site core, also indicate that most, if not all, the buildings were of Late Preclassic date. Sometime toward the end of the Preclassic (A.D. 200-300), it appears that there may have been one, or more, major floods that completely inundated the small settlement, depositing almost a meter thick layer of alluvium over the buildings. Top floods that submerge the downtown section of San Ignacio are not uncommon, particularly during tropical depressions and major hurricanes. This was the case during Hurricane Hattie in 1961, during Hurricane Greta in 1978, and more recently during Hurricane Mitch.

The alluvium above the Late Preclassic settlement was almost devoid of cultural remains. The only exceptions to this situation are the two burials that were discovered in Special Deposit G, and a few ceramic objects that were recovered in Special Deposit K. In the case of the burials, it is almost certain that these interments were intrusive into Late Preclassic contexts. This interpretation is strongly supported by the atypical orientation and position of Burial 2, and by the presence of a couple fragments of Postclassic pottery next to the burials. In the case of the Postclassic effigy censer fragment, and the scroll foot, their discovery just below the modern road surface suggests that they could have been deposited there by alluvial activity. We know that just upriver from Cahal Pech, the site of Tipu flourished during the Late Postclassic period. Additional evidence for Postclassic activity has been reported in the vicinity of Tipu at Uchentzub Cave (Schmidt 1977). It is possible that the fragment of the effigy censer and the scroll foot may have been washed down from Postclassic settlements upriver and deposited in the present location of Burns Avenue. Alternatively, they could represent objects that were associated with a very ephemeral Postclassic settlement that may have been established in the area. If this was the case, however, modern construction in San Ignacio town has likely destroyed most of the evidence for such a settlement.

Finally, the fact that no Classic period remains were discovered over the Preclassic deposits strongly suggests that following the destruction of the Late Preclassic settlement, the inhabitants of the area abandoned the location for higher ground. This settlement pattern appears to have continued for the next several centuries of Maya occupation. Not until the establishment of modern San Ignacio Town, a little more than a century ago, was the area once again occupied and utilized for human habitation.

**Conclusion**

The discovery of the Burns Avenue settlement provides a unique example of a prehistoric community whose development was arrested in time, and it offers important caveats for future research in Belize and the Maya lowlands in general. In regards to the latter point, the Burns Avenue remains represent an excellent example of “hidden” contexts that generally escape archaeological attention. This is particularly relevant to those of us who work in a region where we customarily define settlements based on the presence of monumental architecture and above ground architectural features. In this case, the discovery of the Burns Avenue settlement provides a clear reminder that even landscape that appear to be bereft of archaeological features can actually contain important cultural remains. Heather McKillop’s (2002) work along the coast of southern Belize is another excellent example of this situation.

Secondly, the abandonment of the Burns Avenue settlement as a result of major floods provides a good example of the impact of natural forces on human settlements and cultural development. The drought hypothesis as a causal factor in the decline of Maya civilization, recently advanced by various researchers (Moyes et al. 2009; Kennet et al. 2012), is another excellent case in point. What these examples tell us is that, for agrarian societies such as the ancient Maya, too much water, or not enough of it, had serious implications for ancient farming societies.

Today, many of the cultural remains that we discovered below Burns Avenue are curated in the San Ignacio Welcome Center. The
exhibits were made possible through the wonderful support and cooperation of the Sustainable Tourism Project of the Ministry of Tourism and Culture, and with the assistance of the San Ignacio Town Council. Besides presenting visitors with a glimpse into the past, the exhibit and salvage project wonderfully demonstrate how developers and cultural heritage managers can work together in mutually beneficial ways.

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References Cited

Audet, Carolyn M.

Awe, Jaime J.


Chase, Arlen F. and Diane Z. Chase


Freiwald, Carolyn

Graham, Elizabeth


Hoggarth, Julie A.

Hoggarth, Julie A., Brendan J. Culleton, Jaime J. Awe and Douglas J. Kennett.


McKillop, Heather
Milbrath, Susan and Carlos Peraza Lope

Moyes, Holley, Jaime J. Awe, James Webster and George Brooks.

Pendergast, David, M.


Sabloff, Jeremy A.

Schmidt, Peter J.

Willey, Gordon R., William R. Bullard, Jr., James B. Glass, and James C. Gifford
REVEALING ARCHITECTURAL VARIABILITY AT CAHAL PECH: RECENT EXCAVATIONS AT PLAZA B

Nancy Peniche May

The ancient Maya center of Cahal Pech (Belize Valley) has one of the longest documented periods of occupation in the region: from the terminal Early Preclassic (1200 B.C.) to the Terminal Classic period (A.D. 900-1000). Extensive excavations at the site’s center and periphery, coupled with the recovery of sealed stratigraphic deposits, have allowed researchers to develop a good understanding of the ceramic sequence and some of the activities of the earliest inhabitants of the site. Yet, there is still a need to better understand the evolution and variability of the formative architecture at Cahal Pech. In an effort to address this question, the Belize Valley Archaeological Reconnaissance Project conducted a large block excavation in Plaza B during the 2012 field season. Information recorded by these investigations now allows us to reconstruct a complex architectural sequence that spans the entirety of the site’s occupational history. Together with data recovered by previous excavations, this provides significant insights on sociopolitical changes that took place at Cahal Pech during the earliest phases of occupation.

Introduction

Since the earliest days of Mesoamerican research, the imposing architectural structures manifestations built by the ancient Maya have drawn the attention of amateur and professional Mayanists. Archaeologists have acknowledged the wealth of information encoded in Maya buildings and have assessed their variability in aspects like scale, form, and spatial patterning to decipher the function of the buildings (Fernandez Souza 2010; Peniche May 2012), its role in the symbolic recreation of sacred geography (Garber and Awe 2008), and their sociocultural meaning, including its capacity for constructing and reproducing power dynamics (Awe 2008; Peniche May 2012). When architectural variability is examined temporally it can also provide insights on how these power dynamics changed. This aspect of architecture is particularly useful to investigate the emergence of complexity in the Maya area, which occurred during the Middle Preclassic period.

Cahal Pech in the Belize Valley is a case in point where the Middle Preclassic architectural variability can be investigated. Cahal Pech has a lengthy, continuous and well documented occupation that extends from the terminal Early Preclassic to the Terminal Classic period (1200BC-AD 1000). Horizontal and vertical excavations at the center and periphery of this site have allowed researchers to develop a good understanding of the ceramic sequence and some of the activities of the earliest inhabitants of this region. Yet, there is still a need to better understand the evolution and variability of the formative architecture in this site, in particular and the Belize Valley in general.

The goal of this paper is to describe the variability of the architectural manifestations at Plaza B of Cahal Pech throughout the Kanluk phase of the Middle Preclassic period (900-350BC), a particularly important time in many parts of the Maya Lowlands because it witnessed the transition from egalitarian to ranked societies. Understanding this variability will offer insights to the sociopolitical changes that took place at this site and the Belize Valley during the earliest phases of occupation.

2012 Excavations at Plaza B of Cahal Pech

Cahal Pech is a medium-sized Maya center that was strategically placed approximately 2km south of the convergence of the Macal and Mopan Rivers in the upper Belize Valley. The site core includes an acropolis located in the crest of a steep hill and covers approximately one hectare (Healy et al. 2004). Of the seven plazas that constitute the acropolis, Plaza B represents the largest plaza (approximately 50 x 30m) and the earliest place of architectural construction, built around 1200BC (Awe 1992; Cheetham 1996; Healy et al. 2004).

Because of these characteristics, several explorations have been conducted in the past three decades across Plaza B. In 1994 and 1995, David Cheetham placed several test pits across this plaza to test for evidence of settlement configuration and cultural complexity during the Preclassic period. These excavations yielded
interesting information on the presence or absence of architecture and other cultural materials during the earliest phases of occupation. In an effort to clarify the functional utilization and the architectural variability at the site core, a north-south trench (52 x 1 m) was excavated over six field seasons from 2004 to 2009 by James Garber and colleagues (2005, 2006, 2007, 2008, 2009, 2010). Several extensions were placed east and west of the main trench to further explore some exposed architectural features.

Cheetham’s (1996) and Garber’s et al. (2005, 2006, 2007, 2008, 2009, 2010) excavations have revealed an amazing sequence of Middle Preclassic buildings as well as associated features and ritual deposits. Despite these accomplishments, test pits and trenches were unable to fully assess architectural variability during the Kanluk phase (900-650 BC).

In an effort to obtain data to evaluate Kanluk-phase architectural development and variability, a large block excavation was placed in Plaza B during the 2012 field season of the Belize Valley Archaeological Reconnaissance project (BVAR). The excavation was located near the southeastern edge of Structure B-5 (on
the southern side of Plaza B). At the end of the season, a total area of 88m² was exposed, in which a complex architectural sequence spanning from Cunil phase (1200-900BC) to the Maxik phase (AD600-AD900) was discovered (Figure 1). Between the earliest Cunil- and the later Maxik-phase occupations, five architectural stages dating to the Kanluk phase were uncovered. Ceramics recovered from the construction fill of these Kanluk-phase buildings were dominated by Savana and Jocote ceramic groups.

The first early Kanluk-phase structure (900-600BC) was an apsidal platform named Feature 19 (Figure 2). This apsidal construction was built on top of a sandy clay loam fill that completely covered the previous Cunil constructions. The total dimensions of Feature 19 are unknown, since it lays partially beneath the Classic-period Structure B-5. The retaining wall of this apsidal platform was approximately 30 cm high and consisted of three and sometimes four courses of limestone blocks, whose faces were roughly cut and shaped. The dimensions of these limestone blocks were quite diverse, ranging from 10 cm to 25 cm long. We did not uncover any decorative element. Neither did we encounter a tampered earth/marl surface or stucco floor at the summit of Feature 19. Nevertheless, we can suggest that it supported a superstructure made of perishable materials.

This small apsidal building was later covered by a rectangular platform, named Feature 20, which was associated with a patio surface made of a chalky white plaster (Figure 3). The stones used to build the retaining wall of Feature 20 were better cut and their dimensions more regular than the stones used in Feature 19. The total dimensions of Feature 20 are unknown because the building was dismantled in pre-Columbian times and part of the platform was located beneath the Classic-period Structure B-5. This rectangular platform should have been 40cm in height since it would have completely covered the previous apsidal structure. Again, no decoration or superstructure were discovered.

Feature 20 was completely covered by a larger rectangular platform (Feature 21) with an exterior terrace and a patio plastered surface (Figure 4). The retaining wall of the exterior terrace was built with smaller limestone blocks (0.20 m in length) than the platform’s retaining wall (0.30-0.40 m in length). The stones of both features were well cut and regular in their dimensions. Again, total dimensions of this sub-structural platform are unknown because it was
dismantled during pre-Columbian times and part of the building was beneath the Classic-period Structure B-5. We can suggest however, that this building should have been more than 40 cm in height, with at least four courses of cut stones covering the previous Feature 20. We uncovered only two courses of stone making up the terrace’s retaining wall but it may have had at least one more on top to cover the core placed between the platform and its terrace.

At some point during the late Kanluk (600-350BC), Feature 21 was completely enclosed by a circular platform, Feature 12 (Figures 5). This round building was approximately 8.50m in diameter and it would have been higher than 40cm. At the time of Feature 12’s construction, the previous rectangular platforms may have been dismantled. Feature 12’s retaining wall consisted of cut stones, 30cm long, which were covered by a 10cm thick plaster. A 1-meter long alignment was constructed off the northeastern end of this round platform. This alignment could be the remains of either a step, a small patio or a subsidiary platform. If it was the latter, then Feature 12 can be considered a “keyhole-shaped round structure” (Aimers et al. 2000). No original floor surface covering Feature 12 was found, and no postholes or the remains of a masonry superstructure were found at its summit. This would conform with the architectural tradition at Cahal Pech in which round structures found at the site were exposed platforms (Aimers et al. 2000).

Almost at the end of the Kanluk phase, Feature 12 was completely covered by another sub-structural platform, Feature 11. The main characteristic of this platform was its cobbled floor (Figure 6). The cobbles in Feature 11 were flattened, regular in their dimensions, and placed

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**Figure 5.** Round platform or Feature 12.
very closely together. Cobbled platforms have been identified typically as a Middle Preclassic construction. For instance, Garber and colleagues (2008) found several Middle Preclassic cobbled platforms during the excavation of the 1-m wide trench. Nevertheless, Cunil cobbled floors (1200-900BC) have also been uncovered at Cahal Pech. At least one Barton Creek cobbled platform has been reported at Barton Ramie (Willey 1965). The total dimensions of the cobbled platform, Feature 11, were not established because we only uncovered its northeastern section in 2012 and because, like the previous sub-structural platforms, it lay beneath Structure B-5. It is interesting to note that this platform was irregular in shape. No postholes or superstructure were found. Nevertheless, it is highly likely that Feature 11 functioned as a basal platform that supported perishable superstructures. North of this platform and partially covering it, we found a lime plaster surface, which could have functioned as the patio of the cobbled platform.

**Architectural Variability during The Kanluk Phase**

Together with data recovered by previous excavations at Cahal Pech and other Belizean sites such as Pacbitun and Blackman Eddy, the 2012 data provide us significant insights on the architectural variability throughout the Middle Preclassic period. During the first part of this period (900-600BC), low apsidal platforms made of roughly cut limestone blocks, which were predominant during Cunil times, continued to be constructed. At the same time or slightly later, low rectangular platforms were erected using roughly cut limestone blocks. Although we still need more data to affirm this, evidence in Pacbitun may suggest that these rectangular platforms were domestic in function, when they were less than 50cm tall and their surfaces were made of tamped marl/earth. Public buildings were slightly higher and had floors coated with a thick layer of plaster (Garber et al. 2004). Throughout the early Middle Preclassic period, the height of these public rectangular platforms increased and sometimes had a staircase to access the summit such as Str. B1-7th from Blackman Eddy (Garber et al. 2004).

During the late Middle Preclassic (600-350BC), low rectangular platforms (less than 50cm tall) made of roughly limestone blocks were predominantly domestic. At least three architectural types of public buildings can be identified. The first type of public architecture is the round structure, which was apparently a popular building form during this time, exhibiting two varieties (Aimers et al. 2000). Contrary to the rectangular platforms, these round structures were made of well-cut limestone blocks and coated with a thick layer of stucco—Feature 12, for example, was covered with a 10cm thick layer of stucco. It has been hypothesized that these round platforms functioned as stages for performances related to ancestor worship (Aimer et al. 2000). Since the
round platforms were located in residential groups, those ritual practices were critical to household identity, especially to the emergent elite households (Hendon 2000).

The second type of public building consists of monumental platforms with stairs probably leading to temples. These monumental constructions were built of large blocks and covered with stucco. Str. B-1 at Blackman Eddy and Str. B-4 at Cahal Pech are examples of this particular type of public construction. The cobbled platform uncovered during the 2012 excavations at Cahal Pech may represent a third architectural type. Cheetham (Cheetham 1995) reported several cobble/flagstone surfaces at the northern, central and southern sections of Plaza B. These features dated either to the Cunil or early-facet Kanluk phases. Garber and colleagues also reported several of these constructions during their excavations at Plaza B, which dated to the Kanluk phase. Willey (1965) also uncovered similar flooring associated with Barton Creek pottery. Therefore, this architectural form prevailed throughout the entire Preclassic period, although it was more common during the Cunil and the Kanluk phases. Based on Feature 11’s dimensions, we can suggest that these cobbled surfaces most probably functioned as platforms supporting perishable superstructures.

**Conclusion**

As it has been noted before, a very similar pattern of architectural sequence has been documented at many sites across the Maya lowlands. Early apsidal houses were replaced first by rectangular platforms and the first public architecture made its appearance. Later, at some point during the transition between the early and late Middle Preclassic period, some of the rectangular platforms were covered by public architecture. Public architecture was either monumental (e.g. Structure B-4 at Cahal Pech and Structure B-1 at Blackman Eddy) or smaller in scale (e.g. round structures). In both cases, only a small sector of the community had special access to this public architecture and, therefore, to the ritual activities that were performed there.

Considering other categories of material culture, during the transition between the early and late Middle Preclassic period, Mamom pottery started its widespread appearance, obsidian manufacture became common, and modeled stucco work were being used (Awe and Healy 1994; Ball and Tascheck 2003; Garber et al. 2004). At Cahal Pech and Pacbitun, there was also specialized production of shell beads and, at Cahal Pech, there was an increased presence of hand-made figurines (Hohman 2002; Zweig 2010).

In addition, during the transition between the early and late Middle Preclassic period, an extensive occupation of sites in the Belize Valley developed. While the occupation throughout the valley started in the terminal Early Preclassic (e.g. Blackman Eddy, Cahal Pech, Xunantunich and Actuncan), larger and more formalized centers emerged during the early Middle Preclassic at sites strategically placed on hilltops (i.e. Blackman Eddy, Cahal Pech, Actuncan, Nohoch Ek, Xunantunich’s Group E, Pacbitun). By the late Middle Preclassic, the entire valley was occupied. Many sites in the Belize Valley evidence occupation during this time (e.g. Actuncan, Baking Pot, Barton Ramie, Buena Vista del Cayo, Cahal Pech, Chan, Nohoch Ek, Pacbitun, El Pilar, Xunantunich’s Group E) (Awe 1992; Ball and Taschek 2004; Brown 2008; Brown et al. 2009; Coe and Coe 1956; LeCount and Keller 2011; Powis et al. 2009; Robin 2012; Willey et al. 1965).

The late Middle Preclassic sites were apparently part of a well-established hierarchy of settlements. Brown (2008) has pointed out that the public buildings of Belize Valley sites during the late Middle Preclassic period were highly variable in terms of the amount of labor invested during their construction. Thus, Actuncan, Blackman Eddy, Buena Vista, Cahal Pech and Xunantunich’s Group E may have been primary centers, while Barton Ramie, Chan, Nohoch Ek and perhaps Pacbitun occupied the other end of the site size spectrum.

In summary, all these events may be indicating the emergence of the first complex chiefdoms in the Belize Valley and the Maya lowlands in general. We still need to clarify, however, the nature of the political dynamics of these polities and how they changed throughout the Middle Preclassic period.
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References

Aimers, James, Terry G. Powis and Jaime J. Awe

Awe, Jaime J.


Awe, Jaime and Paul Healy

Ball, Joseph W. and Jennifer Taschek


Brown, M. Kathryn

Brown, M. Kathryn, Jaime Awe and James F. Garber

Coe, William R. Michael Coe

Cheetham, David J.

Fernandez Souza, Lilia

Garber, James F., M. Kathryn Brown, Jaime J. Awe, and Christopher J. Hartman

Garber, James F., Jennifer L. Cochram and Jaime Awe

Garber, James F., Jennifer L. Cochran, Lauren A. Sullivan, and Jaime Awe


Garber, James F., Sherman W. Horn III and Jaime J. Awe
Archeological Project: Results of the 2007 Field Season. Edited by James, F. Garber, pp. 4-26. Texas State University.

Garber, James F., Amy Benton, Whitney Lytle, Marta Salazar and Jaime J. Awe

Garber, James F., Sherman W. Horn III and Jaime J. Awe

Healy, Paul F., David Cheetham, Terry G. Powis and Jaime J. Awe

Hohmann, Bobbi
2002 Preclassic Maya Shell Ornament Production in the Belize Valley, Belize, MA thesis, University of New Mexico Albuquerque.

LeCount, Lisa J. and Angela Keller

Peniche May, Nancy

Powis, Terry G., Paul F. Healy and Bobbi Hohmann

Robin, Cynthia

Willey, Gordon, R. William R. Bullard Jr., John B. Glass and James G. Gifford
NEW INVESTIGATIONS OF XUNANTUNICH’S SITE CORE

Leah McCurdy, Whitney Lytle, and M. Kathryn Brown

The site of Xunantunich is best known for its Late to Terminal Classic construction and occupation. The Mopan Valley Preclassic Project (MVPP) has been investigating the site since 2008 focusing primarily on the Preclassic ceremonial center located approximately 800 meters to the northeast of the Classic period site core. The goals of the project have expanded to encompass research beyond the Preclassic period at Xunantunich in order to understand temporal and cultural change at the site from the earliest occupation to the final abandonment. This paper will discuss the Mopan Valley Preclassic Project’s recent investigations within the Classic period ceremonial core of Xunantunich. Our recent investigations within the site core and the nearby elite residential unit, Group D have targeted understudied areas in order to gain a better understanding of the history and development of Xunantunich. During the 2012 and 2013 field season, excavations were carried out in Plaza A-I, on El Castillo, and at Group D. In our presentation of each of these foci, we discuss our findings, current interpretations, as well as future project goals. Additionally, we discuss the use of innovative methods such as 3D modeling and intensive plaza investigations and how these methods have been useful in addressing our research questions.

Figure 1. Map of Xunantunich’s site core indicating areas of concentration: the Castillo, Group D, and Plaza A-I.

Introduction

The Mopan Valley Preclassic Project (MVPP) has been investigating the site of Xunantunich since 2008. The goals of the project have expanded to encompass research beyond the Preclassic period at Xunantunich in order to understand temporal and cultural change at the site from the earliest occupation to the final abandonment. In this paper, we present data from MVPP’s recent investigations within the Xunantunich site core (Figure 1). In 2012 and 2013 we began investigations at several understudied areas of the Castillo acropolis to gain a better understanding of the construction history and techniques. Additionally, we conducted limited testing in Plaza A-I to look for evidence of buried Preclassic occupation.

MVPP also began investigations at Group D focusing on the elevated courtyard and ancestor shrine of the group. Overall, our investigations in the site core, coupled with the continued focus at Group E (the Preclassic ceremonial center) have revealed new data related to the site’s occupation history. MVPP’s most recent excavations show the importance of exploring lesser targeted sections of ancient Maya sites such as open plaza or courtyard spaces, seemingly unembellished terrace levels, and the peripheries of major structures. These investigations show the importance of studying these often overlooked spaces at ancient Maya sites and have sparked new questions and interpretations.

The Castillo

Recent investigations at the Castillo are conducted as part of a case study for McCurdy’s doctoral research to explore ancient Maya architectural construction practices, or monumental architectural production. Theoretically underpinned via community research, the anthropology of technology, craft production constructs, coordination and organizational theory, and a healthy dose of practice theory, this socio-technical approach is a way to investigate monumental architectural production and centers on three principal foci. These include: 1) construction processes and practices to be investigated and reconstructed through operational sequences; 2) labor and its organization for the understanding of work, collaboration, and control; 3) the cultural implications of large-scale, highly coordinated
Excavations at the Castillo are designed to provide direct evidence of each aspect via intensive architectural data collection methodologies. The methodologies employed in Castillo investigations include 3D architectural survey (McCurdy 2012a), excavation, ethnoarchaeology (McCurdy 2012b), virtual reconstruction (McCurdy 2011, 2013), architectural volumetrics and energetics, organizational analysis, and standardization analysis. For this discussion, virtual reconstruction is the focus because it is the data driven foundation for many of the other methodologies and is directly evidenced by recent excavations at the Castillo.

Virtual reconstruction provides an accurate architectural form reconstruction in virtual space that serves as a platform for volumetric analysis. Architectural volumetrics informs energetic reconstructions of labor populations. Estimates of total labor populations are the foundation for detailed organizational analysis to understanding labor structure and control. Results of organizational analysis feed into interpretations of standardization, specialization, and the diversity of labor populations. A virtual reconstruction of the Xunantunich Royal Palace (Plaza A-III) was presented and discussed in this venue recently (McCurdy et al 2011). This previous project and the virtual reconstruction of the Castillo are underpinned by similar basic questions including: 1) What did the architectural complex look like? 2) How did spaces connect? 3) How were these spaces accessed? 4) How were spaces decorated or embellished? Excavations at El Castillo will provide answers to these basic questions and inform interpretive virtual
reconstructions of architectural form and construction phasing.

The Castillo provides an excellent case study because there is already extensive documentation of its architectural features from previous archaeological investigations. Figure 2 illustrates areas of the Castillo (in approximate terms) that have been previously examined and/or excavated by archaeologists. Distinct projects are differentiated by colors on this map. The green areas represent work conducted by the Xunantunich Archaeological Project (XAP) over multiple field seasons in the 1990’s (Leventhal 2010 for overview). The red areas indicate Euan Mackie’s (1985) focus on Structure A-6. Purple areas represent the work of A. H. Anderson (1966) and the yellow areas designate Lindon Satterthwaite’s (1970) investigations. McCurdy obtained permission to peruse the XAP archive held by Dr. Richard Leventhal in Philadelphia to recover important information regarding XAP excavations and those preceding as well. In addition, McCurdy consulted with Jorge Can of the Institute of Archaeology (IOA) to better understand work conducted under the Tourism Development Program (TDP) (Can n.d.).

McCurdy’s dissertation research targets lacunae in the architectural evidence at the Castillo to more holistically inform accurate virtual reconstructions. Specific areas of concentration include the Castillo’s eastern side, particularly the medial terrace level, and the southeastern corner as well (highlighted in orange on Figure 2). Excavations during the MVPP 2012 and 2013 field seasons targeted four architectural features: 1) Structure A-31; 2) Structure A-29; 3) the southern medial terrace; 4) Structure A-5 (each circled on Figure.2).

In 2012, excavations at Structure A-31 recovered important phasing information with architectural evidence of a frontal wall, occupational floor, and plaza floor interface. Also in 2012, excavations at Structure A-29 revealed similar characteristics and data imperative for accurate virtual reconstructions including documentation of access ways, frontal apertures, and several construction episodes and/or dismantling events. Excavations on the southeastern corner of the Castillo’s medial terrace began in 2012 with continued investigations in 2013. We encountered evidence of an intermediate terrace edge and multiple plaster resurfacings. In 2013, we discovered several constructions pins supporting this terrace edge (Figure 3) and offering detailed insights into constructions practices as well as architectural form and phasing for virtual reconstructions. Continuing investigations of these constructions pins and their apparent diversity of materials and construction techniques will be an ongoing concentration at the Castillo. Investigations on the southwestern corner of the medial terraces involved cleaning and re-exposure of Structure A-33. Our work included intensive mapping of this building’s exposed remains and its connection to the large corbel-vaulted drain that opens on the west side of the Castillo’s medial terrace face. Exploration of a similar location on the eastern medial terrace face in 2013 potentially located a complementary drain that would have expelled water off the east side of the Castillo.

Excavations on the medial terrace level of Structure A-5, located beneath its exposed later phase to the northeast of Structure A-6, were
initiated in 2012 and continued in 2013. This area of the Castillo is increasingly interesting and significant for reconstructions of the early stages of the Late Classic (Samal phase) and the transition to the latter portions of that period. In terms of construction, a southern wall is very well preserved with intact plaster, patches of interior paint, and a large 2 meter wide blocked doorway (Figure 4). A thick coring wall perpendicularly abuts the blockage of this doorway and underlies heavy layers of wet-laid and dry-laid marl fill. A portion of the room interior behind this blocked doorway was exposed in 2013, with traces of ancient graffiti incised into the painted plaster. In addition, it appears that this fill has preserved interior painting or stucco work in relatively good condition. The source of this fill remains an important question for future investigations.

To the south of excavations on the lower sections of Structure A-5, our investigations encountered multiple terrace faces and surfaces descending down the northeastern corner of the Castillo (Figure 5). The terraces faces were constructed with superior and basal moldings and the plaster was well preserved in most areas. We could only uncover corners of these terrace faces in 2013, but expect that these features extend to the south and originally functioned as the architectural boundary of the Castillo acropolis on the east side, relatively early in its development. These terraces appear to be either associated with the lower sections of Structure A-5 or with an earlier configuration of structures on this eastern side. Preliminary indications suggest that these terraces relate to the level of the early Quetzal building uncovered by XAP (Neff 1995) on the western side of the Castillo.

**Future Investigations at the Castillo**

Current excavations at the Castillo demonstrate the merit of investigating less targeted locations in large complexes, such as seemingly unembellished terrace surfaces and peripheral zones of major structures. Much like the revelations discerned from plaza spaces described below and from our work at Xunantunich’s Group E (Brown et al. 2011), the understudied areas of the Castillo offer highly valuable insights for the reconstruction of architectural form and phasing, as well as the
understanding of monumental architectural production as a whole. In future field seasons, expanding excavations from Structure A-5 to the south along the medial terrace will greatly increase the understanding of architectural features on the east side of the Castillo and its early architectural forms. Excavations within the lower section of Structure A-5 will provide important data on phasing and interior construction techniques. Also on the eastern side, continued exploration of the possible eastern drain will yield insights into engineering and architectural planning of monumental complexes like the Castillo. Possible expansion to the west side of the Castillo may offer complementary data for accurate virtual reconstructions, especially as regards Structure A-33 and the associated drainage system. Lastly, excavations along the substructure of Structure A-6 from the eastern upper terrace level may reveal additional details on the early Late Classic architectural configuration and complement previous excavations of the Quetzal building. With such an eventual dataset, incorporating all previously recorded excavations at the Castillo, virtual reconstructions will provide a sound foundation for the reconstruction of labor populations, construction tasks, and the people involved in monumental architectural production over the Castillo’s history.

**Plaza A-I: Investigations**

During the 2012 field season, MVPP began limited investigations within Plaza A-1 to gain a better understanding of the construction history of Structure A-8. Structure A-8 is located on the west side of Plaza A-1, directly across from Structures A-2, A-3, and A-4. The formal layout of these structures resembles an E-Group complex (Jameson 2010) and, although the formal arrangement was altered through the addition of Structures A-1 and A-7, an earlier E-Group arrangement may have been the architectural focus of the plaza. During the 2012 field season, a 2x2 meter unit (labeled 16a) was placed on centerline in front of Structure A-8 (see Figure 1). Our goal was to excavate to bedrock to locate buried floor surfaces that may have been associated with earlier construction phases of Structure A-8. The test excavations identified one poorly preserved floor surface indicating the possibility of an earlier construction phase. Additional floors were not identified, however, differences in fill may suggest the possibility of other surfaces that were not preserved. Ceramic analysis of the collected material is on-going, however, no diagnostic Preclassic sherds were recovered. The plaza area was relatively shallow as bedrock was encountered at approximately 85 cm below ground surface. Bedrock was fairly level, suggesting the possibility that it was modified in antiquity, however, further exposure is necessary to confirm this. MVPP plans to further investigate Structure A-8 and its association with Structures A-2, A-3, and A-4 in the future as it seems likely that these buildings were part of an earlier E-Group complex.

**Group D: Elite Residential Complex**

During the 2012 and 2013 field seasons, MVPP re-established excavations at Group D, an elevated residential unit that is directly connected to the Xunantunich site core via a sacbe (see Figure 1). This new research serves as the foundation of Lytle’s dissertation research. The function of Group D was previously investigated as part of XAP. The majority of previous research at Group D was lead by Jennifer Braswell between 1993 and 1995. Braswell (1998) concluded that Group D was a residential unit home to a non-royal elite group of approximately 70 individuals. They are identified as elites based on several markers: 1) the sacbe which connects the residential unit to the site core; 2) grander construction than that at other residential locations; 3) the existence of two stela at the group; 4) the large pyramidal ancestor shrine on the eastern edge of the central platform complex (Braswell 1998).

**Structure D-6: Ancestor Shrine**

Structure D-6 is the Group D ancestor shrine. It is the largest structure within the group and is located on the eastern edge of a raised platform identified as Structure D-8. Based on examination of a looter’s trench and limited excavations, Braswell (1998) was able to discern at least three construction phases. Braswell concluded that the lower platform of Structure D-6 was extended in the Late Classic
II period. Several crypt burials and one individual interment were placed into the platform presumably at the time of this renovation (Braswell 1998).

The goals of the MVPP 2012 field season at Group D were to evaluate the use of the courtyard directly in front of the ancestor shrine and to reveal the terminal construction phase of Structure D-6’s staircase. Excavations began with a 2x2 meter unit placed on the front of the structure. The primary goal for this unit was to relocate the western-most edges of Braswell’s excavation units and to further expose remains of the staircase from the final construction phase. Though we successfully relocated Braswell’s units, the final construction phase of the staircase was poorly preserved. Excavations did reveal the remains of at least one stair tread, and possibly two additional treads. We expanded these excavations in 2013 and exposed more of the lower portion of the D-6 staircase. To date, we have not penetrated into the staircase to look for buried offerings and interments. We plan to fully expose the central staircase and gather architectural data related to the form of the final and penultimate phases, prior to investigating earlier construction phases. We anticipate finding both primary and secondary burials within the staircase and plan to focus on this during the 2014 field season.

**Structure D-8: Courtyard Spaces**

The majority of XAP excavations focused on determining the function of structures within Group D. We wanted to complement this prior excavation program with a focus on areas that were not thoroughly investigated. One such location was the courtyard area in front of Structure D-6. The courtyard space directly in front of the ancestor shrine is a prime location to look for material correlates of rituals that may have been associated with the celebration of important ancestors interred in the shrine. The excavation of open spaces between structures such as courtyards and plazas has become a key component of MVPP methodology and is employed heavily in the project’s work at Group D. We focused much of our 2012 and 2013 investigations in the courtyard area to look for buried ritual deposits and our results strongly suggest that this space was indeed used for ritual activities.

The courtyard in front of Structure D-6 is a built platform designated Structure D-8. XAP conducted excavations directly in front of Structure D-6 (Braswell 198) and encountered human interments. In 2012, MVPP placed a 2x2 meter unit into the platform at the approximate centerline of Structure D-6 west of the XAP excavations. The initial goal of our investigations was to gain a better understanding of the platform construction history and to look for additional burials. Though no additional skeletal remains were found, an unusual rectangular platform was encountered. This platform was located at the approximate center of the courtyard. The eastern face of the platform was heavily plastered and well preserved. White marl had been dumped in front of the platform in order to build up the courtyard area and this process essentially sealed
the eastern face of the platform. The platform had several unusual features. First, the top outer edge of the summit’s east side was lined with a freestanding, low stone wall. Second, the freestanding wall feature exhibited two types of stonework indicating that it was either extended or rebuilt at some point (Figures 6, 7, and 8).

In the 2013 season, we expanded our excavations on this platform and uncovered the southeast corner, as well as both the western and northern edges. White marl was not used as plaza fill in these areas and therefore, the south, west, and north facing walls were not as well preserved as the east wall. We did encounter evidence of the freestanding wall on the northern edge of the platform suggesting that this wall enclosed at least half of the platform. The platform was approximately 6 meters north/south by 3.5 meters east/west and measured 60 centimeters in height. An associated courtyard floor surface was encountered and extended below the base of the
east, south and north facing walls of the platform, however we did not encounter this floor on the west side. We penetrated through the associated courtyard surface on the eastern side in order to gain a sample of ceramic material for chronological purposes and look for bedrock. We encountered bedrock at approximately 12 centimeters below the associated floor surface.

The summit of the platform was uniformly plastered and did not contain postholes indicating that a superstructure was not present. On close examination, we determined that the freestanding wall was an addition to the platform and a re-plastering event occurred after this feature was set in place. The function of the freestanding wall is unknown at this time. In order to determine if the platform had earlier construction phases, we placed a 1x1.5 meter unit in the center (Figure 9). Our excavations in this area encountered an extremely dense deposit of ceramics, and several thousand sherds were collected. At the base of this ceramic layer, we found an earlier platform surface. On top of the summit surface, we encountered several partial vessels and two rounded ceramic disks. Further investigation of this intact deposit was not possible during the 2013 field season due to time restraints. Although the ceramics have not been fully analyzed, many of the sherds dated to the Late Preclassic including numerous Sierra Red sherds. The two ceramic disks were quite interesting and may have served as pot stands or lids. They appear to have been the bases of bowls that were modified into disks.

In order to determine if the platform had a 3rd construction phase, we conducted a small 1x1 meter test pit through the 2nd phase. We did not encounter evidence of an earlier phase and terminated excavations at bedrock. We plan to analyze the ceramic sample from this unit in 2014 to help refine the construction chronology. The fact that Late Preclassic ceramics were present within the dense sherd deposit above the 2nd phase does suggest that at least this phase of the platform might be earlier than expected. This is both surprising and interesting and hints at the fact that Group D may have had an early occupation that was not identified by the XAP excavations. We suspect that the earliest platform phase may date to the Late Preclassic and that it is quite possible that Structure D-6 will also have a Late Preclassic phase. We suggest this because there is a plastered floor that extends from the eastern edge of the platform towards Structure D-6. Additionally, a deeply buried floor was encountered in the XAP excavations at the base of Structure D-6 and appears to be at roughly the same elevation as the platform floor surface. Furthermore, the inhabitants took special precautions to preserve the platform wall facing the ancestor shrine by sealing it with white marl. We plan to further investigate the platform and its association to the nearby ancestor shrine to further refine the chronology during the 2014 field season.

Conclusions

The recent work by MVPP in the site core and Group D promises to broaden our understanding of Xunantunich’s history and fill in many of the gaps from earlier archaeological investigations. Although previous investigators at the site have addressed the political significance of the Castillo, questions related to the construction process have not been sufficiently addressed. McCurdy’s dissertation research on the Castillo is targeting understudied areas of the complex to gain a better understanding of construction techniques and construction history in order to shed light on the monumental architectural production as a whole. Additionally, the use of innovative research methods such as 3D architectural survey and virtual reconstruction will greatly add to our understanding of the construction of this extraordinary architectural masterpiece. In addition to our work on the Castillo, MVPP initiated a small scale testing program within Plaza A-1 to better understand the construction of the plaza area in front of Structure A-8. Structure A-8 has been suggested to be the western pyramid in an E-Group complex. We plan to explore this hypothesis in the near future with more intensive investigations of Structure A-8 and the eastern set of structures, A-2, A-3, and A-4.

Our work in the elite residential unit, Group D has yielded some new and exciting data. The discovery of a small buried platform in the center of the ancestor shrine courtyard is
interesting and suggests a possible earlier use of this special location. Although our exploration of this unusual platform feature is preliminary, we do believe that this structure had a ritual function. The platform did not have a superstructure and was associated with thousands of broken ceramic sherds. Additionally, it appears to be associated with an early phase of the nearby ancestor shrine, Structure D-6. It seems logical that this platform served as a venue for celebrations associated with the interment and remembrance of important ancestors.

References

Anderson, A. H.
1966 An Ancient Maya Vaulted Masonry Crain and Related Works at Xunantunich Site, British Honduras. XXXVI Congreso Internacional de Americanistas 1: 351-354.

Braswell, Jennifer

Brown, M. Kathryn

Brown, M. Kathryn, Jennifer Cochran, Leah McCurdy, and David Mixter

Can, Jorge

Leventhal, Richard M.

Mackie, Euan

McCurdy, Leah


McCurdy, Leah, Jason Yaeger and M. Kathryn Brown

Miller, Julia C.

Neff, Linda

Satterthwaite, Linton
SEARCHING FOR PATTERNS: APPLYING SPATIAL TECHNOLOGIES AT PACBITUN, BELIZE

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In 2012, the Pacbitun Regional Archaeological Project (PRAP) began a systematic geophysical survey at the site of Pacbitun. There were two goals of this project. The first goal was to identify areas in the site core that differed geophysically from the surrounding soil using ground penetrating radar and gradient magnetometry. It was hoped that the earliest occupation in the site could be identified. The second goal was to document excavations and digitally preserve any encountered features using terrestrial laser scanning. These geophysical and laser scanning techniques are seldom utilized at sites in Belize due to a number of perceived factors, including rental costs, lack of visibility due to vegetation cover, and the overall utility of such techniques in a jungle setting. While we experienced daily challenges and hardships in moving such sensitive and expensive equipment around the jungle and challenges to interpretation of the results, we have been able to determine the scale and scope of the earliest settlement at the site, dating back to ca. 800 BC. We now have a much clearer picture of the location, depth, size, and shape of these early Middle Preclassic platforms. Preliminary results from the site core have yielded a wealth of new information not previously known through more traditional techniques that were implemented in the past by surveyors.

Pacbitun

The site of Pacbitun is located in the foothills of the Mountain Pine Ridge in the Cayo District, about three miles from San Antonio Village (Figure 1). The site is situated at the juncture of two eco-zones: the lowland tropical rainforest and the Mountain Pine Ridge. The site is oriented east-west along three major plazas, A, B, C, with another two plazas, D and E, located to the north of the main site axis (Healy 1990). While the site, and its agricultural sustaining area, likely covered a territory of at least nine km², the epicenter covers about 0.5 square kms. This “downtown” zone is marked by over 40 masonry constructions, some as much as 12 m tall, including temple-pyramids, palace-like range structures, a ball court, five plazas, two lengthy causeways (or sacboeb), and a number of smaller courtyard groups. The remains of 20 stelae and altars have also been recovered in the epicenter.

The surrounding terrain is hilly with naturally fertile soils trapped in low-lying catchment basins and valley-like depressions. First inhabited about 800 BC, Pacbitun reached its peak of cultural development during the Late Classic Period (AD 600-900). At this time the site likely controlled an area of nine square kilometers (Healy 1990; Healy et al. 2004). Ceramic analysis indicates that the site was possibly abandoned by the beginning of the tenth century. While evidence is accumulating to reveal that the Belize Valley was settled by the Maya during the terminal part of the Early Preclassic (ca. 1200-900 BC), locally termed the Cunil and Kanocha phases at Cahal Pech and Blackman Eddy, respectively, Pacbitun does not seem to have been permanently occupied until the subsequent Middle Preclassic, several centuries later (ca. 800 BC). While this notion needs to be investigated, it is also reasonable to suggest that these first Pacbitun inhabitants came from the Valley, located only a short distance away, and that settlement at Pacbitun may have been directly related to population growth, and an ongoing Middle Preclassic process of settlement fissioning. Under such a scenario, Maya colonists, following settlement of the most productive river bottom lands by the ninth century BC, had then begun to in-fill available, adjacent lands as farming colonists.

Geophysical and LiDAR Theory

Ground penetrating or probing radar (GPR) works by sending a pulse of microwaves with a certain central frequency into the ground, and then measuring the total travel time and power of returning waves reflected off materials with differing electrical properties (Conyers and Goodman 1997:23; Weymouth 1986:371). For the best possible detection of archaeological features, there needs to be significant differences in the electrical properties (called the dielectric) between the feature's materials and the surrounding layers. Soils containing large amounts of water and/or clay tend to cause dispersion of the wave energy in all directions, causing attenuation of the microwaves and loss
of both detection depth and signal clarity (Conyers and Goodman 1997:55; Reynolds 1997:688). Gravel and pebble filled layers also reflect microwaves in all directions, causing loss of signal and clarity as well. In a jungle environment, it can be difficult to maintain contact of the GPR with the ground surface, vegetation becomes tangled with wires, electrics can get wet, and the density of roots makes identifying features more difficult. Finally, features with linear edges parallel to the survey direction, or long flat surfaces parallel to the ground surface can be easily missed between survey lines or accidentally filtered out (Mala 2013). Despite these difficulties, when GPR works, both plan maps and depths to archaeological features can be determined.

Magnetic gradiometry measures the difference in strength of earth's magnetic field between two sensors set a fixed distance apart, which reduces effects of natural changes in the field over the time needed to complete the survey (Weymouth and Huggins, 1985:198). Each sensor acts as a magnetometer, and records both earth's magnetic field, and any remnant magnetism caused by burning of soils which contain iron minerals (Heimmer and Devore 1995:12), or induced magnetism caused by organic remains is excavated features (Clark 1996:65-66). Any objects, modern or ancient, made of iron or other magnetic materials will affect the magnetic readings much stronger than the remnant or induced magnetism of archaeological features.

Like the radar-based applications, Light Detection and Ranging (LiDAR) is also a remote sensing technique. However, instead of operating with microwave pulses, LiDAR is based on laser pulses (Lasaponara and Masini 2013; White 2013). At the most basic level, laser scanning accurately and repeatedly measures distance based on time, creating coordinates (Opitz 2013). These coordinates are stored as point clouds which can be used to create high spatial resolution digital terrain modes or DTM’s (White 2013). Most commonly, laser scanners today come as either aerial systems with airborne laser sensors (ALS) attached to a plane or helicopter, or as terrestrial laser sensors (TLS) mounted on a tripod (Masini et al. 2011; Pirotti et al. 2013; Remondino 2011; White 2013).

Unlike the airborne application (generally referred to as LiDAR), terrestrial laser scanning systems are operated from fixed positions recording all that is in their field of view and producing large point clouds of x,y,z data. Here, the laser sends out discrete pulses of light and records a point as soon as it hits a solid surface, calculating how long it takes to return and how
much of the original energy is reflected back to the instrument sensor (Armesto-González et al. 2010; Chase et al. 2012; Clawges et al. 2007; McCoy and Ladefoged 2009; White 2013). This information is then combined with the position and orientation data of the scanner station.

**Survey Methods**

Both the GPR and the magnetic gradiometry surveys were conducted in Plazas A and B at Pacbitun (Figure 1). They were carried out along the same survey lines oriented approximately east-west and spaced 0.5 meters apart. Plaza A was 35 meters by 44 meters, for a total of 2066 meters of survey line length covered (Figure 2). The main portion of Plaza B was a 25 meter by 30 meter section from the middle of Structure 8 to the eastern edge of Structure 7 (see Figure 1), and a total of 1340 meters of survey line length was covered. Two smaller sections of Plaza B were positioned around dense tree stands, and then surveyed to fill in as much as possible the remainder of Plaza B. Prior to survey, both plazas were cleared of underbrush and obstructions to within a few centimeters of the ground. Larger trees and rocks remained in place, and a survey line was stopped and restarted on either side of the obstructions (Figure 2). The GPR used was a Mala X3M controller with a 500 mHz antenna attached to a collapsible cart with an inline survey wheel that measured total survey distance. Magnetic gradiometry was carried out using a GEM Systems GSM 19GW and two Overhauser sensors set 0.5 meter apart. These were deployed in a horizontal gradient position about one meter above the ground surface, with readings taken twice a second. Both GPR and magnetic gradient data was processed using GPR-Slice.

Following an initial, successful terrestrial laser scanning project conducted at the Pacbitun site core in 2012, we returned to Plaza A during the 2013 field season to capture large scale excavations and discover features. The terrestrial scanner used was the Leica C10 scan station, a time of flight 3D long-range scanner that allows for a 360° degree rotation and has a range of up to 300 meters. Like most terrestrial scanners, the Leica C10 instrument is restricted by line-of-sight limitations and resolution.

**Figure 2.** Map of the GPR / Magnetic Gradiometry survey lines in Plaza A. Survey started in southwest corner between Structures 2 and 6 (Figure 1). The ordering of X axis units was later flipped for data processing.

quality is affected by distance. Because of this, most scanning projects require setting up at multiple locations, or “stations”, to capture the entire desired area or feature and avoid shadows caused by line of sight restrictions. In order to later connect these multiple stations, the scanner needs to be provided with reference points or “targets” which can be used to stitch the individual scans together during post-processing of the data. In 2013, nine individual scans were conducted in Plaza A, employing four 6” (15 cm) round targets during each scan. The software used for post-processing the data was Cyclone 8. After transferring the data into the program and filtering out erroneous points, the acquired point clouds from each scan was merged, a process called “registration”, in order to obtain a complete model of the scanned target (Romanescu et al. 2012).

**Geophysical Results**

Due to the overwhelming excavation requirements of the work in Plaza A, there was no work done to ground truth geophysical results in Plaza B. Thus only Plaza A results will be discussed in this research report.

Much of the interpretation of geophysical data to identify cultural features from the multitude of geologic anomalies depends on the previously identified patterns acquired for a particular place and period. As noted by Haley, there are very limited examples of geophysical
examples to compare to cultural features in Belize (Haley 2006:32). Haley has applied multiple geophysical techniques to Xunantunich, Cahal Pech, Pook's Hill, Caves Branch, and Buena Vista (Haley 2006, 2007; Haley et al. 2008), while Aitken studied Maax Na (Aiken 2008), all with limited success.

Some of the difficulty in interpretation is determining how to stack the various survey lines into a plan map view. Figure 3 shows the Plaza A GPR signal grouped into layers about 12 cm thick, with 10% overlap between layers. Clearly multiple, strong radar reflections (red and yellow areas) are visible in both the shallow and deep areas of the plaza. This is not uncommon in areas with complex occupational histories and multiple construction events. Figure 4 is the result of the magnetic gradiometer data, which is a single plan map of Plaza A, with both higher magnetic anomalies (yellow and red) and lower magnetic anomalies (white). When deciding what anomalies to
target, there was concern that modern trash was causing the magnetic anomalies, so the strongest signals were disregarded when determining where to excavate. On reflection, it is possible that targeting these would have revealed the shallowest burned portions of the structure found through the GPR analysis (see Excavation Results).

In Figure 5, the excavation units are overlaid on a single, shallow slice of the GPR plan views from Figure 3. Excavation Unit 1a was targeted due to the intriguing linear anomalies noted from 50 cm to 85 cm deep, between 10 m and 20 m on the X axis and at 28 m on the Y axis. It was also noted that a circular anomaly was in this area in the 195 cm to 205 cm deep layer (lower right most plan map in Figure 3). Excavation Unit 1b is the area opened up to determine the extent of the structure discovered in excavation of Unit 1a (see Excavation Results). Excavation Unit 2 was a minor shallow anomaly, but it's alignment with the centerline of Structure 3 was determined to be worth investigating. Excavation Units 3 and 4 were chosen because both had strong linear reflections in middle to deep layers, and they also aligned with the centerlines of Structures 1 and 2.

Excavation Results

Numerous anomalies were detected in Plaza A, but four of them were determined by the senior author to be significant enough to investigate through excavation. As mentioned above, these have been designated as Excavation Units 1a, 1b, 2, 3, and 4. Units 2, 3, and 4 were taken to bedrock, and none of them revealed the anomalies detected by the geophysical survey. However, a building was discovered in Excavation Units 1a and 1b. The results from each unit will be discussed below, beginning with the three units which produced negative results.

Excavation Unit 2 was placed in the plaza at the base of Structure 3. It was positioned along the centerline of the structure, approximately one meter in front (or south) of Stela 11. The unit was placed directly on top of an anomaly detected through the GPR/Mag survey. The unit measured 2 m x 2 m in size, and was excavated to bedrock. A total of eight stratigraphic levels were identified, including five plastered lime plaza floors. Based on ceramic dating, the lowest three levels in the unit date to the Middle Preclassic (ca. 800-300 BC). The five plaza floors post-date the late Middle Preclassic period, with the upper four floors dating to the Late Classic period (AD 600-900). During excavation, no anomaly was found but detailed information about the occupational history of the plaza was learned.

Excavation Unit 3 was placed in the center of Plaza A, just 10 centimeters north of...
Stela 4 (based on its current fallen location). Like Unit 2, this unit was situated directly on top of an anomaly detected through the GPR/Mag survey. The unit measured 1 m x 1 m in size, and was excavated to bedrock. A total of five plastered lime plaza floors were excavated. Based on ceramic dating, the lowest floor in the unit dated to the late Middle Preclassic (ca. 600-300 BC) and the most recent one dated to the Spanish Lookout phase (AD 700-900). During excavation, no anomaly was detected but, again, significant stratigraphic data was collected.

Excavation Unit 4 was placed in the plaza approximately four meters in front of Structure 1. Like Unit 2, it was positioned along the centerline of the structure. In fact, the unit was placed along the centerline between Structures 1 and 2. The unit was situated directly on top of an anomaly, one of the strongest recorded during the survey. The unit measured 1.5 m x 1.5 m in size, and was excavated to bedrock. No architecture was found in any of the four cultural layers excavated. Ceramics recovered from each level have not been fully analyzed but the stratigraphy is nearly identical (and presumably the chronology) to that recorded in the other plaza units. During excavation, no anomaly was detected. In fact, the absence of any architectural remains is interesting given the results elsewhere in the plaza.

Excavation Units 1a and 1b are centrally located on the north side of Plaza A. Unit 1a is the original unit which was expanded and labeled separately as Unit 1b for the geophysical survey. For excavation purposes, Unit 1a was dug as a 4 m x 1 m trench (originally designated as Trench 1 containing four smaller 1 m x 1m units; these units are labeled as Units A-D). Similarly, Unit 1b was dug as a 12.5 m x 3 m trench (originally designated as Trench 2...
containing eleven smaller 3 m x 3m units; these units are labeled as Units E-O). As stated above in the Geophysical Results, this unit was placed directly overtop a circular anomaly measuring three meters in diameter. Unit 1a was positioned so that it would bisect the anomaly east-west. Initially, we found five plastered plaza floors before encountering a platform around one meter in depth. The plaza floors match up with the ones mentioned from the other plaza units and therefore date to the same time periods. Located below the plaza floors but above the platform was a retaining wall. This wall was likely part of a much larger construction pen for the building of Plaza A. The wall was laid down directly on top of the platform. It was through the excavation of this wall that we began large-scale investigation of the platform. The platform was not circular in form (as previously thought) but did indeed exceed our expectations.

The platform was originally found in Unit 1a but was later expanded (Unit 1b) because of the immense size of it. We are currently in the early stages of excavation of this platform so the information we have at present may change over the next few seasons of investigation. The platform is buried (less than one meter deep) beneath five plaza floors and appears intact but heavily burned (Figure 6). It appears that the Maya abandoned the platform, burned it almost entirely, and then covered it to protect it before building successive plaza floors above it. Based on ceramic dating, it tentatively dates to the late Middle Preclassic period, ca. 600-300 BC. The platform measures 16.5 meters east-west x 3 meters north-south x 1.5 meters high. It has five steps that face eastward. If symmetry is to be expected then it would measure approximately 25 meters long by 10-12 meters wide. The summit has not been exposed yet so we have no information on whether it supported a perishable superstructure. And, given the early date of this stepped platform, it may actually be a radial building with four staircases placed equidistant to one another.

Scanning Results

While the in-depth analysis of the scanning data collected at Pacbitun is a long term project and is still underway, a few comments can be made about the usage of the terrestrial scanner in an archaeological setting. The scanning results of the buried Middle Preclassic (600-300 BC) stepped pyramid discovered in Units 1a and 1b in Plaza A in the site core allows a view of the feature from a unique 3-D perspective see (Figure 6). In addition to the aesthetic visual display, the scanning data also revealed detailed structural features, including possible remnants of ancient fire clouding on the platform surface.

Of course, there are several limitations to terrestrial laser scanning, predominantly caused by environmental constrictions. For example, while scanning the castle of Haut-Andlau in Alsace, France, the surrounding relief and ditches in combination with the limited field of view of the scanner prevented the capturing of a reliable point cloud of the upper parts of the towers (Grussenmeyer et al. 2008). At Pacbitun, we experienced similar issues. Even though six stations were placed around the unit, as close to the edges as possible, and one station placed in it, the vertical angles of the steps could not be captured within the confinement of the unit (Figure 7). Here, a combination of different techniques like terrestrial scanning combined with photogrammetry or airborne LiDAR can certainly help cover scanning limitations and enhance data quality, if it can be afforded (Pirotti et al. 2013).

Conclusions

The strong anomalies targeted in excavation area 1a were clearly the linear stone wall, the descending steps further to the east which make up a portion of the deep "circle anomaly", and a portion of the burnt structure (see Excavation Results). However, such a large structure was not within the mental map of the senior author when initially examining the geophysical data. The GPR plan map layers do show small portions of the approximately north/south edges of the burned platform, but not enough to initially identify. With this model in mind, a few predictions can be made toward further excavation strategies. First, the layers between 60 cm and 85 cm deep from 20 m to 30 m along the Y axis and at 15 m on the X axis in Figure 3 show a large, strong anomaly that could be a structure with stairs. Second, by reexamining each survey profile from 2 m to
10 m along the X axis, the general features of the burnt platform structure can be identified (Figure 8). Both the profiles and plan view (Figure 5) suggest that the shallowest intact portion of the structure is between 22 m and 25 m on the Y axis and 4 m and 6 m along the X axis. Additionally, the profile views may help identify any potential caches or burial locations as well as structural anomalies within the burnt platform.

As a non-destructive archaeological survey technique, the terrestrial laser scanning can offer the fast acquisition of large and precise 3D data-sets which can then be used to create incredibly detailed images. Such images assist not only archaeological research but also may
aid in conservation and preservation efforts of cultural heritage (Armesto-González 2010; Núñez et al. 2013; Seidel 2011). Despite environmental obstacles and expected long processing times, the 2013 scanning survey conducted in Plaza A at the site of Pacbitun helped to reveal previously undiscovered features and provide detailed 3D documentation.

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References Cited

Aitken, Julie Ann.

Armesto-González, Julia, Belén Riveiro-Rodríguez, Diego González-Aguilera, and M. Teresa Rivas-Brea


Clark, Anthony

Clawges, R., L. Vierling, M. Calhoon, and M. Toomey

Conyers, Lawrence B. and Dean Goodman

Grussenmeyer, P., T. Landes, T. Voegtle, and K. Ringle

Haley, Bryan S.


Haley, Bryan, Bernadette Cap, and Jason Yeager

Healy, Paul F.

Healy, Paul F, Bobbi Holmann, and Terry Powis

Heimmer, Don and Steven DeVore

Lasaponara, Rosa, and Nicola Masini

Mala
Masini, Nicola, Rosa Coluzzi, and Rosa Lasaponara

McCoy, F.D., and T.N. Ladefoged

Núñez, Amparo, Felipe Buill, and Manel Edo

Opitz, Rachel S.

Pirotti, Francesco, Alberto Guarnieri, and Antonio Vettore

Remondino, Fabio

Reynolds, John M.

Romanescu, Gheorge, Vasile Cotiugă, and Andrei Asăndulescu

Seidel, D.

Weymouth, John W.

Weymouth, John W. and Robert Huggins
THE SACRED CENOTE AND THE WATER TEMPLE: POOL 1, CARA BLANCA, BELIZE

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This paper presents the 2013 excavations of Str. 1 at Cara Blanca Pool 1. We present a brief discussion of artifacts and other features that indicate Str. 1 having served as a water temple. Since the majority of ceramics consist of water jars dating to the Terminal Classic period, we attempt to show that Maya from all directions came to Cara Blanca to propitiate gods and ancestors for rain during a 100+ year period of several multiyear droughts. Other artifacts (e.g., fossils, marine shell, etc.), as well as the surrounding flora, indicate that the Maya conducted ceremonies and feasts at the edge of the watery underworld.

Introduction

The Classic Maya (A.D. 250-950) of the southern Maya lowlands lived in the humid tropics with noticeable seasonality (Lucero 2006; Scarborough 2003). They depended on rain to grow maize, beans, squash, and other cultigens, as well as for manufacturing plaster and ceramics and other quotidian needs. Predicting when the rains would begin each season was always a challenge in this rainfall-dependent society. Water was plentiful during the six-month rainy season when farmers worked in their fields and daily rain showers replenished water supplies and nourished growing crops. In the dry season, the Maya relied on rivers, aguadas (natural rain-fed depressions), or artificial reservoirs (Scarborough 1993).

Water was sacred to the Maya, particularly standing water since it emerges from openings in earth (sinkholes and caves), features found throughout the karstic landscape (Finamore and Houston 2010; Scarborough 1998). Openings in the earth are considered portals to the underworld where the Maya petitioned gods and ancestors for bountiful crops and rain (Bassie-Sweet 1996). Cara Blanca in central Belize has many such openings (Figure 1).

Cara Blanca (‘white face’) consists of 25 pools along the base of a limestone escarpment c. 80 to 100m high (Kinkella 2009). Survey of the surrounding cliffs to the north and bajos (seasonal swamps) to the south has thus far revealed relatively little settlement. With the abundant year-round water and good agricultural land just beyond the pools, one would expect to find dense settlement, especially given the annual dry season when water was critical.

Pool 1, a steep-sided cenote, stands out from the other pools for several reasons, especially because of its associated settlement (Figure 2), size (c. 100 x 70m), and depth (over 60m). Exploratory dives and excavations at Pool 1 (Lucero 2011, 2012) have yielded intriguing clues suggesting that the Maya considered Cara Blanca a special place, likely for pilgrimage (Lucero and Kinkella in press), and that the Maya began to increase their visits to Cara Blanca at the end of the Late Classic (Lucero 2011). One possible reason may have been similar to that found for caves, where the Maya increased their ceremonial visits in response to a series of multiyear droughts that struck the Maya area between c. A.D. 800 and 930 (Medina-Elizalde et al. 2010; Moyes et al. 2009). In addition to ceramic sherds, divers also recovered extinct megafauna fossils, submerged trees, and freshwater shells that can be used to assess ancient climate and landscape.

In this paper, we briefly summarize our findings at Pool 1 surface excavations, which focused on Str. 1. We discuss the excavations,
Figure 2. Pool 1 and associated settlement.

ceramic assemblage, and the preliminary results of a botanical survey conducted at Pool 1. Together, these data indicate that Str. 1 served as a water temple.

Structure 1 as Water Temple

As part of our long-term goals to explore Cara Blanca as a sacred landscape, we began excavating one of the seven buildings at Pool 1 in 2013. Between mid-May and the end of June 2013, we exposed the exterior walls and two rooms of Str. 1, a 20 x 7.5m, 3.5m tall range structure with 6-8cm wide basal molding, originally with 6 to 8 rooms with remnant red paint in the interior rooms (Figure 3). It is oriented 10°, though the northern portion of the building angles more easterly, going from c. 10° to 18° beginning about 6m south of its northern edge. Perhaps the Maya built the temple to mirror the edge of the cenote, as was the case for a small Terminal Classic shrine at the aguada at Yo’okop in Quintana Roo, Mexico (Shaw 2002). Unfortunately we will never know, since the northeast portion of Str. 1 has collapsed into Pool 1 due to looting and the building’s proximity to the pool edge. Walls are 0.85 to 0.90m thick, faced on both exteriors with cut stone and filled with small boulders, cobbles, and mortar. An exterior plastered c. 2-m wide platform surrounds the entire structure, and there may be an additional lower platform on the east side. The southern end of the summit has lots of collapsed vault stones, some of which are nearly a meter long.

Most of the collapse/fill consists, instead of surface limestone cobbles and boulders, of tufa—a calcium carbonate that forms under water into varied shapes because it precipitates around things that fall into the cenote, like tree branches or shell (Figure 4). There is plenty of
Figure 3. Structure 1 plan.

Figure 4. Samples of tufa.
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surface limestone about, so the Maya were clearly collecting fill from the water, likely because it came from the watery world. Previously divers had noted the presence of tufa embedded in the sidewalls everywhere, at all depths (Lucero 2012).

Once the excavation exposed exterior walls, we turned our efforts to the rooms, starting with Rooms 1 and 2. For the sake of space, we only briefly discuss Room 2, where two plaster floors were excavated, one lipping over the other on the east side of the room. Only one piece of stucco was found, and it had remnant red paint. We found fewer and smaller tufa stones as we excavated, but found an increasing number of ceramics, largely dating to the Terminal Classic period. Of particular interest are the three ceramic clusters on the floor against the north wall that include Cayo Unslipped jar rims, a Dolphin Head Red: Silver Creek Impressed dish sherd with stick impressions, Vaca Falls Red: Vaca Falls variety dish sherds, and Indian Creek polychrome bowl sherds with a roughly hewn jaguar and water elements (Figure 5). We also recovered nearly 200 similarly sized (i.e., sorted) *Pomacea* shells immediately above the jaguar vessel.

In total, the Str. 1 ceramic assemblage consists of 56 jar, 19 bowl, 12 plate, and 7 dish diagnostic sherds. Jars account for 62% of the assemblage, bowls for 21%, plates for 10%, and dishes for 6%. Additionally, an Achote Black tecomate sherd was recovered (1%). The predominant type is Cayo Unslipped, with Sibun Redneck, Dolphin Head Red: Silver Creek Impressed, Achote Black, and Indian Creek Polychrome vessels completing the assemblage. Many of these vessels have traits that are foreign to the Belize Valley area. For example, the Achote Black tecomate with thin, fragile walls appears to be more in the style of the Petén than the Belize Valley (Eleanor Harrison-Buck, pers. comm., 2013). Additionally, the Indian Creek polychrome, or jaguar vessel, is decorated with iconography that is more in the style of the northern lowlands than the elaborate designs of the Petén or Belize. Were these vessels made locally by artisans with knowledge and experience of more distant styles, or were they brought to Cara Blanca from communities as far away as the Petén and Yucatan?

Comparing the Cara Blanca Pool 1 Str. 1 assemblage to a typical domestic assemblage, it is clear that the structure is not a residential building (Lucero 2013). The typical assemblage in western Belize consists of 60% serving vessels, 33% cooking and storage vessels, with the remaining 7% consisting of special vessel forms such as incensarios (Lucero 2001:47). The Cara Blanca assemblage is starkly different from this typical domestic assemblage, and noticeably different from the typical Xunantunich assemblage described by LeCount (1999). While Maya homes during the Terminal Classic at Xunantunich were predominantly composed of calcite tempered wares, which account for 82.59% of the materials recovered, the Cara Blanca ceramics include a surprisingly high proportion of ash tempered wares, from fine ware to unslipped storage jars. Moreover, while 48.6% of the calcite tempered vessels recovered at Xunantunich were Mount Maloney, we have yet to recover a single sherd of this type at Cara Blanca. Finally, while only 30.12% of the calcite tempered vessels at Xunantunich are unslipped (LeCount 1999:250), over 62% of the entire Cara Blanca assemblage—both ash and calcite tempered—are unslipped.

The vast majority of the ceramics recovered during the 2013 season are water jars, predominantly Cayo Unslipped jars with a few Sibun Redneck jars also present. The orifice diameter of some of the jars is narrow, which indicates they were used to hold liquids. Jars used for storing solids have wider orifices so that the contents of the jar are more easily accessible. In contrast, a narrow orifice jar prevents liquids from spilling (Lucero 2001:15). Of the jars recovered in 2013, nearly half had an orifice diameter of 15 cm. Though the largest jars had orifices of up to 45 cm, these wide-necked jars are rare and do not typify the storage vessels of Str. 1. The remaining ceramics consist of serving vessels, both utilitarian and fine wares. The serving vessels show no signs of having been used to cook food, and were probably only used to present food in ritual contexts such as feasts. Plates have an average diameter of 30 cm, bowls are 37 cm in diameter on average, and dishes have an average diameter of 45 cm. These serving vessels are fairly large and indicate that feasting events at Pool 1 may have
been inclusive, involving larger groups of people, rather than exclusive events for a select few. The storage jars would have most probably been used to contain water from the pool. This sacred water could have then been used in ritual events at the temple as well as divided into smaller storage containers for transportation back to the homes of worshippers. The Cara Blanca Pool 1 Str. 1 ceramic assemblage speaks loudly to the ceremonial role of the structure; this was a place for collecting sacred water, performing ceremonies and holding feasts, not a space for the practice of daily life.

Cayo Unslipped jars are common storage vessels during the Late to Terminal Classic in central Belize. The Cayo Unslipped jars recovered from Str. 1 include a variety of pastes and lip treatments. While all of the jars have a relatively straight everted rim typical of the Late/Terminal Classic, there is much variation on the theme. The width of the everted rim varies, as does the slight angle of the rim. While Gifford et al. (1976) highlight several different types of Cayo Unslipped jar rim treatments, they are rarely all represented in the same assemblage like we see for the Str. 1 assemblage. Many of the jars have a buff paste, though tan to light grey pastes are common. Interestingly, buff paste Cayo Unslipped jars rarely have special lip treatments outside of the Terminal Classic Upper Belize Valley (Harrison-Buck 2007:232). The diversity suggests that people from Upper Belize Valley communities visited Cara Blanca.

A second jar type, Sibun Redneck, is also found at Cara Blanca. These storage vessels are common in northern Belize during the Terminal Classic, but are rare in the Belize Valley (Harrison-Buck 2007:424). Does the presence of Sibun Redneck jars among the assemblage indicate that pilgrims from northern Belize...
journeyed to Cara Blanca? The diversity of styles suggests that the shrine was an important place for communities near and far.

There are other indications that Str. 1 functioned as a water temple, which we summarize here. First, there are the features that relate to water: its proximity to water and the fact that Str. 1 may have mirrored the cenote edge, the presence of freshwater snails, the two pieces of marine shell, the tufa, water jars, and sedimentary and other aggregates from the pool, the jaguar vessel with its water symbolism, the blue chert chunks and flakes we recovered, and two possible fossils from Rooms 1 and 2.

The possible fossils from Rooms 1 and 2 are of particular interest, especially if the Maya collected them from the fossil bed 20+ m underwater. At Palenque, in addition to crushed fossils in the mortar and plaster found at major temples, archaeologists also found slabs with visible shark teeth and stingray spines fossils (referred to as coquina) in the architecture (Riquelme et al. 2012). Several outcrops are found near Palenque and up to c. 110 km distant representing all kinds of marine life. One of the most intriguing uses of fossils in plaster and mortar is found on steps 1-41 leading down to Pakal's tomb in the Temple of the Inscriptions. Even more intriguing are the several ritual deposits with fossils, particularly shark teeth and stingray spines from extinct species, as illustrated in dedicatory deposits from the Temple of the Cross, Temple of the Foliated Cross, and Temple of the Sun ( Cuevas García 2008). At the Temple of the Sun, for instance, a dedicatory cache yielded a vessel with a fossil shark tooth and stingray spine as well as jade fragments and bird bone; together they represent the sky, earth, and watery underworld. Palenque has always been known for its creation stories that extend far back into time, an apt timeframe given that this center emerged from the original primordial sea. Clearly the Maya purposefully collected fossils, indicating a connection to the watery underworld.

Also notable are things that are lacking or few in number at Pool 1. Even though we only exposed the exterior walls and two of the rooms, we still did not find any individual serving vessels, only one obsidian blade fragment, no stone tools to speak of, no metates (we found five partial manos without use wear), no censers, little evidence for surface burning, no spindle whorls, and no barkbeaters. The items lacking, especially domestic artifacts, suggest that the major function of Str. 1 was not residential.

Additionally, there is evidence for community feasting and ceremony in the form of the several bird bones we recovered, bone fragments of all sizes, including a few thoroughly burned bones. The similarly sized Pomacea freshwater snails from Room 2 suggest that they were selected, sorted, and prepared for feasting. There are also the large prep/storage and serving vessels. Another notable pattern is the number of jars with extensive fire clouding, especially on those from exterior wall excavations. This pattern, in addition to the lack of censers, suggests the Maya used jars to burn offerings. In fact, there is not much evidence for much burning beyond the jars other than a few burned limestone pieces, a few fire-cracked flakes and chunks, and burnt bone. We were also able to piece sherds together that were found in different parts of the structure (as far as 6 m distant). If the Maya did purposefully break and place vessels, was it part of a termination rite, or does this behavior reflect something else altogether? Another telling pattern is how most of the refits involve Room 2 cluster ceramics. We also noted that many sherds appeared to be purposefully broken, perhaps signifying an aspect of a termination ritual or some other kind of ‘ending’ ceremony. That said, they are found on the summit, East wall, and Room 1—in other words, the ‘business’ end of the temple toward the water.

There is additional support for the ceremonial significance of Str. 1 based on the preliminary results of a botanical survey, briefly described here.

**Botanical Survey at Pool 1**

Building on botanical surveys conducted by Lindsay in 2010 and 2012 in and around Yalbac and along a 6 km transect from Yalbac to Cara Blanca Pool 6, as well as at Pool 1 bordering Structure 1, Lindsay noted a high concentration of useful botanical species (Figure 6). She also has identified several key plants may have been used for Maya ceremonies near Str. 1. It has some of the more common species
Figure 6. Pool 1 botanical survey conducted by C. Lindsay.

typical of other locations around the Yalbac and Cara Blanca regions, but in concentrations not found elsewhere. In addition, Pool 1 incorporates unique species, especially associated with medicinal or ritual use (e.g., Wild Papaya (*Carica papaya* L.), Jackass Bitters (*Neurolaena lobata* (Linnaeus) R. Brown), the Bullet Tree (*Bucida buceras* L.), and the Wild Pineapple (*Bromelia pinguin* L.). The botanical species at Pool 1 are listed in Table 1; however, for the purposes of this discussion, we concentrate on three species to highlight the broader significance of Pool 1.

Several key subsistence plants (including the staple crop ramón (*Brosimum alicastrum* Sw.) were noted. However, none showcase the deep ceremonial significance of this region like the Allspice (*Pimenta dioica* (L.) Merr.). Allspice Trees, whose berries were used ceremonially in making cacao and medicinally for treatment of gastrointestinal ailments, were also depicted in the iconography, for example, on ceramics (Weiss-Krejci 2012). In addition to these uses, the leaves are also used for tea and soup seasonings, and the plants antimicrobial properties might have resulted in its use in mortuary contexts. Dry allspice leaves are depicted pictorially on rulers clothing, and aromatic slices from the branches of allspice trees appear on ceramics that were most likely used for ceremonial purposes.

One ritual plant has been associated with the Classic Maya since ancient times, Copal (*Protium copal* (Schltldl. & Cham.) Engl.). According to the Popol Vuh, the Maya were required to burn the hearts of animals as a ritual practice. Copal was sometimes formed into the shape of these hearts and used as a non-blood
<table>
<thead>
<tr>
<th>Col. #</th>
<th>Family</th>
<th>Latin Name</th>
<th>Authority</th>
<th>Common Name</th>
<th>Maya Common Name</th>
<th>Use</th>
</tr>
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<tbody>
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<td>Apocynaceae</td>
<td><em>Stemmadenia donnell-smithii</em> (Rose ex J.D.Sm.) Woodson</td>
<td>Horseballs</td>
<td>ton tzimin</td>
<td></td>
<td>Chewing gum</td>
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<td>2</td>
<td>Moraceae</td>
<td><em>Brosimim alicastrum</em> Sw.</td>
<td>Ramón</td>
<td>oox</td>
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<td>Food</td>
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<td>4</td>
<td>Arecales</td>
<td><em>Attalea cohune</em> Mart.</td>
<td>Cohune Palm</td>
<td>tutz</td>
<td></td>
<td>Thatch</td>
</tr>
<tr>
<td>6</td>
<td>Burseraceae</td>
<td><em>Protium copal</em> (Schldl. &amp; Cham.) Engl.</td>
<td>Copal</td>
<td>pom</td>
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<td>Incense</td>
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<td>9</td>
<td>Cecropiaceae</td>
<td><em>Cecropia peltata</em> L.</td>
<td>Trumpet Tree</td>
<td>xk’o’och</td>
<td></td>
<td></td>
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<td>11</td>
<td>Anacardiaceae</td>
<td><em>Spondias radlkoferi</em> Donn.Sm.</td>
<td>Wild Plum</td>
<td>pook’</td>
<td></td>
<td>Fruit</td>
</tr>
<tr>
<td>17</td>
<td>Arecales</td>
<td><em>Sabal mauritiiformis</em> Adans.</td>
<td>Bayleaf Palm</td>
<td>xa’an</td>
<td></td>
<td>Thatch</td>
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<tr>
<td>18</td>
<td>Nyctaginaceae</td>
<td><em>Pisonia aculeata</em> L.</td>
<td>Cross Prickle Vine</td>
<td>Tea from bark</td>
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<td></td>
</tr>
<tr>
<td>22</td>
<td>Piperaceae</td>
<td><em>Piper aduncum</em> L.</td>
<td></td>
<td></td>
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<td>26</td>
<td>Fabaceae</td>
<td><em>Acacia gentilei</em> Standl.</td>
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<tr>
<td>27</td>
<td>Arecales</td>
<td><em>Philodendron sp.</em> Schott.</td>
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<td>37</td>
<td>Simaroubaceae</td>
<td><em>Simarouba glauca</em> DC.</td>
<td>Negrito</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Vitaceae</td>
<td><em>Vitis tilifolia</em> Humb. &amp; Bonpl. ex Schult.</td>
<td>Water tie-tie</td>
<td>aak’ yaan u-ja’ (lit. vine that has water)</td>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>48</td>
<td>Fabaceae</td>
<td><em>Leucena leucocephala</em> (Lam.) de Wit</td>
<td>Black ironwood</td>
<td>quebracho / tz’ilam</td>
<td></td>
<td>Lumber</td>
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<tr>
<td>49</td>
<td>Sapotaceae</td>
<td><em>Pouteria campechiana</em> (Kunth) Baehni</td>
<td>White Sapitilo</td>
<td>tz’äl’tz’ ya’aj</td>
<td></td>
<td></td>
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<tr>
<td>52</td>
<td>Dioscoreaceae</td>
<td><em>Dioscorea villosa</em> L.</td>
<td>Wild Yam</td>
<td>Tuber</td>
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<td></td>
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<tr>
<td>65</td>
<td>Burseraceae</td>
<td><em>Bursera simaruba</em> (L.) Sarg.</td>
<td>Gumbolimbo</td>
<td>chäkaj</td>
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<td>Medicine</td>
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<td>75</td>
<td>Marantaceae</td>
<td><em>Thalia sp.</em></td>
<td>Huachump/Waha leaf</td>
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<tr>
<td>81</td>
<td>Unknown</td>
<td></td>
<td>Anatto</td>
<td>chimun</td>
<td></td>
<td>Lumber</td>
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<tr>
<td>82</td>
<td>Costaceae</td>
<td><em>Costus guanaiensis</em> L.</td>
<td></td>
<td>we’te</td>
<td></td>
<td></td>
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<tr>
<td>116</td>
<td>Bombacopsis</td>
<td><em>Bombacopsis quintata</em> Jacq.) W.S.Alverson</td>
<td>Cotton Tree</td>
<td>Lumber</td>
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<td>119</td>
<td>Verbenaceae</td>
<td><em>Vitex guameri</em> Greenm.</td>
<td>Asnic</td>
<td>yaax-nik</td>
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<tr>
<td>169</td>
<td>Piperaceae</td>
<td><em>Piper sp.</em></td>
<td></td>
<td>“big leaf” pu-chooch</td>
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<td>183</td>
<td>Caricaceae</td>
<td><em>Carica papaya</em> L.</td>
<td>Wild Papaya</td>
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<td></td>
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<tr>
<td>186</td>
<td>Asteraceae</td>
<td><em>Neurolaena lobata</em> (Linnaeus) R. Brown</td>
<td>Jackass Bitters</td>
<td>Medicine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>190</td>
<td>Unknown</td>
<td></td>
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<tr>
<td>220</td>
<td>Convolvulaceae</td>
<td><em>Merremia tuberosa</em> (L.) Rendle</td>
<td>Potato vine</td>
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<tr>
<td>222</td>
<td>Unknown</td>
<td></td>
<td></td>
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<tr>
<td>232</td>
<td>Cactaceae</td>
<td><em>Epiphylum phyllanthus</em> (L.) Haw.</td>
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<td>235</td>
<td>Poaceae</td>
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<td>K’Kan grass</td>
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<td>Polygonaceae</td>
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<td>Wild Grape</td>
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<td>276</td>
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<tr>
<td>289</td>
<td>Combretaceae</td>
<td><em>Bucida buceras</em> L.</td>
<td>Bullet Tree</td>
<td>Puc’tey</td>
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<tr>
<td>290</td>
<td>Araceae</td>
<td><em>Xanthosoma robustum</em> Schott</td>
<td>Cho-cho</td>
<td>Food</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
sacrifice substitution (FLAAR 2008). It has maintained its ritual usage, being incorporated in religious ceremonies from the Classic Maya ceremonies to the present-day Catholic Church.

Finally, the Cotton Tree (*Bombacopsis quinata* (Jacq.) W.S.Alverson) was used for many purposes across the Maya region, including for nutrition and the fermenting of intoxicating beverages; medicinal and ritual purposes; fiber, stuffing, fuel, oil, and floral ornamentation. The Cotton Tree also has religious significance, and often members of this genus are depicted on sacred Maya ceramics (e.g., as part of a headdress on cacao vessels) (Zidar and Elisens 2009). On another cacao pot, the Bombacoid flower is pictured with the Maize God. In addition, the Bombacoideae family is depicted on incensarios and burial urns. Various animals, including cranes and hummingbirds, are also depicted next to this important family. The depiction of a tree on the jaguar vessel could possibly have been a member of this genus.

**Discussion and Concluding Remarks**

We have presented evidence that support our claim that Str. 1 functioned as a water temple. The question then becomes why the Maya would have built one at Pool 1 for worship—and pilgrimage. To build it, they used materials from the sacred waters, particularly tufa, and even fossils. Since tufa size and number noticeably diminish as we excavated into the rooms, instead of it having served as fill, it is possible that the Maya covered the temple with tufa, or used it in roof construction? Or did they use it as part of a termination rite? The diverse ceramic styles at Pool 1 originate from different areas—the Belize River Valley, northern Belize, eastern Belize, the Petén and the Yucatán suggest that people were coming to Pool 1 from all over to participate in water ceremonies and public feasts.

Cara Blanca’s similarity to Yalbac’s assemblage suggest that Yalbac’s leaders may have played a role in maintaining or controlling Cara Blanca, or perhaps provided the shamans or priests who lived in the buildings on the other side of the pool from the temple or elsewhere nearby (e.g., the settlement found near Pools 7-9) (see Figure 1). Yalbac also is the closest and most accessible center; San Jose and Saturday Creek each are 11km distant from Cara Blanca, but lack the direct access Yalbac has via Labouring Creek, which merges with Labouring Creek to the east. Labouring Creek, c. 2km southwest of Pool 1, is c. 6.5km northeast of Yalbac. These perennial creeks would not only have provided means for pilgrims to get to Cara Blanca, but also would have provided the means to transport offerings—and trade goods (e.g., Woodfill 2011). Other routes approaching Pool 1 include directly from the south by crossing Labouring Creek, from the east along the north side of the pools, and from the north via several ravines. That said, Cara Blanca’s distance from dense settlement indicate that it may have served as a boundary, a liminal place between the living and numinous entities. As such, and similar to caves, water bodies had dangerous aspects and only were to be approached at particular times—such as prolonged droughts.

In conclusion, increasing evidence from excavations shows that Pool 1 at Cara Blanca was a sacred place, likely for pilgrimage and rain ceremonies. As mentioned, nearly all the ceramics date between A.D. 800 and 900, a period when the Maya experienced at least eight multiyear droughts lasting three to 18 years according to results of the isotopic analysis of speleothems from Yucatán caves (Medina-Elizalde et al. 2010). In response, progressively more and more people came to Cara Blanca from the north, south, east and west to supplicate ancestors and water deities, especially the rain god Chaak, who the Maya believed lived in cenotes and other openings in the earth. The Maya brought offerings to the temple, and casted them into the sacred waters.
Future plans include continuing excavations at Str. 1, and we expect to continue finding evidence supporting Str. 1 as a water temple, especially in the Terminal Classic period when the Maya were faced with dealing with several multiyear droughts.

Acknowledgements The 2013 season was funded by a University of Illinois Research Board grant (#13173) and a private donation from Forestland Group, for which we are grateful. We also appreciate permission to work at Cara Blanca provided by the Belize Institute of Archaeology, National Institute of Culture and History, and its landowners, Yalbac Ranch. We are grateful to our top notch field assistants: Cleofo Choc, Stanley Choc, Don Luna, Rutilio Luna, Ernesto Vasquez, Ernesto Vasquez, and Juan Antonio Lópes. Joanne Baron’s exquisite drawings and interpretation (and Simon Martin) of the jaguar vessel are greatly appreciated. Input from Eleanor Harrison-Buck and Astrid Runggaldier about our ceramics was invaluable.

References Cited

Bassie-Sweet, Karen

Cuevas García, Martha

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FLAAR

Gifford, James C., Robert J. Sharer, Joseph W. Ball, Arlen F. Chase, Carol A. Gifford, Muriel Kirkpatrick, and George H. Myer

Harrison-Buck, Eleanor

LeCount, Lisa J.

Kinkella, Andrew

Lucero, Lisa J.


Lucero, Lisa J., and Andrew Kinkella

Medina-Elizalde, Martín, Stephen J. Burns, David W. Lea, Yemane Asmerom, Lucien von Gunten, Victor Polyak, Mathias Vuille, and Ambarish Karmalkar
2010 High Resolution Stalagmite Climate Record from the Yucatán Peninsula Spanning the Maya


ANCIENT MAYA WETLAND USE IN THE EASTERN BELIZE WATERSHED

Eleanor Harrison-Buck

The Belize River East Archaeology (BREA) project is examining the wetlands of the eastern Belize Watershed. Within the 6000 km² BREA study area there are over 122 km² of perennial wetlands (28% of all wetlands in Belize). Here I report on the beginning stages of our investigations of an expansive wetland area in the northern part of the BREA study area, which effectively transformed marginal areas into highly productive agricultural land and profitable centers of aquaculture. Through aerial survey we have identified ditched and drained fields as well as other canal features that resemble ancient wetland features identified in the northern parts of Belize as well as the Gulf Lowlands of Mexico. Our investigations in the BREA wetlands are guided by the following three research objectives: 1) to document the history and aerial extent of wetland use and surrounding Maya settlement; 2) to examine the relationships that exist between wetland agriculture and climate change; and 3) to understand the local and regional economy of wetland agriculture and aquaculture, specifically during the Late-to-Terminal Classic Transition—a period characterized by long-term drought, political collapse, and shifting political economies in the Maya Lowlands. With attention also focused on the associated settlement, this project will shed light on the populations wetland environments were able to support and the role wetlands may have played in both local and regional economies through time, particularly during periods of extended drought.

Introduction

Perennial wetlands are exceedingly rare in the Maya Lowlands and are found only in the periphery or so-called “margins” of the Classic Maya world, including the Candelaria drainage in the Gulf Lowlands of Mexico, southern Quintana Roo, and parts of central-northern Belize (Fig. 1). Research has shown that perennial wetlands provide a rich repository of sediments, fauna, and plant remains that offer important proxies for gauging climate change, such as drought, and for understanding human-environment interactions and adaptive responses to stress in the Maya area (Emery and Thorton 2012a, 2012b; Luzzadder-Beach et al. 2012). Investigations of perennial wetlands have revealed not only important climate data, but also that these biologically diverse environments were intensively managed and used for hunting, aquaculture, and agriculture throughout ancient Maya history (Beach et al. 2009; Pohl 1990; Turner and Harrison 1983; among others). Despite over forty years of wetland research in the Lowlands, we still have a poor understanding of Maya wetland agriculture in terms of the chronology, aerial extent, types of crops that were cultivated, and the role wetlands played in the local and regional economies (Guderjan and Krause 2011:128; Luzzadder-Beach et al. 2012:3646). Detailed settlement data in the area around wetlands is lacking, which limits our understanding of the populations these environments may have supported, particularly during periods of prolonged drought that have been documented at different times across the Maya Lowlands (Brenner et al. 2002; Haug et al. 2003; Hodell et al. 1995, 2005; Iannone 2013; Kennett et al. 2012).

As part of the Belize River East Archaeology (BREA) project, we are investigating the history of wetland use, examining how environment, wetland agriculture, and ancient Maya society operated together in the eastern Belize Watershed from Preclassic through Postclassic times (ca. 950 BC-AD 1500). Within the 6000 km² BREA study area, there are over 122 km² of perennial wetlands, which is significant given there is only a total of 436 km² of wetlands in the entire country of Belize (Meerman and Sabido 2010:Table 2). The signatures of human-wetland interaction are still visible today, but like the Candelaria and Rio Hondo (e.g., Baker 2003:Fig. 8.17; Beach et al. 2009:1711) mechanized agriculture is clearing and trenching massive ditches that are draining and transforming these swamps at a rapid pace and threatening to erase all traces of these features in the archaeological record. My aim is to carry out a human-ecological study of the wetlands that examines data gleaned from archaeology, aerial imagery, palynology, and faunal analysis. Our study of the BREA wetlands is in the preliminary stages and here I present the three
major objectives that guide our current and future research: 1) to document the history and aerial extent of wetland use and surrounding Maya settlement; 2) to examine the relationships that exist between wetland agriculture and climate change; and 3) to understand the local and regional economy of wetland agriculture specifically during the Late-to-Terminal Classic Transition—a period characterized by long-term drought, political collapse, and shifting political economies.

Below I discuss my three research objectives for the BREA wetland study. I present a series of hypotheses concerning the role that drought and distant political economies may have played in the collapse and resilience of wetland economies in Belize, which we plan to test in our future field seasons. Our current understanding of the aerial extent of modified wetlands in the BREA study area comes from intensive inspection of satellite imagery that is publically available on the web. Further study of higher resolution imagery is planned and we also are hoping to document the wetlands aerially using low-flying drones in the summer of 2014, at which time we also will begin formal survey and excavation in the study area.

**Background on Wetland Research**

Guderjan and Krause (2011:128) suggest that current models of ancient Maya political economy “fail to integrate the role of [wetland] agricultural systems into adequate models of macroeconomics, production and trade.” This may be due, in part, to the peripheral location of perennial wetlands, which are largely restricted to the low-lying coastal plains of Belize, southern Quintana Roo in Mexico, and the

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**Figure 1.** Map of the Maya Lowlands showing the locations of wetland fields and sites discussed in text (drafted by M. Brouwer Burg).
Chontal Maya region in the Gulf Lowlands of Mexico. In these peripheral regions of the Classic Maya world, settlements tend to be more modest in size when compared to the central upland region, such as Peten, Guatemala, where the vast majority of large Classic Maya centers are located. These core city centers in the so-called Maya “heartland” were the focus of large-scale archaeological projects in the early years of Maya archaeology and the peripheral regions where wetlands are found received far less attention. It was not until the late 1960s that wetland research came to the forefront of scholarly attention when “ridged and drained fields” were discovered in the wetlands of the Candelaria River and northern Belize along the Rio Hondo and New River during aerial reconnaissance, led by Siemens and Puleston (1972). Wetland research in the 1970s and 80s, including Turner and Harrison’s (1983) seminal study of Pulltrouser Swamp in northern Belize, moved the periphery to center stage in Maya archaeology.

Wetland use in northern Belize dates as early as the Archaic period sometime before 3000 BC (Pohl et al. 1996), but wetland fields with drainage canals and other constructed hydrological features are documented in northern Belize no earlier than the Middle Preclassic period (ca. 950-400 BC) and appear to be mostly abandoned by the Postclassic (post-AD 950 [Beach et al. 2009; Luzzadder-Beach et al. 2012]). A range of wetland field configurations have been documented, including ridged, ditched, drained, and raised field systems with canals. Many of these overlap in form and function and a firm typology has proven difficult to define. “Wetlands in the [Maya] region vary tremendously in hydrologic regimes and soils, and there is no single technology that the Maya could have used to bring all the wetlands under cultivation” (Fedick 1998:109). In some cases, like the perennial wetlands of northern Belize, the Maya built canals “to drain the waterlogged fields of gypsic, high-ion groundwater” that was toxic to young plants, but in other cases they built canals “to deliver water to fields during the dry season, thus extending agricultural productivity” (Luzzadder-Beach et al. 2012: 3650).

Most paleoethnobotanical studies have been largely confined to what people ate (Hastorf 1996). Few studies of wetland agriculture in the Maya area have considered the broader social, political and economic roles that non-subsistence crops like cacao, cotton, and tobacco may have played in the development of wetland fields. These three non-subsistence crops are among the 15 species that Frederick Wiseman (1983:116-117) suggested were cultivated in the wetland fields of Belize, based on his reading of the ethnohistoric accounts from the neighboring Peten region (Hellmuth 1977:433-436). While the pollen of the *Gossypium* species (cotton) has been identified in wetland fields of northern Belize (Bozarth 2009; Hansen 1990; Jones 1994; Wiseman 1983:116-117), the presence of tobacco (*Nicotiana* sp.) and cacao (*Theobroma cacao*) is more elusive in the archaeological record because the pollen does not tend to preserve well (Lentz 1991:279; Muhs et al. 1985:121). Only limited evidence of both plants has been identified from the Maya area primarily as macrofossils (wood fragments and seeds) in flotation of sediments from sites, including Pulltrouser Swamp and Birds of Paradise wetland fields (Bozarth 2009; Guderjan and Krause 2011:129; Morell-Hart 2011:109, 165; Turner and Harrison 1981; Turner and Miksicek 1984). While cotton and tobacco grow in a wide range of environments, cacao is more particular. Soil studies by Muhs and colleagues (1985:131) have revealed that ideal growing conditions for cacao in Belize include the low floodplain soils. This shade-loving tree does not normally grow well in waterlogged environments, but when drained the wetland soils also could potentially support cacao (Beach et al. 2009:1715).

Wetland environments support a wealth of different faunal species. Zooarchaeological studies have shown that the Maya made good use of wetland-fidelic taxa, including fish, mollusca, water-dependent amphibians, reptiles, birds, and mammals (Covich 1983; Emery 1990; Masson 2004; Shaw 1999; Shaw and Mangan 1994; Sheehan 2002). Certain species, such as the tapir (*Tapirus bairdii*), semi-aquatic reptiles, like iguana, and the small brocket deer are known to roam in these moist, wetland habitats (Emery and Thorton 2012a:206). Many of these taxa, particularly fish and mollusca, are
midden contexts, indicating they were important food sources that supplemented agriculture and probably were regularly hunted and collected by the Maya living around wetlands.

The History and Aerial Extent of BREA Settlements and Associated Wetland Use

The landscape of the BREA study area is dominated by water, including sinkholes, springs, lagoons, and streams. The bulk of the 122 km² of perennial wetlands tend to cluster along the slower-moving tributary streams of the Belize River (Figs. 1 and 2). Our survey and excavation in the middle Belize Valley during 2011 and 2012 indicate that ancient Maya settlement is virtually continuous along the main trunk of the Belize River and its tributaries and, unlike other parts of the southern Maya Lowlands, this area appears to have been densely populated during the ninth century Terminal Classic period (Harrison-Buck et al. 2012, 2013). The BREA study area offers an ideal context in which to review human-wetland interactions through time, particularly during the Late-to-Terminal Classic transition (A.D. 800-900) when drought conditions and societal collapse are documented throughout a broad area of the Maya Lowlands (Brenner et al. 2002; Haug et al. 2003; Hodell et al. 1995, 2005; Kennett et al. 2012).

Some of the most convincing evidence of extensive wetland agriculture and hydrological features in the BREA study area have been identified in the stretch of perennial wetlands that are part of the seasonally inundated Revenge and Western Lagoons in the Crooked Tree Wildlife Sanctuary (Pyburn 2003 [Fig. 3]). This area represents the largest inland perennial wetland system in all of Belize, extending more than 24 km in length and 1-2 km in width. At
Figure 3. Google Earth GeoEye Satellite Image of canal features cross-cutting the Western Lagoon Wetlands and the location of Chau Hiix and several other possible sites (in red).

Figure 4. Google Earth GeoEye Satellite Image of Jaeger Wetlands showing fields and canals.
the southern end of the Western Lagoon on the western side is the sizeable ancient Maya center of Chau Hiix, with the largest pyramid measuring 20m in height. Anne Pyburn (2003), who investigated Chau Hiix between 1990-2005, suggested that the site was likely involved in modifying the wetlands with drainage canals for cultivation and also developed extensive channels for both hydrologic and transportation purposes, as well as possible aquaculture.

Pyburn (2003:125) identified and partially excavated two dam features that were constructed where the Spanish Creek enters the southern end of the Western Lagoon near Chau Hiix. The dam features are reminiscent of the impediments that Siemens and colleagues (2002) have identified in the Candelaria Basin. In this same southern part of the Western Lagoon, Pyburn (2003:125) noted fifteen enormous canal features that she thought possibly served as dikes. They measure between .5-.6 km in length and were constructed perpendicular to the stream flow (see Pyburn 2003:Fig. 4). Based on my own examination of more recent satellite imagery (now publically available on Google Earth), it appears that this modified wetland system in Crooked Tree is much more vast than previously reported. North of Chau Hiix, one can detect countless long, linear channels cross-cutting the entire length of this 24km long wetland system in a zig-zag pattern (Fig. 3). While the resolution of the satellite imagery is variable, in each case the channels appear to lead to a well or pond catchment. Pyburn (2003:125) observed several of these wells associated with the large canals and suggested that, together with the dam features, they may have served to regulate the annual flooding and stream flow into the lagoon and that the well features may have been used for pot irrigation for agriculture. The extensive system of linear channels and wells may also have functioned as fisheries. With the annual drop of the floodwaters, the fish would become trapped in the channels of the lagoon and concentrated in the wells where they could be kept and caught throughout the ensuing dry season (cf. Siemens 1983:172-173). Eric Thompson (1974) offered a similar interpretation of aquaculture for the Candelaria, where large, linear channels running perpendicular to the river have been identified that resemble those in Crooked Tree (Siemens and Puleston 1972:Fig. 2).

In comparing the satellite imagery of the BREA study area alongside eco-system maps with similar perennial wetland environments, I was able to identify additional evidence of canals and drained fields in the Jaeger Wetlands to the south along Labouring Creek (Fig. 4) and also some additional evidence of modification in the wetlands associated with Spanish Creek and Black Creek, all of which are tributaries of the Belize River (Fig. 2). Like the Candelaria wetland features, some of the ancient canals seen in the BREA study area may have served as drainage channels for wetland fields and others may have served as transportation routes, including one that links the site of Chau Hiix with an elevated area on the eastern side of the Western Lagoon about 1 km away (Pyburn 2003:125). More recent satellite imagery shows that this long, linear channel continues to the east beyond the edge of the lagoon and I suspect there is a site at the end of this route (see Fig. 3). If thoroughly mapped, these fluvial transportation routes in the BREA study area could provide clues to the movement of goods and people and shed some light not only on the places of production, but also on the centers of distribution and consumption of wetland goods.

Pyburn (2003:123) suggests that Chau Hiix, as one of the larger centers, may have “controlled portage between northern Belize and the Belize River Valley by an inland route between Yucatan and the central Peten.” The Western Lagoon system becomes inundated at the height of the rainy season at which time the Black Creek, which normally flows into the Belize River gets backed up due to high floodwaters and the current of Black Creek becomes reversed. This would have allowed canoes flowing downriver from the Peten to continue their journey north on the Black Creek, without any upstream paddling and enabled them to avoid the coast during the hurricane season. Sites situated along this riverine corridor, like Chau Hiix, were in a strategic position to take advantage of this inland trade route, which replaced a portion of the coastal route and offered merchants a more protected route for canoe transport during this dangerous
time of the year (Pyburn 2003:123). Given the aerial extent of the wetland fields and canal systems, it seems likely that Chau Hiix was one of several Maya centers involved in the development and management of this large-scale wetland project. Local informants from around the site of Rancho Dolores (located on the Spanish Creek south of Chau Hiix) have informed me that several large-scale settlements containing pyramidal architecture exist between the ancient Maya center of Rancho Dolores and Chau Hiix, where the Spanish Creek and Western Lagoon converge (see Figs. 1 and 2).

Based on Pyburn’s (2003) preliminary investigations in Western Lagoon and what I am able to discern in the available satellite imagery, I believe the 122 km² of perennial wetlands of the BREA study area were intensively managed and well-trafficked. With the exception of Chau Hiix, systematic investigation of the area has yet to be carried out. Our first primary research goal is to conduct a regional investigation, which will include aerial survey using satellite imagery and drones, followed by ground-truthing, archaeological survey, and excavation to document the aerial extent of settlements and associated wetland features and their chronology.

Relationships Between Climate Change and Human-Wetland Interaction

Research has shown that wetland environments provide important proxies for gauging climate change, such as drought, and for understanding human-environment interactions and adaptive responses to stress in the Maya area (Beach et al. 2009; Dunning et al. 2012; Emery and Thornton 2012a, 2012b; Luzzadder-Beach et al. 2012). Numerous paleoenvironmental studies point to pan-regional drought conditions during different periods of Maya prehistory, the most famous being the one around the time of the political collapse of many large Peten-affiliated Maya centers at the end of the Late Classic period (for recent discussions see Iannone 2013, ed.; Turner and Sabloff 2012). A recent analysis of tree ring sequences proposes a punctuated period of drought between A.D. 897-922 (Stahle et al. 2011). Other recent paleoclimate data gleaned from speleothems (cave formations) recovered from caves in southern Belize show a series of multi-decadal droughts including one that occurs between A.D. 820 to 870 (Kennett et al. 2012:789). Although the chronology varies somewhat, the paleoclimate records suggest a pan-regional trend of long-term drought that may have continued as long as a century, overlapping with the Terminal Classic period when most large Classic centers in the Southern Maya Lowlands collapse. Most of these paleoenvironmental studies in the Maya area are widely dispersed across the Lowlands and in most cases have been carried out separately from the archaeological investigations, making it difficult to confidently link human adaptive strategies to changing environmental conditions. Research has shown that perennial wetlands are ideal environments for revealing evidence of drought through marked changes in faunal species, vegetation, and water tables and offer a context in which to review these diverse paleoecological records in direct association with the cultural contexts (Emery and Thorton 2012a, 2012b; Dunning et al. 2012; Luzzadder-Beach and Beach 2009). For instance, Emery and Thorton (2012a:215) observe that “archaeological swamp-fidelic fauna record highly site-specific climate histories that are not captured by broader paleoenvironmental studies.”

Luzzadder-Beach and colleagues (2012:3646) conclude: “Research on wetland field systems can demonstrate the diversity and complexity of ancient human adaptations to changing environments, and they demonstrate starkly different interactions between humans and wetlands even in similar and nearby environments.” This site-based variability emphasizes the importance of conducting regional studies that examine multiple sites and a range of datasets, such as cultural stratigraphy, the zooarchaeological record, as well as palynological evidence found in settlement deposits, wetland soils, and ancient wetland features (raised and ditched fields, canals, wells, dams, and dikes). Many of these hydrological features may reflect adaptive strategies in response to prolonged drought, which required more intensive management of available water resources. A reduction of wetland surface water may have impacted not only wetland farming, but also Maya aquaculture (Pyburn 2003:126;
Siemens 1983:167; Thompson 1974). Emery and Thorton (2012a:206) found that the reduction of archaeological fauna, particularly water-dependent swamp/wetland-fidelic species, is indicative of the contraction of aquatic and moist habitats. In comparing relative abundance of aquatic taxa, they found an overall drop in small water-body species in middens and other settlement contexts during the ninth century Terminal Classic period when compared to assemblages from prior centuries of the Late Classic period (A.D. 600-800), a time when moister periods are recorded in the paleoclimate record (Emery and Thorton 2012a, 2012b).

To evaluate the relationship between human-wetland interactions and the impact of climate change, namely drought, we will examine the faunal evidence and the timing of wetland use and abandonment of sites, for example Jabonche (Figs. 1 and 2), which is located adjacent to the wetlands. This study will be aimed at testing Emery and Thorton’s (2012a, 2012b) hypothesis that suggests aquatic taxa from small water bodies, such as perennial wetlands, diminish in the Terminal Classic period at most sites when compared to the Late Classic period and can serve as a local index of drought directly associated with cultural contexts.

Evaluating the Local and Regional Economy of Wetlands

Much like the Candelaria, the low-lying wetlands of Belize are situated in a commercially strategic location along the major eastern riverine corridors of the Belize, Hondo, and New Rivers. The Maya inhabitants living here were in a position to take advantage of not only a trade network connecting to large inland regional capitals of the Peten, but also long-distance trade moving up and down the eastern Caribbean coast. Both glyphic and architectural evidence suggests that Classic Maya centers in the Peten, like Naranjo, may have been competing for control over these peripheral production zones (Fields 2004; Harrison-Buck et al. 2007; McAnany et al., 2005: 317; LeCount and Yaeger 2010; Taschek and Ball 1992). Even after the Peten political economy dissolved at the end of the Late Classic period, the riverine corridor in the eastern Maya Lowlands of Belize may have remained a strategic commercial location because it is situated at the convergence of a circum-peninsular trade route that expanded during ninth century Terminal Classic (Kowalski 1989). Participation in this long-distance trade network would have connected the Maya living along the rivers in the eastern periphery of Belize with the distant trading economies of the Gulf of Honduras, northern Yucatan, and the Gulf Coast of Mexico.

Jeff Kowalski (1989:173-177) and others suggest that this long-distance circum-peninsular trade network was developed and administered by Chontal-Itza factions originally from the Gulf Lowlands, who established a regional capital at Chichen Itza in northern Yucatan during the ninth century (Harrison-Buck and McAnany 2013; Sabloff and Willey 1967; Thompson 1970; Vargas 2001; among others). The broad distribution of so-called “non-Classic” traits found in Maya epigraphy, iconographic elements, fine paste ceramics, and new types of architecture, including circular shrines and c-shaped structures has been linked to the outward movement of Chontal-speaking “Mexicanized” Maya merchants stemming from the Gulf Lowlands (Kowalski 1989; Kristan-Graham and Kowalski 2007:35; Sabloff and Willey 1967; Thompson 1970; Vargas 2001; among others). Kowalski (1989) suggests this Chontal-Itza influence is relatively short-lived, dating to a narrow period of time in the Terminal Classic (AD 790-909), based on epigraphic data that contains Gulf Coast calendrical elements with squared cartouches (Rice 2004:238).

Many of these “non-Classic” traits are found in the eastern Maya Lowlands of Belize during the ninth century. At Chau Hiix, Andres (2009) reports finding non-Classic traits dating to the ninth century, including fine paste ceramics and Northern Yucatec (Muna Slate) trade wares that were associated with an elongated c-shaped structure. Elsewhere in the BREA study area, I have identified three examples of Terminal Classic circular shrine architecture during our first two field seasons (Harrison-Buck 2011, 2013). I also investigated three other examples from sites in the Sibun Valley just south of the Belize River (Harrison-Buck 2007, 2012; Harrison-Buck and McAnany 2013). Numerous other examples of Terminal
Classic circular structures, along with fine paste ceramics and imports from the Gulf Coast and northern Yucatan appear during the ninth century at sites in the eastern Maya lowlands of Belize (Fig. 1), including Nohmul (Chase and Chase 1982), Blue Creek (Guderjan et al. 2009), Lamanai (Scott Simmons, personal communication June 2012), Caye Coco (Masson and Mock 2004), and San Juan on Ambergris Caye (Guderjan and Garber 1995).

The Peten and Chontal-Itza influence seen in Belize during the Late and Terminal Classic periods likely was facilitated by the trading activity along the eastern riverine corridor, but the nature of these core-periphery relationships remains debated (Harrison-Buck and McAnany 2013; McAnany et al. 2002; Reese-Taylor and Walker 2002). In the context of wetlands, various economic models have been proposed for wetland agriculture that range from centralized to decentralized systems of production, distribution, and consumption. In small village contexts, such as K’xaob that ring wetlands like Pulltrouser Swamp, scholars are more inclined to view wetland reclamation as a small-scale kin-based endeavor (Berry and McAnany 2007). However, the range of wetland formation in northern Belize—from the irregular, piece-meal construction of fields found at Pulltrouser Swamp to the large-scale, pre-planned projects like the fields in the Birds of Paradise wetlands on the Rio Hondo (Luzzadder-Beach et al. 2012)—reinforces the notion that wetland agriculture was a dynamic and heterogeneous practice that cannot be placed under a single economic category (Berry and McAnany 2007:160).

Based on ethnohistoric accounts from sixteenth-century Yucatan detailing the roles and responsibilities of the Maya nobility, Foias (2002:226) argues that elite duties were primarily political, judicial and religious involving only a small amount of economic oversight, namely tribute collection. She cites Roys’ (1943:57-64) discussion of the political institutions in the Yucatec provinces at the time of Spanish Contact. Roys (1943:61) notes that sources of income for the halach uinic or provincial ruler included the “produce of the cacao groves and farms worked by his own slaves” and a “very light” tribute levied from each town in his province, which included goods such as maize, beans, chile, poultry, honey, cotton cloth, and game, as well as salt and fish if the town was on the coast (Roys 1943:61). At the time of the Spanish conquest, Lamanai was likely the provincial seat of a halach uinic and capital of a Yucatec-speaking province known as Dzuluniacob, which encompassed the entire eastern Belize Watershed and other parts of central-northern Belize (Jones 1989). Elsewhere I have suggested that the ceramic distributions for the Terminal Classic period sharply parallel the boundaries of this province and may indicate this “political geography” dates earlier in time (Harrison-Buck 2007, 2010).

Guderjan and Krause (2011:128) speculate that the wetland agricultural systems in northern Belize supplied both food and non-food products and were “a Maya ‘bread-basket’, providing products to the equally highly populous Northern lowlands (Merida, Chichen Itza, etc.) which did not have access to the highly fertile soils of the south.” Yet, we currently know very little about “how much and how far the Maya transported food” (Luzzadder-Beach et al. 2012:3647). Pyburn (2003:127) suggests that foodstuffs cultivated in the vast extent of wetland fields in the seasonally inundated Western Lagoon adjacent to Chau Hiix would have far exceeded the needs of this one community. She suggests that such goods were transported outside the local area and speculates that Lamanai or Altun Ha—two of the largest nearby settlements to the east and west of Chau Hiix—may have been the recipients of this surplus. Yet, she acknowledges that neither Altun Ha nor Lamanai appears to have had any land shortages and concludes, “if either community depended on food from Chau Hiix, it was because they were supplying more than local needs” (Pyburn 2003:128). The ethnohistoric records suggest that places like Chau Hiix and others along the Belize River may have cultivated both subsistence and non-subistence crops, like cacao, cotton, and tobacco in the adjacent wetland fields and that some of these products may have been destined for local trade and/or tribute with centers like Lamanai that maintained a seat of power in the area from Classic to Postclassic times (ca. A.D. 700-1450). Moving
outside the local region, it is difficult to imagine subsistence crops, like maize, traveling hundreds of kilometers by canoe to places like Naranjo in the Peten or Chichen Itza in northern Yucatan. However, the ethnohistoric accounts suggest that non-subsistence luxury crops, like cacao, cotton, and tobacco were traded over great distances and may have served an important economic role in terms of trade and/or tribute with these two distant core areas where the cultivation of such products, namely cacao, was more limited (Jones 1989:102; Scholes and Roys 1968:29).

To address our third primary research objective concerning the influence of local and regional economies, BREA investigations will examine the architecture, artifacts, fauna, and paleoethnobotanical evidence from wetland fields and associated (elite and non-elite) settlements to determine the degree of influence local and more distant polities may have had on the wetland economy, particularly during the Late and Terminal Classic Periods.

Conclusions

There is little doubt that the Maya living in northern Belize at sites like Lamanai, Chau Hiix, and Jabonche registered the “value” of the wetland environments not only for their rich resource potential, but also for their ties to the riverine and coastal trade networks. What remains debated among scholars is 1) the degree to which elites controlled these wetland economies and 2) the impact drought may have had on Maya communities relying on wetlands for agriculture and aquatic resources. To what extent did wetland fields in Belize support local populations and/or supply regional goods to other more distant locations? Did wetland farmers grow both subsistence and non-subsistence crops? Did these crops serve the immediate population, meet the demands of the burgeoning populations of the Peten in the Late Classic and/or fulfill the economic demands of Chontal-Itza merchants during the Terminal Classic? Did prolonged periods of aridity impact wetland resources and farming practices and ultimately lead to their demise?

If wetland economies were contingent on the florescence and decline of Peten and/or Chontal-Itza political economies, then we would expect to see a close alignment with their historical trajectories in the chronological sequencing of wetland abandonment (early 9th and 10th centuries, respectively). In this case, we would expect to find in wetland fields the remains of non-subsistence luxury crops, like cotton, cacao and tobacco that were central commodities of trade and/or tribute with these distant regions. If elites held some degree of control over the economic production and distribution (and not just consumption), then we would expect to see a marked disparity in the artifact distributions with commoner (or slave) residences relatively impoverished and elite residences showing substantially greater wealth. In this vein, we might expect to see special trade wares (gifts) in elite contexts and the display of artifacts and architectural styles emulative of local and “foreign” powers.

If long-term drought played a primary role in the decline of both wetland agriculture and aquaculture, it would not necessarily align with the political and economic oscillations of the Peten or Chontal-Itza. Rather, the decline of wetland use should align more closely with pan-regional, multidecadal periods of drought, occurring in the Terminal Classic period somewhere between ca. A.D. 820-922 (Kennett 2012:789; Stahl 2011). In this case, we might expect to see during this period of stress an increase in adaptive strategies for sustaining water supplies, aquatic habitats, and agricultural resources, including the construction of canals, dams, wells, artificial levees, and other hydrological control features for managing different water sources. Long-term drought would result in the reduction of surface water in wetlands and in this case we would expect to see an overall drop in small water-body species in middens and other wetland settlement contexts during the ninth century Terminal Classic when faunal assemblages are compared to the prior centuries of the Late Classic when moister periods are recorded in the paleoclimate record (A.D. 600-800 [Emery and Thorton 2012a, 2012b]).

The results from the different components of our research project (survey, excavation, palynology, faunal studies, and radiometric dating) will provide indices of local climate history and settlement, along with an understanding of the aerial extent, chronology,
and different types of crops that were grown in surrounding wetland fields and will allow us to cross-examine these hypotheses concerning climate change and shifting political economies. With attention focused on the settlement associated with wetlands, we hope to gain a better understanding of the populations wetland environments were able to support and the role(s) wetlands may have played in both local and regional economies through time, particularly during periods of extended drought. Our study of fauna and plant remains from perennial wetlands will offer important proxies for gauging climate change. In this way, we will be able to further evaluate the geographic extent and local impact of drought conditions and expand our understanding of complex human-environment interactions and adaptive responses to stress, particularly during the Late-to-Terminal Classic transition when pan-regional drought conditions are reported throughout much of the Maya Lowlands.

**References Cited**

Andres, Christopher  

Baker, Jeff  

Beach, Tim, Sheryl Luzzadder-Beach, Nicholas Dunning, John Jones, Jon Lohse, Tom Guderjan, Steve Bozarth, Sarah Millspaugh, and Tripti Bhattacharya  

Berry, Kimberly A. and Patricia A. McAnany  

Bozarth, Steven R.  

Brenner, Mark, Michael F. Rosenmeier, David A. Hodell, and Jason H. Curtis  

Chase, Diane Z., and Arlen F. Chase  

Covich, Alan P.  

Dunning Nicholas P., Timothy P. Beach, and Sheryl S. Luzzadder-Beach  

Emery, Kitty F.  

Emery, Kitty F. and Thornton, Erin K.  

Emery, Kitty F. and Thornton, Erin K.  
2012b Tracking Climate Change in the Ancient Maya World through Zooarchaeological Habitat Analysis. In *The Great Maya Droughts in Cultural Context*: Case Studies in Resilience and Vulnerability, University of Colorado Press, Boulder, CO.

Fedick, Scott L.  

Guderjan, Thomas H., and James F. Garber
1995 *Maya maritime trade, settlement, and populations on Ambergris Caye, Belize. Labrinthos*, Lancaster, CA.

Guderjan, Thomas, Timothy Beach, Sheryl Luzzadder-Beach, and Steven Bozarth

Guderjan, Thomas H. and Samantha Krause

Hansen, Barbara C.S.

Harrison-Buck, Eleanor


Harrison-Buck, Eleanor, Adam Kaeding, and Satoru Murata

Harrison-Buck, Eleanor and Patricia A. McNaney

Harrison-Buck, Eleanor, Satoru Murata, and Adam Kaeding

Hastorf, Christine A.

Haug, Gerald H., Detlef Gunther, Larry C. Peterson, Daniel M. Sigman, Konrad A. Hughen, and Beat Aeschlimann

Hodell, David A., Mark Brenner, and Jason H. Curtis
2005 Terminal Classic drought in the northern Maya lowlands inferred from multiple sediment cores in Lake Chichancanab (Mexico). *Quaternary Science Reviews* 24:1413-1427.

Hodell, David A., Jason H. Curtis, and Mark Brenner

Iannone, Gyles (editor)

Jones, Grant D.

Jones, John


Kowalski, Jeff K.
1989 Who Am I Among the Itza?: Links between Northern Yucatan and the Western Maya Lowlands and Highlands. In *Mesoamerica after the Decline of Teotihuacan AD 700-900*, edited by R. A. Diehl
Kristan-Graham, Cynthia, and Jeff K. Kowalski  

LeCount, Lisa J., and Jason Yaeger  

Lentz, David L.  

Luzzadder-Beach, Sheryl and Timothy Beach  

Luzzadder-Beach, Sheryl, Timothy P. Beach, and Nicholas P. Dunning  

Masson, Marilyn A.  

Masson, Marilyn A. and Shirley B. Mock  

McAnany, Patricia A., Ben Thomas, Steven Morandi, Polly Ann Peterson, and Eleanor Harrison  

Meerman, Jan and Wilbur Sabido  

Morell-Hart, Shanti  

Muhs, Daniel R., Robert R. Kautz, and J. Jefferson MacKinnon  

Pohl, Mary D.  


Pyburn, Anne K.  

Reese-Taylor, Kathryn  

Reese-Taylor, Kathryn and Debra S. Walker  

Rice, Prudence M.  

Roys, Ralph L.  

Sabloff, Jeremy A., and Gordon R. Willey


Turner, B. L. and Peter D. Harrison (editors) 1983 Pulltrouser Swamp: Ancient Maya Habitat, Agriculture, and Settlement in Northern Belize. University of Texas Press, Austin, TX.


Vargas Pacheco, Ernesto 2001 Itzamkanac y Acalan: tiempos de crisis anticipando el futuro. Universidad Nacional Autónoma de México, México.

AT THE CROSSROADS: EXAMINING THE HATS KAAB MONUMENT AS A NODE OF TRADE AND COMMUNICATION IN THE EASTERN BELIZE WATERSHED

Marieka Brouwer Burg, Eleanor Harrison-Buck and Astrid Runggaldier

In 2011 a large architectural complex, known as Hats Kaab, was identified within the Belize River East Archaeology (BREA) study area and test excavations were performed in 2012. While E-Group-like in its configuration, the structure displayed various anomalies, most notably the lack of an associated ceremonial center or residential structures. Here, we explore reasons why the Late Preclassic Maya would have placed such a large monument in a relatively “isolated” location. We posit that this site marked an important crossroads or nexus between east-west and north-south trade and communication networks. To bolster these claims, various lines of evidence were explored, including a least cost-path analysis between the Belize, Sibun, and New Rivers; and artifact analyses of obsidian from the Guatemalan highlands and groundstone from the Maya Mountains. We conclude that the Hats Kaab monument may have served as a natural meeting point and functioned as a recognized place in the landscape for groups to congregate and exchange both information and trade goods beginning as early as the Preclassic period.

Introduction

In 2011, the Belize River East Archaeology (or BREA) project discovered a large architectural configuration during archaeological field survey (Harrison-Buck 2011; Runggaldier et al. 2012). The site, known as Hats Kaab, was initially thought to be an E-Group monument on account of its large western mound faced on the east by three smaller, linear mounds running along a north-south axis. An additional southern mound helped to circumscribe a large, flat plaza. Apart from the intriguing arrangement of buildings, surface collection of the monument yielded some compelling artifacts: two chert projectile points presumably Late Preclassic in age; a polished greenstone axe head and celt base; three metate and four mano fragments; a hammerstone; some Preclassic and Classic era ceramics (including a bulbous mammaform foot); and a very large (75cm) bifacially flaked chert eccentric. Needless to say, the initial evidence warranted a return to the site for further investigation. Here, we describe the results of recent excavations, artifact analysis, and least cost path studies, all of which indicate that the monument of Hats Kaab marked an important crossroads location within the Maya Lowlands.

In January and May-June 2012, we opened two excavation trenches (Operations 7 and 9, positioned along the central axis of the eastern platform; Figure 1), with the goals of (1) obtaining temporal resolution of the site through analysis of the stratigraphic sequence; (2) determining the site’s primary function vis-à-vis artifact analysis and distributional studies; and (3) documenting the degree of post-depositional disturbance. We felt that the site was particularly well suited to answer the third of these goals – regarding post-depositional disturbance and site integrity – because it had been cleared of bush only around 10 years previously, and has been planted with sorghum only in the last five years. The results of a systematic surface collection campaign revealed that much of what we call “bake clay material” (i.e., daub) was recently formed by brush-burning events on top of the naturally clayey soils (Runggaldier et al. 2012). To put into perspective the relative recentness in which the site was cleared, it was still in bush when the nearby (1.5km south) complex of Saturday Creek was excavated by Dr. Lisa Lucero and the Valley of Peace Archaeological (VOPA) Project in 1998–2002 (Lucero 1999, 2002).

The results of the 2012 excavations revealed that the Hats Kaab monument was erected and used minimally in the Late Preclassic, although it cannot be excluded that the site was constructed and used in earlier years as well. An analysis of the ceramic assemblage yielded convincing evidence of a Late Preclassic occupation (including such types as Sierra Red, Society Hall Red, Polvero Black, Flor Cream, Matamore Dichrome, and San Antonio Golden-brown; Runggaldier et al. 2012). Radiocarbon dates taken from both excavation trenches were dated in January of this year by the University of
Arizona AMS lab, fully supporting the temporal interpretations from the ceramic analysis (Table 1).

All three radiocarbon dates fall squarely in the Late Preclassic period, between 400 B.C. and A.D. 150. Of the three dates analyzed, Samples 1 and 2 are statistically coeval, overlapping considerably in their reported ages. Sample 3, by contrast, appears to date to a separate and earlier occupation of the site. These results were intriguing to us, as Samples 1 and 2 were derived from the Operation 7 trench, located along the east-west axis of the central eastern mound. Sample 3 was derived from the Operation 9 trench, located 10m to the north of Operation 7. These samples reveal part of the construction history of the site: the lower and larger platform was constructed first, followed some 100-200 years later by the erection of structures atop the platform. A presumed sacrificial burial found at the bottommost western edge of the Operation 9 trench suggests an initial dedication or offering at the site.

We will not go into detail here on the theory behind E-group typology, functionality, or construction, except to note that Hats Kaab has the look and feel of an E-group (as described by Aimers 1993; Aimers and Rice 2006; Aveni 2003; Chase 1983; Chase and Chase 1995; Cohodas 1980). The monument consists of a large western mound perpendicularly positioned across from three north-south structures atop a
level platform; a large interior plaza; and a building arrangement that accurately predicts the rising of the sun over the northern part of the eastern platform at the summer solstice (which was tested on the morning of June 21, 2012). However, there are also architectural characteristics that do not conform to standard E-group morphology, including the presumable later construction of a broad platform on the south side of the western mound; the possible offset nature of the middle building on the eastern platform; the fact that the structures were not built directly on bedrock; and the lack of associated residential architecture. Until further horizontal excavation of the western mound and eastern platform can be undertaken, we can only speculate that the Hats Kaab monument functioned at times as an E-group, such as those found at Caracol or Uaxactun (Chase 1983; Chase and Chase 1995; Blom 1924; LaPorte and Fialko 1993; 1995; Ricketson and Ricketson 1937).

We posit that the structural variations exhibited by Hats Kaab differ from other established E-groups because of its divergent function. Current literature holds that most E-groups were used initially for observation of astronomical events, important cyclical markers in the yearly agricultural calendar (Aimers 1993:46; Aimers and Rice 2006:80; Aveni and Hartung 1989; Aveni et al. 2003; Chase and Chase 1995; Estrada-Belli 2010:79), and later appropriated by elites and rulers for establishing and maintaining dynastic power. Hats Kaab, however, requires a cross-examination of these assumptions of E-Group functionality and perhaps an elaboration on the breadth of uses of such monumental sites. In specific, we believe this monument functioned more broadly as a place for community gatherings, as well as a nodal location for travelers exchanging goods and information.

E-groups are commonly positioned near site cores, and often on elevated acropolises. Hats Kaab, however, is located in relative isolation, or what Thompson (1939) and later McAnany (1986) have referred to as “interstitial areas” between larger monumental sites. The nearest site with residential architecture, known as Xaman, lies about 0.5km to the east (Figure 2). Similar residential sites lie to the north, west, and south (Chumu’uk Ha, Chikin Chi’haal, Chik’in, Saturday Creek, and Ma’x’an). To our knowledge, Hats Kaab is the only E-group-like monument that has been found without a surrounding settlement to accompany it, which begs the question: Who would have used the site? The nearest mid-sized site with an established Late Preclassic occupation is Saturday Creek, at a distance of 1.5km. For this and other reasons, we believe the Hats Kaab monument may have served multiple purposes as well as multiple segments of society.

Another idiosyncrasy of the Hats Kaab monument involves its size. A comparative survey of Late Preclassic E-group dimensions was conducted that measured both the length/width and surface areas of western mounds, eastern platforms, and plazas (Table 2). The analysis revealed that the primary buildings (e.g., the western pyramidal mound and the eastern platform) and the plaza of the Hats Kaab monument exceeds even the largest established E-Groups, such as Tikal, Caracol, and Waka-Guio (Laporte and Fialko 1995; Chase and Chase 1995; Hansen pers. Comm.). The western pyramidal mound at Hats Kaab is roughly 1.3 times larger than Caracol’s; the Hats Kaab eastern platform is 1.4 times larger than Caracol’s; and the Hats Kaab plaza is 1.7 times larger than as its counterpart at Tikal. It should
Table 2. Comparative Analysis of E-Group Dimensions and Surface Area, as Compared to the Monument of Hats Kaab (adapted from Runggaldier et al. 2012:70).

<table>
<thead>
<tr>
<th>Site</th>
<th>West Mound dimensions (m)</th>
<th>West Mound surface (m²)</th>
<th>East Platform dimensions (m)</th>
<th>East Platform surface (m²)</th>
<th>Plaza dimensions (m)</th>
<th>Plaza surface area (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uaxactun</td>
<td>24x23 (main mound); 14 x 13 (south platform)</td>
<td>734</td>
<td>70x40</td>
<td>2800</td>
<td>92x44</td>
<td>4048</td>
</tr>
<tr>
<td>Tikal</td>
<td>60x60</td>
<td>3600</td>
<td>89x21</td>
<td>1869</td>
<td>135x69</td>
<td>9315</td>
</tr>
<tr>
<td>Caracol</td>
<td>63x58</td>
<td>3654</td>
<td>115x52</td>
<td>5980</td>
<td>65x48</td>
<td>3120</td>
</tr>
<tr>
<td>Wakna-Guíro</td>
<td>71x44</td>
<td>3124</td>
<td>191x27</td>
<td>5157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hats Kaab</td>
<td>94x52</td>
<td>4888</td>
<td>156x56</td>
<td>8424</td>
<td>171x95</td>
<td>16,587</td>
</tr>
</tbody>
</table>

be noted that the dimensional estimates for the plaza at Hats Kaab are conservative, extending only to the northern edge of the eastern platform. It is possible that a northern structure once circumscribed this space, but has since been destroyed by modern-day road and channel construction.

To further illustrate the sheer size of the Hats Kaab monument, we plotted known E-groups in the Belize lowlands, Petén, and Campeche region by plaza size (Figure 3). Hats Kaab appears in relative isolation, in a depopulated intervening area between other E-groups or ceremonial centers. The twin factors of site openness and accessibility, paired with the very large size of the Hats Kaab monument, suggests to us that this site may have been used as a place for the gathering of large groups of people, perhaps as part of community-wide celebrations or events.

Given the anomalous physical characteristics of the Hats Kaab monument, the following question arises: If this architectural configuration was intended to function as an E-Group structure, why was it so large and why was it constructed in the middle of the Belize River watershed, in an area commonly considered to be sparsely populated hinterland? Given that the nearest politico-ritual centers (such as Lamanai, Xunantunich and Cahal Pech, and Caracol) lie at least 40km distant as the crow flies (and much further if traveled by foot or canoe, especially in the upriver direction), Hats Kaab’s primary purpose was probably not related to reinforcing divine kingship. Rather, we believe that the monument functioned as a ritual or civic outpost that facilitated gatherings of the dispersed rural farming communities living in the vicinity (similar to the county fair model in rural America). Researchers working at sites such as Cival and elsewhere in the greater Maya region have documented that people from the outskirts often traveled to site cores in order to partake in civic and ritual ceremonies (Estrada-Belli 2011). Such a location would provide periphery populations with a minor core location, not too far from home, to converge at during parts of the year,
presumably coordinated around important yearly agricultural cycles marked by astronomical events such as solstices and equinoxes. This would provisionally explain why an E-group-like structure was constructed at this juncture instead of some other monumental architectural form. The unique shape and size of the Hats Kaab monument may be a product of architectural appropriation or imitation, or it may have been an intentional choice to expand the existing E-group template seen at other civic-ceremonial centers to meet the needs of this “interstitial” community.

Recent research has also indicated that the site of Hats Kaab may have operated as a strategic crossroads location along trade and communication routes between northern and central Belize, and between the Petén interior and the coast. We know from ethnohistoric accounts that the Spanish used a hybrid overland/overwater path to travel between northern and southern Belize, following the New River south toward Laboring Creek, down Cut-and-Throw Away Creek to Colorado Lagoon, and on to the Belize River and beyond (Jones 1998). It seems plausible that the Spanish followed a course tried-and-tested by the Maya themselves, who may have used this route for many hundreds or thousands or years previously. Looking at ceramic assemblages from the Terminal Classic, Harrison-Buck (2011) has previously suggested that an overland route would have passed very close by to the Hats Kaab site (Harrison-Buck 2011). We are now investigating whether this path had even deeper roots as far back as the Late Preclassic by establishing that Hats Kaab was an important node in the regional system of communication and trade. The crossroads explanation also helps to justify the large size of the plaza, its relative openness, and its accessibility. The Hats Kaab monument was built on a low terrace of the Belize River floodplain and survey data up to this point does not suggest that any features, human or otherwise, would have impeded site entry. The plaza was constructed at the level of the surrounding ground surface and does not entail any access-restricting buildings or structures (e.g., ball courts, causeways, or retaining walls).

We have investigated multiple lines of evidence including artifact analysis and least cost path (LCP) geospatial modeling in order to refine our understandings of the possible overland routes that may have been trod to reach Hats Kaab and the Middle Belize Valley. Below, we discuss the preliminary results of these analyses undertaken during recent field and lab work.

Testing the Hypotheses

We assume that if the Hats Kaab monument was indeed utilized as an interstitial gathering place for locals and a waypoint for travelers, there ought to be material traces of ritual, political, and economic behaviors.

Regarding ritual-political activities, our primary evidence comes from a possible sacrificial burial at the base of the eastern platform, although this inference is speculative at best (Figure 4). Radiocarbon Sample 3 was derived from this burial, and dated to 256 B.C. +/- 41. Weather and time restrictions precluded further exposure or removal of the burial; it was found during the last week of excavation, during which time the rains had just begun with vengeance. However, the positioning of the individual at the base of the eastern platform is a pattern that has been found at other E-Group sites (e.g., Seibal and Cival)(Inomata 2012; Estrada-Belli 2011). The only additional ritual evidence from the site derives from an abundance of obsidian bladelets, which could be indicative of ritual bloodletting activities; however, the widespread occurrence of use-nicking on many of the specimens suggests more mundane uses as well.

Regarding economic activities, analysis of the Hats Kaab artifact assemblage yielded a large number of groundstone fragments, both in terms of count and weight values. In fact, a greater number of groundstone pieces were recovered from Hats Kaab (one of our smaller sites area-wise) than any other excavated site in the BREA project area (Figure 5). Such an overabundance of groundstone for a presumed ritual or civic site is intriguing and implicates additional activities such as feasting, trading, or marketing. This evidence dovetails with our previous argument about the size of the Hats Kaab plaza and the assumption of
Figure 4. Possible Sacrificial Burial from Hats Kaab (from Runggaldier and Brouwer Burg 2012:82).

Figure 5. Groundstone Counts and Weights from All BREA Sites.
accommodating large gatherings of people who likely needed to bring their own food preparation and cooking implements, and who clearly ground a lot of maize. No residues have yet been processed, nor have we discerned any concrete patterns in the distribution of the groundstone artifacts, undoubtedly due to the intensive agricultural disturbance the site has undergone in the past 10–15 years. However, the fact remains that many metates (n=19 fragments) and manos (n=17) were brought, used, broken, and left behind at the site (and we assume there is much more, as we have only excavated a small fraction of the site). In the future, we hope to test the soil chemistry of the site to see if elements such as phosphorus occur in elevated levels.

The primary raw material used was pink granite, sourced from the Maya Mountains to the south about 20km (43% of the assemblage). Other tool stone were used sparingly. This suggests that the users of the Hats Kaab monument actively participated in a regional economic exchange system and to a lesser extent, long-distance trade (e.g., basalt from the Highlands of Guatemala).

Geospatial Modeling

Given that the groundstone evidence indicates movement of people, goods, and ideas transpiring in the central Belize Valley, we turn next to the questions of how and where: how did people move between interstitial areas like Hats Kaab to central nodes in the Maya economic, political, and ritual spheres; and where, or rather what, paths did they follow? To unravel these questions, a least cost path analysis (LCP) was undertaken using ArcGIS. In very broad brush strokes, this type of analysis builds upon the basic premise that if you can estimate how much energy (or other cost unit) it takes to pass from one location to another, you can then generate a composite surface representing the degree of difficulty of moving across the landscape from Point A to Point B. A least cost path analysis, then, calculates the route from a source to a destination that accumulates the least amount of friction. Such geospatial analyses have been used increasingly by archaeologists in recent years, as they can provide instructive hypotheses about the nature of human movement and exchange of goods. The primary goal of this analysis was to ascertain which routes would have been most suitable for overland and overwater travel between Hats Kaab and other sites with Late Preclassic occupation. Four main travel scenarios were modeled: (1) overland travel in the dry season, (2) overland travel in the wet season, (3) overwater travel in the dry season, and (4) overwater travel in the wet season.

A number of important input data “building blocks” must be gathered and pre-processed before a least cost path analysis can be carried out. For this study, input data surfaces included topography, ecosystem extents, and river drainages, all provided by the open source site Biodiversity and Environmental Resource Data System of Belize (www.biodiversity.bz; Figure 6). For each travel scenario, relative friction weights were constructed to represent the differential ease of moving through a given ecosystem. For example, moving through lowland savanna in the dry season is assumed to have been relatively easier than moving through lowland broad-leaved forest. The final step of the process calculates the most direct and least costly path to get from a source (in this case, Hats Kaab) to a destination. The destinations used in this analysis included a number of sites with Late Preclassic occupations in Northern Belize, the Upper Belize Valley, and the Sibun watershed (Figure 7).

The results of the LCP analysis reveal that if one were to pass overland from Hats Kaab to more northerly sites, the most likely route proceeded through the predominantly lowland savanna corridor between the New River and Western Lagoons. A site like Chau Hiix may have served as yet another important waypoint in this north-south movement. To pass overland from Hats Kaab to Xunantunich or Cahal Pech, a route that roughly parallels the Belize River was least costly. To pass overland from Hats Kaab to the Sibun, travel appears to have followed along Beaver Dam Creek. Based on the assumptions of overland travel suitability for the wet or dry season, the least costly routes changed slightly, mostly avoiding areas that have the potential of becoming extremely wet in the rainy season.
Figure 6. Input Data for the Least Cost Path Analysis.
Figure 7. Output of the Least Cost Path Analysis.
Analysis of over-water travel reveals that the least costly path from Hats Kaab to the northern sites follows the course of the New River, Black Creek, the Belize River, and even up into the Booth’s River watershed. This travel scenario assumes that portaging would take place between river drainages (an activity documented in the ethnohistoric records), and we see that the route changes very little between the seasons.

While these results are still extremely preliminary, and further geospatial analysis is ongoing, we believe the centrality of the Middle Belize Valley is clearly discernable as a crossroads for human movement, trade and communication between the north, south, east and west. When comparing the overland route used by the Spanish (see Jones 1998:Map 2), we see that it very closely parallels the LCP generated by this study. Thus—regardless of the point of departure, the destination, or the mode of travel—human traffic probably proceeded through this otherwise interstitial area of the Maya lowlands. It is not surprising then that the Maya would choose to erect a large E-Group-like monument in this nodal location, likely serving economic, civic, and ritual functions for both the surrounding communities as well as the various travelers passing through.

**Ecological considerations**

The last line of evidence considered here involves the ecological diversity of the Hats Kaab interstitial area. Assuming that the average person walks between 3–4km/hr and could keep up this rather leisurely pace for around eight hours, an individual could hypothetically walk about 24–32km in a day. If that individual plans to walk out to a particular ecological niche and return within the day, they would probably not want to venture more than about 12–16km before returning to their home base. If the individual plans to walk out and bivouac, they could walk about 12–16km from their home base. Figure 8 displays these distances graphically (the red circles). The smaller of the two circles has a 14km radius and the larger of the two has a 30km radius. What is key is that an array of different ecological zones that can be accessed within a day’s walk from Hats Kaab. If an individual wanted to make a day trip, they could access lowland savanna, shrubland, lowland broad-leaved forest, wetlands, riparian zones, and rivers. If an individual wanted to make an overnight trip, they could access a submontane broad-leaved and pine forest, and waterfalls in the northernmost reaches of the Maya Mountains, as well as more extensive savannas, wetlands, freshwater lagoons, and inland mangrove to the north and west. This relative ecological diversity presumably added to Hats Kaab and the central Belize Valley’s attraction.

**Summary and Conclusions**

To conclude, we have drawn on multiple sources of data to investigate the significance of the Late Preclassic monument of Hats Kaab as an important crossroad location. In the future, additional types of evidence and further analyses will be added. Interpretations of the Hats Kaab monument have so far proven a challenge, as the site defies E-Group norms in size, context, and location. Given the relatively peripheral location of the site, its lack of association with
other monumental or residential buildings, and its position in the Middle Belize Valley, we believe that the site was a rural community-gathering place as well as a nexus for the exchange of goods and information via travelers and traders. We see the site as an interstitial location from a sociopolitical perspective (between civic-ceremonial cores) and a geographic perspective (between Chetumal Bay and the Maya Mountains, and between the coast and the Petén interior). We do not believe it’s a coincidence that Hats Kaab and the Middle Belize Valley mark the crossroads between these axes.

1We refer to the Hats Kaab architectural configuration interchangeably as both a site and a monument, as it is isolated in space, but also represents large-scale non-utilitarian building.


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References


Aveni, Anthony F., Anne S. Dowd and Bejamin Vining 2003 Maya Calendar Reform?: Evidence from Orientations of Specialized Architectural Assemblages. Latin American Antiquity 14:2, pp. 159-178.


Inomata, Takeshi

Jones, Grant D.

Laporte, Juan Pedro, and Vilma Fialko


Lucero, Lisa J., editor

Lucero, Lisa J., editor
2002 Results of the 2001 Valley of Peace Archaeology Project: Saturday Creek and Yalbac, Report submitted to the Department of Archaeology, Ministry of Tourism, Government of Belize.

McAnany, Patricia A.

Ricketson, Oliver G., and Edith B. Ricketson

Runggaldier, Astrid, Brouwer Burg, Marieka, and Eleanor Harrison Buck

Runggaldier, Astrid, and Brouwer Burg, Marieka

Thompson, J. Eric S.
23 USING CUTTING-EDGE LIDAR TECHNOLOGY AT EL PILAR BELIZE-GUATEMALA IN DISCOVERING ANCIENT MAYA SITES ~ THERE IS STILL A NEED FOR ARCHAEOLOGISTS!

Anabel Ford

The exuberant vegetation of the forest challenges archaeological settlement in the Maya Area. The solution for survey has been to design sampling strategies that gather data by linear transect or positioned quadrant samples. These have been based on maps using land survey techniques and, more recently, Global Positioning Systems. From these terrain samples we have been able to extrapolate our data and analyze to the greater Maya area. This method has proven successful in developing interpretations of ancient patterns of Maya residential and civic ceremonial sites, yet the objective of understanding the details of settlement and land use has remained illusive. LiDAR (Light Detection And Ranging) is a remote sensing method capable of penetrating overlying vegetation and forest canopies, imaging at very high spatial resolutions and with extraordinary accuracy. New data for the El Pilar Archaeological Reserve for Maya Flora and Fauna provide the potential to understand the subtleties of settlement and land use. We will discuss the nature of the new LiDAR data for El Pilar and how this could revolutionize survey strategies in the future.

Introduction

Archaeological survey in the verdant tropical Maya forest presents challenges in finding undiscovered archaeological sites, and yet most of the large sites have been identified and located (Figure 1). Traditional mapping strategies have involved focused surveys of specific areas, usually around major centers, such as Tikal (Carr and Hazard 1961). Later, the surveys expanded in areas outside of centers, such as my work between Tikal and Yaxhá (Ford 1986). These settlement data have given us samples of ancient landscapes that can be projected across broader areas, as I have done in the context of the GIS (Ford and Clarke 2005; Ford et al. 2009; Ford et al. 2011), and this data has been extremely useful in predicting Maya residential patterns across the Upper Belize River Area (Figure 2) and beyond (Fedick and Ford 1990). While traditional survey techniques have provided results in spite of the constraints of the dense forest, new and cutting edge LiDAR technology has the potential to be a game changer for archaeology in tropical areas, as with the work of the Chases’ at Caracol (Chase et al 2011, 2012). The recent contribution from Mayaniquel of Guatemala of LiDAR data for the El Pilar Archaeological Reserve for Maya Flora and Fauna provides a remarkable new view that expands our understanding of the Maya occupation at the site (Figure 3). Using this technology, we can readily identify the large temples and locate them precisely on the landscape with extraordinary spatial precision. Is this the new magic wand? How will archaeologists integrate this new tool? What are its potentials for discovery?

El Pilar is an ideal location to develop the new field study protocol of integrating LiDAR...
technology because of the comparison with traditional field archaeological surveys that have been conducted there. We have been working at the site for over 20 years and have mapped the major architecture (Figure 4). Human activities have had little subsequent impact on the Maya forest around the site since the Classic Maya monumental infrastructure was abandoned around CE 900. Now a protected area in Belize and Guatemala, there is a need for an understanding of El Pilar’s cultural remains as part of the binational management planning process. Thus, the results of our first validation project of the LiDAR imagery will begin the development of a comprehensive map of the Maya landscape of El Pilar for research, and will also provide vital input for the adaptive management of the site in Belize and Guatemala.

The Application of LiDAR at El Pilar

LiDAR (Light Detection And Ranging) is a laser based remote sensing method capable of penetrating overlying vegetation and forest canopies, imaging at very high spatial resolutions and with extraordinary accuracy. LiDAR simultaneously images the top of a tree canopy, its mid-biomass, and the ground, which comes out in the “last return” part of the laser pulse (Figure 5). In a recent publication of the Proceedings of the National Academy of Sciences, Chase and others (Chase et al. 2011, 2012) have argued that LiDAR is poised to generate a fundamental shift in Mesoamerican archaeology with the potential to transform research in forested areas worldwide. The El Pilar LiDAR project is part of this global archaeological revolution.

Prior to LiDAR, many of the secrets of ancient Maya settlements remained hidden from view; yet now with LiDAR, large and small structures are visible in the imagery (Figure 6). Successful identification of built structures from LiDAR, however, depends on the use of robust interpretive algorithms to extract terrain features from the data “point cloud.” In other words, LiDAR results must be decoded to interpret cultural structures and this is a work in progress. Inspection of the visualization results provides the “targets” for validation (Figure 7). These can be obvious residential compounds, suspected monuments, and more subtle features of small
Figure 5. Point Cloud view of El Pilar Looking South, Green is the forest Canopy and Blue is the ground surface. Note the cultural feature of major acropolis on the left.

Figure 6. Mapped structures in a quadrant at El Pilar.

structures, depressions, and quarries. Validation in the field is critical in building strategies to distinguish cultural from natural features and to separate artifacts of the image processing from physical surface features. We need to look at all types of visualized elements—both those we think are positive ancient elements as well as those that appear ambiguous or negative. This way, we can begin to understand thresholds of interpretations and the factors that impact our analyses.

Exploring Solutions Past ~The Maya Forest Alliance, a US non-profit, recently received a gift from Mayaniquel of airborne LiDAR imagery covering the entire 20 sq km area of the El Pilar Archaeological Reserve. At
the highest resolution of c. 20 laser pulses per square meter images were recorded from a helicopter that moves sinuously across the area. Data were gathered on forest canopy (height and density) and ground surface in an enormous data set called a “point cloud” that incorporates all of laser point observations. We have processed the LiDAR data using Terrascan and custom feature extraction software (Pingel 2010, 2012). The result, called the “bone map” (see figures 4 and 6), provides an interpretation of the last laser return that is variable across the 20 sq km (Figure 8). We have used these images to target potential positive cultural features, questionable elements, and areas without features at El Pilar.

The 2013 season was aimed at building a field validation scheme and a protocol for moving from the LiDAR visualization imagery in the context of the Geographic Information System (GIS) to the field using the Global Positioning System (GPS). We have gathered a tremendous amount of data in our two-month field season. Focusing on a detailed area of c. 1.4 sq. km in the core of the city, we now are processing and analyzing the data. This new tool has many implications for field survey at Maya archaeological sites. Determining just how much is readily interpretable and what requires more field attention will take time to sort out. While it may well take the four years it took Car and Hazard (1961) to map Tikal, our goal in using our LiDAR data is not simply to produce a map El Pilar, but to devise a reliable and repeatable field strategy protocol for the verification of the imagery for archaeologists working in forested areas beyond the Maya forest.

**Themes and Issues with LiDAR**

At first review, one is staggered at the quality of the surface detail and information that can be gleaned from the ground point LiDAR visualizations. In many ways it is a magic wand. Indeed, the development of a contour map is miraculous (Figure 9). But as one works through the details, issues arise that need attention. There is the assessment of the last return, used for developing the ground surface imagery. The coverage is variable in terms of the laser count per unit area (see Figure 5).
Figure 8. Ground point coverage by Hectare.

Figure 9. Contour map at One-Meter of the El Pilar Archaeological reserve for Maya Flora and Fauna.
Table 1: Comparison of Four GPS Units Used in the 2103 El Pilar Field Validation Survey.

<table>
<thead>
<tr>
<th>GPS device</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td>Garmin® 62S</td>
<td>Garmin® 62S</td>
<td>Garmin® Etrex10</td>
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<td>6.6 m</td>
<td>8.3 m</td>
<td>7.7 m</td>
</tr>
</tbody>
</table>

Figure 10. Example LiDAR Laser Returns at El Pilar: Total, Last, and First Returns.

There are also the visualization methods (see Figure 7) and the thresholds of element interpretation, not to mention the accuracy of the GPS units (Table 1). All these aspects impact working with the LiDAR and the results produced. This 2013 field season began the testing of these dimensions.

Average LiDAR coverage is gathered with as few as 7 laser points per square meter up to 30 or more points per square meter. In the case of El Pilar, our coverage averaged 24 laser points per square meter. These points are gathered from the top of the vegetation to the last return at the presumed surface. The greater points returned from the tops of the vegetation limits the number of points that reach to the surface. The factors impacting surface coverage are complex, we have recorded canopy and understory density in an effort to isolate the potentials.

Each laser point is accurately georeferenced with X and Y surface coordinates, as well as a Z as elevation. These data are gathered from the first element (bird, leaf) with which the laser comes into contact all the way down towards the ground surface, returning data at each obstacle (branch, trunk), eventually to the surface of the landscape (a root, rock, ground). This provides a laser reference point in the return for each reference be it a bird or butterfly in the air, the top leaves of the forest canopy, the branch on the way down, the roots, and last the ground surface (Figure 10). In other words, not all point cloud reflects the ground topography (see Figure 5). The main factor impacting the ground point reference appears to be the vegetation cover. Our tests suggest that canopy and understory density have great effect on the ground point coverage and thus the surface interpretations.

We experimented with 15 distinct visualization methods and compared images among them (see Figure 7). Signatures of cultural features, natural topography, and what we called artificial elements varied among the different visualizations. In addition, while...
Figure 11. Citadel Feature validated East of the Main temples of El Pilar.

Figure 12. Sunken Plaza Identified with LiDAR and Confirmed in the Field.
certain visualizations were better at imaging cultural features, others were better at natural features. Artificial signatures as a result of the computer visualizations are complex; many may be related to the algorithms used in the visualizations to identify surface elements. These artificial elements show up with the processing of data and could be from spreading palms, such as the Corozo or Cohune palm, or expanding roots of large trees, such as found in Amate fig and Ramon trees. More testing of these relationships will help define the variations.

One visualization stands out as remarkable—the topographic contour lines demonstrating the great potential of the georeferencing data of the ground point data of LiDAR. For the 20 sq km area of the El Pilar Archaeological Reserve, we were able to develop a 1-meter contour map (see Figure 9) revealing details of hills, lowlands, and water flows that were only vaguely understood before the LiDAR. Our visualizations produced excellent one-meter contour maps for the area, and discussions with LiDAR analysts suggest we can expect accuracy to 0.5 meters. These topographic data are extremely important in understanding water drainages and settlement relationships, the identification of the cultural features, and may also help isolate factors of the detection thresholds.

Determining thresholds of interpretation based on the visualizations will take more experimentation and testing. How does the size of the cultural feature impact its detection? The large features are very clear and can be seen with some precision (see Figure 4). But is there a limit below which structures are invisible. What length and what height may we hold as a limit? It is clear that the more linear the feature, the more detectible. This is true for low berms as well as clear walls. Yet small structures appear to be variably visible. We will continue to pursue this line of analyses.
The last issue is the GPS locational data collection. The LiDAR imagery provides the most accurate geo-referencing data that can be had, but the generally used GPS units, unless survey grade, are not measuring up to the accuracy of the LiDAR data. We used four separate GPS units, 3 of the Garmin type 62S and one of Garmin type Etrek10. We experimented with averaging points and instant points. Interestingly, regardless of collection method, all varied within 7-8 meters of each other (Table 1). Neither the averaging nor the instant point determination yielded different results. Thus, with recreational grade GPS units, your results will vary within a radius of 7 meters of an actual point. In most cases, this distance is not dramatic. The site location can be replicated on a return visit with the data at hand.

Accomplishments for El Pilar

In the context of our expanding UCSB Maya Forest GIS, the work with the new El Pilar LiDAR data are establishing an essential base for the site-specific scale research that will enhance our accumulating GIS layers of air photographs, soil studies, plant identification, archaeological surveys, and excavation data. Existing sites maps from the field have provided visual correlates of ancient human constructions visible in the LiDAR imagery based on our enhanced GIS visualizations. Unusual complexes have already been detected: a “citadel” like construction to the east of the main monuments of El Pilar (Figure 11) and a sunken plaza (Figure 12) that appears to link the offset causeways—neither feature had been recorded before the LiDAR visualizations. These discoveries change our understanding of ancient Maya land use and the city of El Pilar, but features like these can only be proven with field validation.

We have already extracted a complete topographic map of El Pilar and have been able to re-register earlier and less accurate observation data stored in our Maya forest GIS (see Figure 9). We also can produce visualizations of cross sections of the landscape to better understand the relationship of the ground and forest, taking for example linear features that were then field verified as terraces (Figure 13); though not all linear features in the visualizations were verified in the field. Each situation demonstrates the complexity of moving from the visualization to the ground truth. Validations require good old-fashioned archaeology, walking though the areas, verifying the features and field mapping the architecture.

As we work in more detail, the verification of elements and feature results against the ground truth testing will allow both a quantitative evaluation of the success of the new method and the field protocol required to integrate and apply this new technology. We anticipate that the new map of the ancient city of El Pilar will be among the most complete and accurate of Maya forest GIS databases.

Based on the LiDAR, we prepared exploratory targets for the field validation. This included feature classifications such as built structures, linear alignments, ambiguous objects, and irregular surfaces. In the field, we assembled coordinates based on the identified elements of the LiDAR and prepared coordinate files to be uploaded into the GPS. These coordinates were identified in the GPS and used to navigate to the actual field targets. At the target features, we verified their qualities, confirming the presence of Maya structures with sketch maps. The classifications of features at El Pilar have initiated the creation of a remarkable map layer of the archaeological features and remains of the ancient city, creating an essential strategy for confirming cultural features illuminated in LiDAR imagery. The ultimate objective will be a GIS and field protocol to aid other archaeologists, working with such imagery, to discern the nature of features within forested landscapes.

The amazing preliminary results that are visible with the El Pilar LiDAR speak to the new archaeological revolution (Chase et al 2011, 2012). But the work only begins with the initial and remote GIS processing of the LIDAR data. Without the ground truth inspection and the feedback to refine and adjust the GIS feature extraction algorithms, we will not be able to have confidence in the visualizations. With improved and validated LiDAR results, we can build a foundation for understanding the LiDAR imagery as results are validated with the use of traditional archaeological field methods. We can then begin to explore the patterns of ancient
Maya land use and their significance in archaeology. LiDAR will be the basis for developing and refining new archaeological research, mapping methods and cultural resource management for the future.

Conclusions

LiDAR, a remote sensing instrument capable of penetrating vegetation, is creating a shift in Mesoamerican archaeology with the potential to transform research in forested areas worldwide. The secrets of ancient Maya sites have been hidden from view beneath the forest canopy, only to now be revealed with this new technology. Our LiDAR imagery, covering the 20 sq km of the ancient center of El Pilar, provides a basis for understanding archaeological settlement patterns and land use in the El Pilar Archaeological Reserve for Maya Flora and Fauna. High-resolution data gathered on the forest canopy and ground surface in a “point cloud” provide the opportunity to incorporate a new and powerful tool for mapping under the forest canopy. We have been able to create a basic topographic map of the reserve with LiDAR and we have begun to identify and interpret elements using a new algorithm with superior LiDAR processing results for cultural features. We find that features and elements identified in the LiDAR visualizations must be visited in the field for validation in order to accurately develop a cultural map of El Pilar. LiDAR technology as a new tool can provide detailed coverage of surface and forest characteristics sufficient to revolutionize archaeological fieldwork, especially densely forested areas. Nevertheless, LiDAR results must be interpreted and validated in the field. We still need the archaeologist!

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References


Pingel, T. J. 2010 Strategic Elements of Route Choice, University of California, Santa Barbara.
Recent studies strongly suggest that Mesoamerican people living in urban communities were not just dispersed across the landscape, but were instead living in neighborhood and districts, much like populations in cities throughout history. Neighborhoods are smaller groupings of residential units where people lived and engaged in social and economic interactions with each other based in part on proximity and kin group histories. Districts are larger settlement clusters that may have functioned as local administrative centers. Both would have been locations of collective action, and formed viable and integral components for the functioning of urban states. Drawing on spatial settlement data we present a model for settlements at Uxbenka, a small but important Classic Period Maya polity that thrived from AD 1 to AD 810.

Introduction

This paper discusses the settlement system at Uxbenká, located in the Toledo District of southern Belize (Figure 1), focusing specifically on the identification and description of neighborhoods and districts as an organizing principle for the distribution of households across the landscape. Spread out over at least 30 km², the settlement system at Uxbenká can be described as dispersed, with household compounds conforming to hilly topography and located entirely on hilltops and ridge tops surrounded by agricultural lands.

Settlement studies are crucial for understanding most any aspect of complex societies. They are the locations where the majority of the populations lived and the nexus of social relations that define political, economic, and religious structures critical for the functioning of the polity. They provided the labor and resources that supported the political apparatus so highly visible in civic-ceremonial architectural complexes. It is through a bottom-up approach with a focus on settlements and commoners, as opposed to monumental architecture and elites, that we begin to tease out the complex interactions and social relationships of past societies.

Intensive research on settlements still constitutes a relatively small proportion of archaeological studies in the Maya Lowlands. Until the 1960s most research focused on urban cores, site-centers, and related special deposits across the Maya Lowlands, and hinterland settlements were less robustly studied. Today, settlement archaeology studies the places where most people lived, farmed, and produced goods and crafts in houses, neighborhoods, and communities (Ashmore 1981; Smith 2011). Recent research suggests that the vast populaces in Maya centers were not homogenous peasants and farmers, and that both rural and central places housed both elites and commoners (Robin 2001) who interacted and co-participated in political, economic, and religious activities that characterized Maya polities and states. Many archaeologists now recognize that settlement and household archaeology are key loci for
understanding the relationships between populations, landscapes, and socio-political and economic dynamics.

Ancient Maya cities have been described as a form of low-density urbanism (Fletcher 2009), characterized by residential groupings interspaced with open agricultural zones distributed across the landscape, which functioned as urban neighborhoods (Smith 2011). According to Smith (2010: 139, 2011: 53), “a neighborhood is a residential zone that has considerable face-to-face interaction and is distinctive on the basis of physical and/or social characteristics.” The composition of these heterogeneous districts and neighborhoods (Robin 2003) form a type of urban residential zone, with architectural groups of varying size and complexity reflecting distributions of wealth and social rank across the city.

A newer trend in archaeological research is the identification of possible neighborhoods and districts as a social unit of past societies. Neighborhoods as tools for the analysis of social organization have been proposed for multi-room buildings in Ur houses in Mesopotamia (Brusasco 2004), ancient Athenian houses (Goldberg 1999), and Pueblo Bonita at Chaco Canyon in the Southwestern US (Bustard 2003). However, most of these studies have focused on spatial organization within a single multi-unit building, rather than the complex interactions between many households spread across the landscape. In the Maya region, neighborhoods have been understudied, with a lack of discussion or analysis of such interpretations (see Smith 2011: 52). Sites in northwestern Yucatan Peninsula, including Chunchucmil, Chacchon, Cuca, Coba, Becan, Mayapan and Dzont Ake’, have boundary walls built between their settlement clusters. These walls act as dividing lines between different residential groups (Dahlin et al. 2005: 231; Hutson et al 2004: 75; Webster 1980: 835 – 840). It has been suggested that the walls are too low to act as defensive barriers and may instead act as boundaries between social groups and help to affirm social identities. Recent work at Baking Pot has used neighborhoods as an identifier of social groupings (Hoggarth 2012) and attempted to detect spatial alignments between housemounds (Bevan et al. 2013). There has been an increased interest in the use of statistics in neighborhood analysis (Bevan et al. 2013), however most work has utilized visual and non-quantitative methods in distinguishing social clusters. We rely on both statistical modeling and visual methods in our classification of neighborhoods.

Settlements in Southern Belize

Southern Belize is a frontier region of the southern Maya Lowlands, circumscribed by the Maya Mountains to the west, swampy bajos to the south, the Caribbean Sea to the east, and inhospitable pine-barrens to the north. Despite these constraints, this geographic frontier was economically and politically connected to the rest of the Maya world. Landscape clearing in southern Belize dates at least to the Late Archaic (Culleton et al. 2012), suggesting indigenous populations could have played a role in the development of sedentary communities and eventually a series of well-developed polities. The earliest known communities with public architecture are Ek Xux in the Maya Mountains, and Uxbenká, in the foothills, which were occupied by the end of the Late Preclassic (400 BC-AD 250), when the region was still sparsely populated. Other centers did not develop until the end of the Early Classic, ca. AD 250-550 (Nimli Punit, Pusilha and Quebrada de Oro), and the Late Classic, ca. 550-900, witnessed a proliferation of political centers (e.g., Lubaantun, Xnaheb, Muklebal Tzul). During the eighth century AD there were at least 20 centers with public architecture, independent rulers, and significant populations dispersed across agriculturally rich hills and valleys.

These major communities are distributed across four different ecological zones, each of which was crucial to the success of the polities, and likely fundamental to their foundation. Ek Xux, Quebrada de Oro, and Muklebal Tzul are located in tributary valleys of the Bladen River, which host a variety of important mineral resources and rich soils derived from the underlying volcanic bedrock of the Maya Mountains (Dunham and Prufer 1997). Pusilha is located along a navigable section of the Moho River, with access to rich alluvial soils (Braswell and Prufer 2009). Coastal sites accessed marine trade routes and resources (Robinson and
Figure 2. Base LiDAR map with surveyed areas and settlement groups identified at Uxbenka. These represent settlements that have been ground truthed in addition to having been identified on from the LiDAR data.

McKillop 2013). Uxbenká, Lubaantun, and Nimli Punit are located along an unusually fertile 25km long hilly relief feature composed of interbedded Tertiary calcareous mudstones, sandstones and shales extending from the foot hills of the Maya Mountains to the north to the coastal plain in the south (Hammond 1975; Prufer et al. 2011).

Settlement studies in southern Belize have been patchwork and it is very difficult to make detailed synthetic statements from a regional perspective (see Hammond 1975; Kindon 2002; Prufer 2002; Braswell et al. 2005). Two general points can be made, however: First, settlements in the region conform to local topographic conditions, and, second these locations of settlements correspond to availability of important resources, such as productive farmlands. For example, Pusilha, Quebrada de Oro, and Ek Xux are located on alluvial plains and have highly nucleated settlements around this resource. Uxbenká, Lubaantun, Nimli Punit, and Mukelbal Tzul are located in high-relief hilly environments with settlements spread across ridges and hilltops in a dendritic fashion that allows for clear differentiation of clusters.

Settlement Studies at Uxbenka

Settlement patterns at Uxbenka suggest a heterarchical arrangement of residences, characterized by a central elite-focused core (administrative, political, religious, and residential center) with a dispersed and economically heterogeneous population spread out across the landscape. These include both smaller hinterland households and elite residential compounds located up to 2.5 km from the site core. The groupings likely formed a
type of urban neighborhoods (Smith 2011), with economic and political authority spread across the landscape, yet also focused on the urban core. We suggest that settlements at Uxbenká were divided into neighborhoods at multiple levels, and that two large clusters that include public architecture may have formed districts and, following Smith (2011: 53), that “….neighborhoods are relatively small spatial zones whose creation and maintenance result from social interaction, mutual support, and other bottom-up or generative social processes. They often co-exist with larger residential zones created by municipal or state authorities for administrative purposes. I call these latter units districts.”

Known settlements at Uxbenká are dispersed across over a 20 km² area centered on a political and religious site core (Figure 2). Decisions regarding settlement locations, and hence patterns were likely guided by both local topography and resources. The landscape is characterized by rolling hills and ridges separated by incised seasonal and perennial streams primarily flowing north to south, and draining into the Rio Blanco. Soils derive from the Toledo Beds, extending from the foot hills of the Maya Mountains to the north and bounded to the south by a Cretaceous limestone karst ridge known locally as the Rock Patch. The Rio Blanco drains an area of approximately 170 km², which flows south over the Toledo Beds until it abruptly turns east at the Rock Patch for 3 km, before flowing underground into a massive cave known as Oke’bal Ha.

All settlements at Uxbenká are located atop hills or ridges. This distribution can likely be attributed to several factors. High rainfall (>4000mm/year, Kennett et al. 2012) makes low-lying areas unsuitable for settlement as water levels in stream drainages fluctuate wildly in the rainy season, from May to December. Local modern subsistence farming techniques also suggest that hilltops are unfavorable for maize due to high winds that accompany storms, but hill slopes are favored. Hilltops are also defensible locations and provide a degree of comfort with access to trade winds blowing from the Caribbean Sea.

Methods for studying settlements at Uxbenká have evolved over the last decade. Initial research in 2005-2007 focused on walking ridges and hilltops to identify and map architectural clusters. It was quickly determined that traditional use of linear transects to identify settlements was not a productive strategy, as no settlements were located in low-lying areas and thick secondary growth vegetation made this method time consuming and expensive. Initially, these survey methods were largely opportunistic. Each year Mopan Maya farmers from the nearby village of Santa Cruz slash and burn tracts of land for the planting corn, beans, and rice. In doing so, they remove the dense foliage, which provides us with an opportunity to explore previously unexamined portions of the landscape with relative ease. By 2011 this had facilitated the identification of 57 residential compounds with excavations conducted in 37 (Kalosky and Prufer 2012).

LiDAR Mapping and the identification of Neighborhoods and Districts

In 2011 the UAP acquired 137 km² of Light Detection and Ranging (LiDAR) in collaboration with the National Center for Airborne Laser Mapping (NCALM). LiDAR comes from lasers fired at the ground from a unit attached to a fixed wing aircraft that reflect back to a series of collectors on the plane. The degree of saturation of the lasers across the landscape is variable, but at Uxbenká we averaged approximately 15 laser returns per square meter in key areas centered on the site core, allowing us to build a Digital Elevation Model (DEM) of approximately 1m, meaning that most relief features more than 100cm high could be clearly discerned. LiDAR data produces large “point cloud” data which can be modeled in three dimensions. We examined two classes of data: "ground" and "non-ground" point returns. “Ground” returns pick up the lowest acquired data points that generally reflect the ground surface, below vegetation, or on the “base earth.” “Non-ground” data points reflect objects above the ground surface, primarily vegetation.

In 2012 and 2013 combined analysis of LiDAR data in the project GIS using the software package LP360 (Q-coherent 2012) and ground-truthing allowed us to increase the number of documented settlements groups to 80, with 331 individual structures, and conduct a
statistical study that identified patterns in the clustering of residential compounds into neighborhoods and districts. Analysis of the LiDAR data indicates that the settlement system was much larger, extending over at least 25 km², however, given modern geopolitical boundaries of villages our survey area has only included those in a 9.8 km² area surrounding the site core.

Settlement groups were initially classified using a settlement typology designed for Uxbenká (Culleton 2012; Kalosky and Prufer 2012) based on local architectural variation and similar to typologies used throughout the Maya Lowlands (Ashmore 1995; Becker 1999, 2004; Leventhal and Baxter 1988; Robin et al. 2004; Webster 1999; Webster et al. 1992). This consists of a hierarchy of five classifications reflecting differences among residential groups. Type 1 groups contain single isolated structures. Type 2 groups consist of 2-3 structures, but lack a formal arrangement. Type 3 groups are composed of 4-7 structures arranged around a central plaza and reflect greater investment of labor and wealth. Type 4 residential groups contain 7-9 buildings. These groups are arranged on a raised platform with an open plaza, may be located on stone-faced hillslopes that create a façade, and have some evidence of landscape modification, primarily hilltop leveling. Type 5 groups consist of more than 10 structures as well as ancillary buildings, and reflect an extended kin-group. They also have significant labor investment in landscape modification, and frequently have some type of public architecture (paved plazas, large shrines, ancestral tombs, or ballcourt). Type 5 groups are arranged around at least 2 conjoined plazas. Out of all the settlements surrounding Uxbenká, we identified 13 (18%) Type 1 groups, 21 (29%) Type 2 settlements, 24 (33%) Type 3, 6 (8%) Type 4 groups, and 8 (11%) Type 5 groups (Figure 3).

Uxbenká neighborhoods were calculated using the Nearest Neighbor Analysis (NN) and Kernel Density tools in ArcGIS 10.0, followed by visual identification and assignment of clusters based on NN results. The NN Analysis indicated that the mean observed distance between settlement groups at Uxbenká is 203 m, a reflection of settlement choices made by the early residents based on topography and resources. This number was used as the distance measure for a Kernel Density analysis, which resulted in a map showing increasing buffers around each settlement with a maximum distance of 203 m. If the buffers touch or connect, the settlement groups are less than 203 m from each other and may have been within the same social sphere or neighborhood. This resulting map was then employed to visually group clusters of settlements into neighborhoods based on both their proximity to each other and density of structures. Groups were created by identifying nearest neighbors based on the use of incrementally increasing buffers; once groups were assigned to the more clustered settlements, outliers were incorporated using the results of the Directional Distribution tool on the core groups. The Directional Distribution analysis summarizes the central tendency, directional trends, and dispersion of input features to create standard deviational ellipse shapefile between nearby groups. Using these analyses, we grouped Uxbenká settlements into 15 neighborhoods, some of which can in turn be grouped into larger clusters, or districts (Figure 4). Following Smith (2010, 2011) we define districts as social boundaries that incorporate several neighborhoods and include higher-status residences (those with significant investment in landscape alteration and public architecture with political or religious functions). Districts were centers of gravity for nearby neighborhoods, and had additional economic, religious, and political functions.

Discussion
Settlement systems are not simply households spread across the landscape. People
who live in the same city aggregate into neighborhoods based on kin ties and common economic or social interests, and interact with each other within those clusters. They are a feature of all cities and even villages (Smith 2010). Santa Cruz, the small Mopan Maya village where Uxbenká is located, and whose residents farm the same lands as their distant ancestors, is also divided into neighborhoods, where people visit with each other daily and form distinct relationships based on proximity. Districts also link people together, but based on other social features that could include administrative functions, religious activities, or as local places for extraction or redistribution of goods and services. The also often co-exist with larger residential zones (Smith 2011).

At Uxbenká we have used formal characteristics of settlement clusters in combination with spatial statistics to propose a distribution of neighborhoods and districts within a 3km radius of the site core. The site core is also a cluster of architectural groups that served a specific function: a civic-ceremonial zone and the epicenter of the city. At Uxbenká the site core also contained residential complexes, most of which likely served the needs of this specific precinct (Prufer et al. 2011). Wealth however was not centralized entirely in this zone. Several outlying clusters of architecture have clear indicators of wealth that distinguish them from the rest of the residential zones of the city. These include the presence of ballcourts (Group I), large plazas and megalithic walls (Group M), significant investment in landscape modifications over centuries (SG 25 and 28), outlaying religious temples (SG 25), and elaborate tombs (Group L and SG 25).

The spatial identification of neighborhoods and districts is not the complete...
story of the social distribution of wealth and power at Uxbenka, or even a definitive identification of the distribution of social relationships based on neighborhoods and districts. Instead it is a starting point for more detailed analysis of excavation contexts and the quantitative and contextual analysis of material culture from these architectural clusters. It serves as a starting point for generating additional hypotheses that can be tested in future studies.

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References

Ashmore, Wendy

1981 Lowland Maya Settlement Patterns. School of American Research, Santa Fe.

Becker, M.J.


Bevan, A, E. Jobbová, C. Helmke, and J.J. Awe

Braswell, G. and Prufer K. M.

Braswell, Geoffrey E., Christian M. Prager, Cassandra R. Bill, and Sonja A. Schwake

Brusasco, Paolo

Bustard, Wendy

Culleton, Brendan
2012 Human ecology, agricultural intensification and landscape transformation at the ancient Maya polity of Uxbenka, southern Belize. PhD Dissertation, Department of Anthropology, University of Oregon.

Culleton, Brendan, Keith M. Prufer, and Douglas J. Kennett

Dahlin, Bruce, Timothy Beach, Sheryl Luzzadder-Beach, David Hixson, Aline Magnoni, Eugenia Mansell, and Daniel E. Mazeau

Dunham, Peter S. and Keith M. Prufer

Fletcher, Roland R.

Goldberg, Marilyn Y.
Hammond, Norman  

Hoggarth, Julie  
2012  *Social Reorganization and Household Adaptation in the Aftermath of Collapse at Baking Pot, Belize*. PhD Dissertation, Department of Anthropology, University of Pittsburg.

Huston, Scott R., Aline Magnoni, and Travis W. Stanton  

Kalosky, E.K. and Keith M. Prufer  
2012  *Recent Results of Settlement Survey and Hinterland Household Excavations at the Classic Period Site of Uxbenká, Toledo District, Belize*. In *Research Reports in Belizean Archaeology* Volume 9:255-266.


Kindon Andrew W.  
2002  *Classic Maya Sociopolitical Organization and Settlement Patterns in the Maya Mountains of Southern Belize*. Ph.D. Dissertation, Department of Anthropology, UCLA.

Leventhal, R.M., Baxter, K.H.  

Prufer, Keith M.  

Prufer, Keith M., Andrew Kindon, Holley Moyes, Brendan J. Cullen ton, and Douglas Kennett  

Quigley, Declan  

Robin, Cynthia  


Robin, C., Middleton, C.W.D., Juarez, S., and Morrison, M.K.  

Robinson, M. E., and McKillop, H. I.  

Smith, Michael  


Webster, David  


Webster, D., Sanders, W.T., and Van Rossum, P.  
25 PROCUREMENT, PRODUCTION, AND DISTRIBUTION OF OBSIDIAN IN THE SOUTHERN BELIZE REGION

James T. Daniels, Jr. and Geoffrey E. Braswell

Three recent projects in inland Toledo District have recovered and analyzed more than 5,000 obsidian artifacts from Pusilha, Lubaantun, Nim li Punit, and Uxbenka: four of the most important sites in the Southern Belize Region. This work compares data we have collected from three of the sites with published information from Uxbenka concerning resource procurement patterns, production, and exchange. Evidence from Nim li Punit suggests that during the Early Classic period, most obsidian came from the Ixtepeque source, linking southern Belize to western Honduran and Salvadoran exchange spheres. During the Late and Terminal Classic, much more obsidian from the El Chayal source reached southern Belize, indicating closer ties with sites in the Maya lowlands. Both Lubaantun and Nim li Punit were consumers of obsidian tools but there is little evidence for the production of bifaces or of prismatic blades at either site. Most such artifacts may have been imported from other sites during the Late Classic, perhaps Pusilha, which had much more access to obsidian than the other sites in the region.

Introduction

Since 2001, members of the Toledo Regional Interaction Archaeological Project (TRIP) and its predecessor the Pusilha Archaeological Project have been studying ancient political and economic interaction in the inland Southern Belize Region (Figure 1). Our research began with an interest in external relations between Pusilha and Copan or Quirigua, but our data indicated very little evidence for important contacts except perhaps during a brief period in the early 7th century, that is, only a few decades after Pusilha was founded (Braswell et al. 2005a,b). As a result, we have since turned our focus inwards trying to understand the relations among the major sites in the Southern Belize Region, especially the three where we work: Pusilha, Lubaantun, and Nim li Punit (Braswell et al. 2011; Fauvelle et al. 2012, 2013). Our principal focus is the obsidian artifacts of Nim li Punit, but we begin with a brief summary of our recent field research at the site.

Recent Excavations at Nim li Punit

In 2010, we began our investigations with a series of 17 test pits in the northern portion of the East Group, the eastern portion of the South Group, and throughout the West Group. Our principal goal was to gather pottery from stratigraphic contexts and to begin to work out a ceramic sequence. As described below, data from the test pits have also revealed surprising temporal patterns in obsidian procurement. In 2012, we excavated two important structures in the royal palace of Nim li Punit (Fauvelle et al. 2013). The first of these is Structure 8, which we interpret as a Popol Nah or council house, built in four distinct stages spanning the Early Classic to the Terminal Classic. Structure 7 was built in at least two major stages dating to the Early Classic and the Terminal Classic periods. There may be more construction stages to this building, which we interpret as the royal residence, but the interior of it has yet to be completely excavated. Two discoveries are of special note. First, the later Terminal Classic construction stage contained many offerings just below the flagstone floor of the platform. These
Figure 2. New map of Nim li Punit.

included vessels dating to two periods: the early Terminal Classic and the Early Classic. Compared to the Terminal Classic pottery, Early Classic vessels were very poorly preserved. Associated with these were stingray spines, tooth caches, at least one painted shell necklace, obsidian bloodletters, and bone flutes and tools. Beneath these offerings and in the fill of the Early Classic substructure we found an Early Classic crypt. Outside of it was a Dos Arroyos Polychrome plate, and inside we found three slab-footed tripod vessels, a crude bowl, a large chert eccentric, two large cowries, and painted beads from the same necklace recovered in overlying Terminal Classic fill. Our interpretation is that the Early Classic burial was opened during the last construction phase and some of the materials were removed, re-dedicated, and re-placed—along with other new offerings—below the final Terminal Classic floor (Fauvelle et al. 2013).

In 2013 we concentrated on non-invasive fieldwork and laboratory analyses. We created new topographic and Malerized maps of the ruins (Figure 2). Using GPS, we established a coordinate system with an accuracy of 10 cm.

We also conducted ground penetrating radar (GPR) surveys of two structures and most of the plazas at the site. Among other things, we were hoping that GPR would locate tombs like those exposed in the Palace Group. The processed GPR data does not display any obvious anomalies that look like tombs, but more may be located under collapse and fall. Survey was most satisfactory in wide-open, grass-covered plazas away from fallen stones and tree roots. Survey close to structures was less productive because of the presence of surface irregularities that degrade the quality of the GPR signal. We did identify one rectangular anomaly at the base of Structure 31 that may be a cache box. Finally, in the laboratory, we sourced all the obsidian we have so far collected at both Nim li Punit and Lubaantun using a Bruker portable XRF instrument, and conducted sourcing experiments with pottery sherds.

Ceramic Chronology of Nim li Punit in a Southern Belize Context

The earliest pottery known from the Southern Belize Region dates to the Early Classic period, what we tentatively call Early Classic I. It dates to about A.D. 250-400/450, comprises both Chicanel and Tzakol types, and so far has been identified only at Uxbenka (Jordan and Prufer 2013). Early Classic II phase pottery, however, is present at Nim li Punit. This is fundamentally a Tzakol sphere complex lacking Peripheral Chicanel pottery. Painted ceramics are fairly abundant in our excavations, and include both Actuncan and Dos Arroyos Polychromes. Also present are red- and black-slipped Peten Gloss ware, small quantities of cream-slipped sherds, and abundant amounts of Toledo Unslipped. The slab-footed Teothuacan-inspired tripods, at least one of which XRF suggests is an import, date to this phase. Basal flanges are exceptionally large during Early Classic II, sometimes measuring up to 3 cm thick. During the following Early Classic III phase, Actuncan Polychrome drops out and basal flanges become much smaller. Early Classic II probably dates to about A.D. 400/450-500/550 and represents the first clear settlement of Nim li Punit. The Early Classic III complex dates to about A.D. 500/550-600 and is represented not only at Nim li Punit but also in
very small quantities at Pusilha. Something important to stress is that at Nim li Punit, virtually all of the Early Classic pottery is carbonate tempered (Fauvelle et al. 2013).

The next phase at Nim li Punit needs much more study and better stratigraphic contexts. At present, we are calling it Late Classic to Terminal Classic I. This phase corresponds to the first settlement of Lubaantun as well as the apogee of that site, and Pusilha, and Nim li Punit as dynastic centers. We hope eventually to be able to split this period into two or even three phases. Much of the Late Classic to Terminal Classic I pottery belongs to the Tepeu sphere and contains modes, forms, and types diagnostic of it. Quite common at all sites in the region are decorated red jars. At Pusilha the vast majority are striated, but zoned-stamped jars are fairly common at Lubaantun and, to a lesser extent, Nim li Punit (Fauvelle et al. 2012). At Pusilha, Palmar Orange dominates the polychromes; at Lubaantun, Zacatel (or Louisville) is much more common. Both are found at Nim li Punit, but Zacatel is more frequent. The Hondo group—defined at Lubaantun on the basis of just 14 sherds—is extremely common at Nim li Punit and contains additional types and surface colors unknown at Lubaantun. We argue Hondo group pottery was made at Nim li Punit, and that pottery trade between that site and Lubaantun was limited (Fauvelle et al. 2012). Nonetheless, ignoring great quantitative differences, the Late Classic complexes of Nim li Punit and Lubaantun are qualitatively similar on the type level. One important difference is that virtually none of the Late to Terminal Classic pottery of Nim li Punit is carbonate tempered. This is a stark contrast with Lubaantun, Pusilha, and even Early Classic Nim li Punit, where virtually all pottery contains carbonate temper. Around A.D. 780 or so, Belize Red began to appear at Nim li Punit. It disappears from that site in later Terminal Classic II contexts that have Fine Orange and Pabellon Modelled-Carved super-system pottery. Thus, we date the Late Classic to Terminal Classic I phase as A.D. 600-830, and the following Terminal Classic II phase to A.D. 830+. In addition to Fine Orange-like and Pabellon-like pottery, Terminal Classic II at Nim li Punit is characterized by the introduction of

Puluacax Unslipped ceramics from Lubaantun. To date, Postclassic ceramics have been found only at Pusilha. Over all, the ceramics of Pusilha differ the most from those of the other sites, Nim li Punit is somewhat different, and Uxbenka and Lubaantun are so similar that we can speculate that the latter is a Late to Terminal Classic offshoot of the former.

**Obsidian Sources Represented at Nim li Punit and Other Southern Belize Sites**

We have recovered and analyzed obsidian artifacts from Pusilha, Lubaantun, and Nim li Punit. In both raw numbers and relative obsidian to sherd counts, obsidian is much more plentiful at Pusilha than at the other two sites. At Pusilha, the ratio of obsidian artifacts to sherds is 43.0 per mil, it is about 12.8 per mil at Nim li Punit, and just 7.3 per mil at Lubaantun. Put another way, relative access to obsidian was about three times greater at Pusilha than at Nim li Punit, and nearly six times as great as at Lubaantun. Obsidian to ceramic mass ratios at Nim li Punit and Lubaantun support the notion that the occupants of Nim li Punit had roughly twice the access to obsidian as did those at Lubaantun. These differences in the relative quantities of obsidian might indicate that different sites in the region participated in distinct procurement networks. Alternatively, it also could be that distribution passed through a central place and that the amount of obsidian at each site reflects economic and political distance from that place. Given the amount and density of obsidian at Pusilha, it is a possible candidate for such a regional central place.

Obsidian artifacts collected from the three sites were assigned to geological sources using three methods. All pieces were subject to visual sourcing. A handful of artifacts from Pusilha that were thought to come from Mexican sources of black obsidian were analyzed by INAA or portable X-ray fluorescence (pXRF). Finally, all pieces from Lubaantun and Nim li Punit were analyzed using pXRF. We established chemical groups for pXRF using previously sourced samples from a variety of sites as well as geological samples. The obsidian consumed in the inland Southern Belize Region came from eight geological sources, only two of which appear in significant quantities (Figure 3).
These sources are El Chayal and Ixtepeque, both located in highland Guatemala. Minor sources represented at the three sites are Zaragoza, Ucareo, Pachuca, Otumba, and Zacualtipan (all in Mexico) and San Martin Jilotepeque (Guatemala). Nazaroff et al. (2010) report similar source data for 135 obsidian artifacts from Uxbenka generated by laboratory and portable XRF analysis. Nim li Punit appears to be the most different site. There, more than one third of the obsidian comes from the Ixtepeque source.

We would like to stress that in some cases, assigning artifacts to a given source using pXRF was not a straightforward or simple process. Quantified data derived from pXRF is not particularly accurate or reliable, and often is quite different from similar data derived from INAA (Nazaroff et al. 2010). Additional problems can be created by the shape and thickness of the artifact. The ratios of certain elemental concentrations are more reliable, but even then rather sophisticated statistical techniques need to be employed to determine probability of membership to a certain source. In the end—and something we still have to do with some samples—we advocate using INAA for pieces for which source assignments are problematical. Moreover, assignments to exotic or numerically rare sources also should be verified using INAA. In particular, two of the three artifacts from Nim li Punit that were assigned to the Otumba source should be reassayed by INAA as should all six artifacts from Nim li Punit that were assigned to the Ucareo source.

The relative quantities of obsidian from different Guatemalan sources have both temporal and spatial implications. In much of the Maya lowlands, obsidian from El Chayal began to become prominent in the Late Preclassic period and by the Early Classic accounted for 90% or more of most collections. During the Terminal Classic and Postclassic periods, Ixtepeque obsidian typically became more common. Spatially, however, this pattern does not hold in the southeastern Maya periphery, especially western Honduras and all of El Salvador, where the vast majority of obsidian for all periods came from Ixtepeque or, in some non-Maya areas, from Honduran sources. Ixtepeque obsidian also can be seen more frequently at some Classic period maritime sites, such as Wild Cane Caye. I have called this the Southeastern Maya obsidian procurement sphere as opposed to the Lowland Maya sphere. But procurement patterns may also indicate distinct trade relationships with distant partners.
This is particularly true in frontier zones where obsidian procurement spheres overlapped. The Southern Belize Region is located in or near such an area.

Temporal Implications

Contextual analysis reveals a strong temporal aspect to obsidian procurement patterns at Nim li Punit. Excavations in the Stela Plaza reveal that above or in the upper plaza floor, just 24% of obsidian comes from the Ixtepeque source (Figure 4). Obsidian is much less common at deeper levels, but 75% of that material comes from Ixtepeque. Excavations in the northern portion of the East Group reveal a similar pattern. There, just 29% percent of the obsidian recovered from above the plaza floor comes from Ixtepeque. Within the construction fill beneath this floor and particularly in the buried A-horizon soils that represent the original surface, 100% of the obsidian is from Ixtepeque. In the West Group behind Str. 48 and near Str. 54, 39% of the obsidian recovered from overburden contexts comes from Ixtepeque. In contrast, 71% of the obsidian collected from a buried A-horizon comes from that source. Thus, in these contexts, Ixtepeque obsidian appears in very high proportions in deeply buried contexts and decreases in later ones. These deeply buried contexts date to the Early Classic period and perhaps the first century of the Late Classic, while the shallower ones contain Late Classic to Terminal Classic I pottery.

A somewhat different pattern can be seen in front of Str. 37 in the East Group. There, all of the obsidian comes from El Chayal. Similarly, in the main plaza of the West Group, a deeply buried but culturally rich surface—as well as the fill above it—has just 28% Ixtepeque obsidian. Above or embedded within the final flagstone floor, however, the relative proportion of Ixtepeque obsidian is as high as 41%. In these cases, the deeply buried contexts date to the Late Classic and Terminal Classic I phase, while the shallower contexts date to Terminal Classic II.
In sum, the density of obsidian in Early Classic contexts at Nim li Punit is rather low, but nearly 70% of it comes from the Ixtepeque source. The remainder of the Early Classic sample comes from El Chayal with trace quantities of Mexican obsidian from Pachuca and Otumba, two sources strongly associated at that time period with Teotihuacan trade. In contrast, obsidian became much more abundant in the Late Classic to Terminal Classic I phase, when about 70% came from the El Chayal source. In even later Terminal Classic II times, the relative proportion of Ixtepeque obsidian increased somewhat and that of El Chayal dropped a bit. Thus, the relative availability of Ixtepeque obsidian—but not absolute amounts—was highest during the Early Classic, decreased dramatically in the Late Classic, and increased somewhat in the Terminal Classic. This suggests that significant shifts in exchange alliances occurred during the Late Classic period.

Pusilha and Lubaantun both have relatively low quantities of Ixtepeque obsidian. These sites lack strong Early Classic occupations. In contrast, Uxbenka has relatively higher relative quantities of Ixtepeque obsidian. Much of this might date to the Early Classic, that is, the same period when Nim li Punit received significant quantities of material from this source. But temporal analysis of the Uxbenka obsidian still needs to be undertaken. Two important questions are: from whom did the Early Classic inhabitants of Southern Belize receive their Ixtepeque obsidian and in what form was it traded to the region? We will turn to the second question first.

**Obsidian Typology**

The obsidian sample from Nim li Punit was classified into just four basic types—flakes, percussion blades, prismatic blades, and chunks—and nine more specific subtypes. These types and subtypes pertain to specific lithic industries or *chaînes opératoires* each characterized by specific products, byproducts, and reduction techniques (Figure 5). These are the prismatic blade industry, the retouch or biface industry, the bipolar percussion industry, and the casual percussion industry. Because byproducts of one industry often were used as blanks in another, and because lithic artifacts often were recycled, a particular piece can be assigned to more than one subtype, type, and even lithic industry. At Nim li Punit, 512 obsidian artifacts (83.5%) pertain to the prismatic blade industry. Only five of these, however, are anything other than blades. Four very small percussion flakes were removed from exhausted or nearly exhausted cores, and one is a tiny piece of shatter from a prismatic blade core. No cores or sizeable core fragments have been found in the center of the site. It therefore seems that almost all blades were produced elsewhere and traded to Nim li Punit as finished artifacts. Alternatively and less likely, itinerant *navajeros* may have visited the site and taken their exhausted cores away with them. Eighteen pieces (2.9%) pertain to the retouch industry, 13 of which are flakes associated with repairing bifaces. Three more casual percussion flakes were removed from bifaces, and just two retouched artifacts—a very small side-notched prismatic blade point and a sequin or round inlay also made on a prismatic blade fragment—have been found. Thus it seems that obsidian bifaces were imported as already finished artifacts and were curated and repaired at Nim li Punit. Finally, a significant number of flakes and chunks indicate the practice of both bipolar and casual freehand percussion on exhausted or irreparable tools in order to make usable *ad hoc* flakes.

When different types and lithic industries at Nim li Punit are stratified by obsidian sources, more patterns emerge. Fully 68.9% of the artifacts pertaining to the prismatic blade industry come from El Chayal. In contrast, 66.7% of retouch industry artifacts, 81.0% of bipolar artifacts, and 82.2% of casual percussion artifacts are made of Ixtepeque obsidian. In other words, while most of the El Chayal obsidian was traded to Nim li Punit in the form of finished blades, Ixtepeque obsidian was much more likely to arrive in other forms—such as bifaces—and to be recycled and reused. A somewhat similar pattern is also seen at Lubaantun, although there, of course, Ixtepeque obsidian is much less common. Just 6.4% of artifacts related to the prismatic blade industry at Lubaantun come from the Ixtepeque source and several of these are bifaces made on blade...
Figure 5. Obsidian typology of Nim li Punit: (a) morphological types; (b) lithic industries represented in sample.

blanks. In contrast, every single artifact pertaining to the biface industry is made of Ixtepeque obsidian as are 46.7% of the casual percussion artifacts. Again, it seems that El Chayal obsidian reached Lubaantun in the form of finished prismatic blades, while Ixtepeque material came as blades, bifaces, and perhaps small chunks to be used to make ad hoc flake tools.

Conclusions

From what site or sites did the Ixtepeque obsidian reach Nim li Punit during the Early Classic period? Two places seem possible candidates. First, as both Kazuo Aoyama (1999) and I have shown, about 95% of obsidian artifacts at Copan come from Ixtepeque. Moreover, obsidian is abundant at that site. But the ceramics of Copan are entirely different from those of Southern Belize. If obsidian was traded from Copan to Nim li Punit, we might expect some pottery to be exchanged as well. A second possibility is Quirigua.

Just 31 obsidian artifacts from Quirigua have been subject to chemical assay: 81% come from Ixtepeque, 12% from El Chayal, and two pieces were not definitively sourced (Stross et al. 1983). This is very close to the Early Classic pattern at Nim li Punit, but unfortunately no temporal information is provided for the small Quirigua sample. Recently, Jose Crasborn (2011) has analyzed 218 obsidian artifacts from the East Group of Quirigua, which dates to the Late and Terminal Classic Hewett phase (ca. A.D. 700-850). His visual source attributions for this material suggest that 62% comes from El Chayal, just 33% from Ixtepeque, and 0.5% from San Martin Jilotepeque (10 pieces could not be assigned to a source). This is very similar to the Late Classic sample from Nim li Punit. Therefore, during the Early Classic period, it may be that both Nim li Punit and Quirigua were connected to trade routes that brought small quantities of El Chayal obsidian down most of the length of the Motagua from the central Guatemalan highlands. But much more Ixtepeque obsidian came overland from the far eastern highlands and down the lower Motagua. Macrocores are known from Quirigua and at least one has been sourced to Ixtepeque, so the Early Classic blades at Nim li Punit might have been produced by navajeros from that site. In the Late Classic, especially during the period of strife between Quirigua and Copan, relative
access to Ixtepeque obsidian declined in Southern Belize. During that period, most artifacts reached Nim li Punit and Lubaantun in the form of finished blades made of El Chayal obsidian, perhaps produced at nearby Pusilha where material from that source is quite plentiful, or perhaps from Quirigua, which appears to have been cut off from Ixtepeque obsidian at that time. Later in the Terminal Classic, more material from Ixtepeque entered the Southern Belize Region for a second time.

In sum, obsidian procurement patterns in Southern Belize show significant changes from the Early Classic to Late Classic and from the Late Classic to the Terminal Classic periods. Moreover, at Lubaantun and Nim li Punit—but not Pusilha—there is little evidence for the local production of prismatic blades. Both of these patterns differ from those known at most lowland Maya sites. The change from a reliance on Ixtepeque obsidian to El Chayal during the Late Classic period may relate to political events in the southeastern Maya periphery, upheavals that seem to be reflected in hieroglyphic texts at Nim li Punit. Reliance on the importation of blades produced at other sites—perhaps Quirigua during the Early Classic and Pusilha or Quirigua during the Late Classic—might be consistent with patron-client or kinship based economic relationships between independent yet interconnected Classic Maya polities within the southeastern Maya frontier.

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References Cited


26 THE ANCIENT MAYA CANOE PADDLE AND THE CANOE FROM PAYNES CREEK NATIONAL PARK, BELIZE

Heather McKillop, Elizabeth C. Sills, and Vincent Cellucci

The 2004 discovery of the K’ak’ Naab’ wooden canoe paddle in Paynes Creek National Park, southern Belize, as well as the more recent discovery of a Classic Maya wooden canoe, underscore the infrastructure of ancient Maya canoe transportation and coastal-inland salt trade. Wooden objects and buildings were preserved in mangrove peat that formed the sediment below the seafloor at the underwater Maya Paynes Creek sites. Wooden posts formed the outlines of buildings associated with briquetage—the broken pots used to evaporate brine over fires to make salt. The Paynes Creek Salt Works produced massive quantities of salt, which was a basic biological necessity that was scarce at inland cities where the bulk of the Classic population lived. In this paper we review the story of the discovery of the K’ak’ Naab’ canoe paddle: from conservation and study, and culminating in the paddle’s 2013 return to Belize. We also expand the story to report the first ancient Maya wooden canoe, discovered at the Eleanor Betty Salt Work, in Paynes Creek National Park, Belize.

Introduction

A search for ancient Maya salt works in a shallow lagoon in Paynes Creek National Park in southern Belize led to the unexpected discovery of wooden architecture and a canoe paddle found below the seafloor (McKillop 2005a; Figure 1). Preserved in mangrove peat that formed the sediment below the seafloor, the discovery of the wooden artifacts broadens our understanding of the Maya past, previously known mainly by stone architecture, pottery, and stone tools. The Paynes Creek Salt Works include wooden buildings with massive amounts of briquetage—the broken pottery vessels and their supports used to evaporate brine in pots over fires to make salt. The amount of salt produced was beyond the needs of the local coastal and island population—even the nearby major trading port of Wild Cane Cay (McKillop 2005b).

Discovery of the K’ak’ Naab’ Canoe Paddle

A search for ancient Maya sites submerged by sea-level rise in the coastal waters of southern Belize revealed three underwater sites in Punta Ycacos Lagoon (Stingray, Orlando’s, David Westby sites), and another site in the nearby mangroves (McKillop 1995, 2002) in Paynes Creek National Park (Figure 1). Ethnographic analogy to modern and historic salt works (eg. Reina and Monaghen 1981), as well as comparison of the briquetage from sites in China, Europe, and North America (Li and Von Falkenhausen 2010) indicate the Maya sites were salt works. Analysis of artifacts from the Paynes Creek Salt Works showed that salt production was specialized, since the salt pots were standardized in their dimensions for mass-production of salt (McKillop 2002). Moreover, the overwhelming majority of artifacts at the sites were used in salt production, with little evidence of habitation.

Since four salt works could not have produced enough salt to meet the biological needs of the Maya at nearby inland cities, a comprehensive search for additional salt works was initiated in 2004. Systematic pedestrian survey in the shallow Punta Ycacos lagoon system indicated there were more salt works, as evidenced by briquetage on the seafloor. The discovery at Site 15 of wood embedded in the seafloor that was neither stray limbs nor old
trees, but the surface evidence of wooden posts deeply buried below the seafloor, dramatically changed the methods for the underwater survey and our understanding of ancient Maya salt production: New techniques were developed to systematically survey the underwater sites using RFDs (Research Flotation Devices) in order to protect the sites from trampling yet allow visibility of the sea floor (McKillop 2005a). The discovery of the wooden structures indicated that the Paynes Creek Maya mass-produced salt inside wooden buildings with a significant infrastructure of production and distribution (McKillop 2005a).

The discovery of wooden posts that form buildings at Paynes Creek Site 15 raised the question of whether there were wooden buildings at Sites 1-14 or even at the salt works previously discovered and excavated in another arm of the lagoon (McKillop 2002). A return to Site 14 led to the discovery of wooden posts and a wooden canoe paddle leading to the renaming of the site as K’ak’ Naab’ (translated as Fiery Water Place; McKillop 2005a). A systematic flotation survey of the previously discovered and excavated underwater salt works, Stingray Lagoon, Orlando’s, and the David Westby site (McKillop 1995, 2002), found that all had abundant wooden posts (McKillop 2011).

**Acquiring Evidence for the Antiquity of the Maya Canoe Paddle**

The context of the K’ak’ Naab’ canoe paddle at a site with Late Classic Maya pottery suggested a similar age for the paddle (McKillop 2007). The similarity in shape of the blade and shaft to those in artistic depictions of the Maya paddler gods carved on bone objects from Tikal’s Late Classic Temple 1, Burial 116 (Trik 1963) also supported a Late Classic age, by the similar date and shape of the paddles (Figure 2). In order to avoid any uncertainty of the Late Classic age of the paddle, a sample of wood from the shaft was submitted for radiocarbon dating. The radiocarbon date of A.D. 660-880 meant that the paddle dated to the Late Classic period (McKillop 2005a).

**Conservation of Waterlogged Wooden Artifacts**

The K’ak’ Naab’ canoe paddle was conserved in the United States with a temporary export permit from the Belize Institute of Archaeology (Figure 3). After the initial discovery of the K’ak’ Naab’ canoe paddle, it was photographed, sampled for C14 dating, returned to the sea, and buried under mangrove peat in order to protect the paddle, which began to dry and deteriorate upon exposure to the air. Once a temporary export permit was granted, the paddle was removed from the mangrove peat and wrapped and sealed in plastic with water, for preservation. Instead of the traditional conservation method of preserving wood in propylene glycol, a new polymer method (Smith 2003) was selected for a variety of reasons. The polymer process results in a dry object that does not require humidity or temperature control (Smith 2003), making the process more suitable for curation and exhibitions in Belize.
Conservation of the paddle required removing the salt water and replacing it with polymer, a process that took almost three years. Desalination of the wood was initiated at Louisiana State University by immersion in fresh water. The desalination was continued at the Preservation Lab at Texas A & Am University by Dr. C. Wayne Smith and Dr. Helen Devereux. Once desalinated, the paddle was soaked in a bath of acetate to remove the water. Then the paddle was immersed in solutions of polymer, a liquid plastic, under a process developed and patented (but freely available for others to use; Smith 2003). Acetate is replaced more quickly by polymers than water. The resulting conserved canoe paddle was a dry object that was stable, since the polymer had penetrated throughout the wood structure. The paddle was not a solid plasticized object. The polymer adhered to the inner cell walls of the wood, resulting in an exterior surface of dry wood. However, the paddle was preserved to the condition in which it was discovered, which included hairline cracks from being in an alternating wet and dry environment. Imagine a wooden paddle lost or set down at the water’s edge, sinking out of sight and periodically being exposed to the air and cracking. After conservation, the paddle continued to deteriorate, with the original cracks expanding (McKillop, Sills, and Harrison 2010a, 2010b).

A 3D digital scan of the K’ak’ Naab’ canoe paddle was carried out in the LSU Digital Imaging and Visualization In Archaeology (DIVA) lab using a Skiron laser scanner attached to a movable Microscribe arm (Figure 4; McKillop and Sills 2013a and 2013b). The 3D digital paddle is a permanent record suitable for study. A 3D printed replica of the paddle was created using the DIVA lab’s Dimension Elite 3D printer (Figure 5). The 3D printed replica became a permanent record for viewing. A 3D print is only as good as the 3D scan, which at 80,000 points per second, provides an accurate record.

Exhibiting the 3D Printed Replica and the Original K’ak’ Naab’ Canoe Paddle

A permanent exhibit of a full-sized 3D printed replica of the K’ak’ Naab’ canoe paddle was opened at the Toledo Information Center in Punta Gorda, Belize, on 11 May 2013. The 3D print was exhibited inside a wooden display cabinet with a glass lid (Figure 6).
Accompanying documentation included a 2D photo of the paddle at actual size, 1.43 meters (4’ 7”) in length, as well as a poster providing information about the canoe paddle. Brochures, bookmarks, and stickers were available at the exhibit. The opening was covered by local media, with Toledo District LoveFM correspondent Paul Mahung acting as emcee of the opening. The opening included a lecture about the canoe paddle. The exhibit added to the permanent exhibit of 3D printed replicas of artifacts opened in 2012 at the Toledo Information Center and at the Paynes Creek Ranger Station (McKillop and Sills 2013a, 2013b).

The world premier viewing of the original K’ak’ Naab’ canoe paddle occurred on 28 June 2013 at the Toledo Information Center in Punta Gorda, with an opening ceremony and visitation over the course of one day of some 300 individuals. The event was covered by local media, including LoveFM, LoveTV, and PGTV. Many people were encouraged and took up the offer to have their photo taken with the canoe paddle (Figure 7).

The second public viewing of the K’ak’ Naab’ canoe paddle occurred at the Belize Archaeology and Anthropology Symposium in San Ignacio, following a presentation on the canoe paddle (Figure 8). The canoe paddle was on view for the duration of the symposium, along with a full-size photo of the paddle, a descriptive poster about the canoe paddle, and a
poster about the Underwater Maya project, all laminated. The conserved original paddle was returned to the Institute of Archaeology staff, along with a 3D printed replica and posters, at the BAAS symposium. The original paddle was subsequently curated in the Museum of Belize for exhibition. The 3D printed replica is durable ABS+ plastic, so is suitable for local exhibits by the IA staff. The 3D print is an accurate replica that also is suitable for study.

**Paddling the Coastal Waters versus the Maya Universe**

Upon discovery of the K’ak’ Naab’ canoe paddle, its similarity with the shape of paddles in use by the Maya paddler gods depicted in Maya art, was immediately apparent (Figures 2, 4, 6). The paddler gods are shown in carvings on bones from Tikal’s Burial 116 in Temple 1 (Trik 1963). The paddles have a straight shaft without a grip, as well as a blade on one side only. The Jaguar Paddler god and the Stingray Paddler god are shown each holding a paddle in an awkward position for paddling: The right arm is bent and the right hand holds the shaft, well above the blade (Figure 2). The left hand holds the shaft below the top. In order to get leverage to move a paddle in the water, the right hand needs to be close to the blade and the left hand closer to the top of the shaft. In addition, the artistic depiction of the blade on one side of the shaft, would not work paddling in the water, since the blade would turn. Perhaps one could suggest that the one-sided paddles were used as rudders, but the artistic depiction of paddling from the bow and middle of the canoe, indicates the paddles were intended to be shown as moving water. The depiction suggests either that the artist was not familiar with canoeing or that it was not important to depict actual paddling. Clearly the paddler gods depicted in the Burial 116 bone carvings were not travelling in the water.

A close examination of the K’ak’ Naab’ canoe paddle did not occur until after it was conserved and stabilized, indicating that the shape of the blade differed from the artistic depictions on the Tikal Burial 116 paddles. The blade of the K’ak’ Naab’ canoe paddle was broken along one side, forming a continuous line from the shaft. The original canoe paddle had a blade that extended on both sides from the shaft. A demonstration of a modern version of the K’ak’ Naab’ canoe paddle took place at the conference hotel pool, indicating a good working paddle (Figure 9).

![Figure 9. Demonstration of the K’ak’ Naab’ canoe paddle using a modern version in the conference hotel pool at the Belize Archaeology and Anthropology Symposium, 3 July 2013, with Cynthia Ellis-Topsey and Anabel Ford in the canoe held by Paul Healy and H. McKillop (photo by Jessica Harrison).](image)

**Canoe Models from the Paynes Creek Salt Works**

Artistic depictions of canoes and boat models have been reported from several ancient Maya sites (McKillop 1985, 2002, 2010). Artistic depictions of Maya canoes on bone carvings from Tikal’s Burial 116 and from a Postclassic painted mural from the Temple of the Warriors at Chichen Itza, show flattened bow and stern and low walls. The shape is similar to boat models carved from manatee rib bones from Altun Ha (Pendergast 1979: Figure 46b) and Moho Cay (McKillop 1985: Figure 4), two fragmentary pottery boat models from the Paynes Creek salt works (McKillop 2002), and a pottery boat model discovered by William D. Strong (1935) from the Bay Islands of Honduras.

In 2013, a complete pottery boat model and a fragmentary model were excavated from Paynes Creek Salt Work74 (Figure 10). They are similar in shape to the other reported boat models. The Paynes Creek Site 74 pottery boat models were stored in plastic bags with fresh water and taken to the 3D imaging lab at our base station in Belize for 3D surface scanning. The boat models were then curated in deep silt
in a storage sack at a marked location in the lagoon at Paynes Creek, along with other artifacts. From previous experience, salt water saturated pottery allowed to dry results in the salt accumulating at the surface and exfoliating the entire surface of the object, so returning the clay boat models to the lagoon environment was a good way to preserve the objects. The 3D scans were post-processed in the LSU Digital Imaging and Visualization in Archaeology (DIVA) lab at LSU, to join the separate 3D scans and remove extraneous data. A 3D printed replica of the complete boat model was made, along with a larger version, suitable for viewing in an exhibit (Figure 11). Painted versions of the 3D printed replicas were given to the Belize Institute of Archaeology (see Figures 7 and 8).

Discovery of the First Ancient Maya Wooden Canoe at the Paynes Creek Eleanor Betty Site

The first discovery of an ancient Maya wooden canoe was made at the Eleanor Betty Site, an underwater salt work in Paynes Creek National Park, Belize (Figure 12). The discovery was reported at the Belize Archaeology and Anthropology Symposium in San Ignacio, Belize, July 3, 2013. The Eleanor Betty Salt Work is located in the western arm of Punta Ycacos Lagoon in shallow water beside a point of land. The site is not visible from the water surface. Systematic flotation survey led to the discovery of a line of palmetto palm posts preserved below the seafloor in the mangrove peat. A 10-20 cm layer of thick silt covers the seafloor and further obscures the posts from view. Flagging the posts and total station mapping indicated that the palmetto palm posts form a semi-circle enclosing a large portion of the site, with an opening in the center. The line of palmetto palm posts bifurcates in the middle, forming a long narrow enclosure, a boat slip, where the wooden canoe was discovered, upside down in deep silt and slightly embedded in the mangrove peat below. Upon discovery, the wooden canoe was raised out of the deep silt and above the water to estimate if the heavy, large, wooden object was in fact a canoe, or a hollowed-out log. Sometimes a canoe really is just a hollowed-out log. Logging in Paynes Creek in historic times, as recently as the 1950s, likely brought logs down past the site. The canoe was sunk back into the deep silt. In 2008,
the canoe was raised again for inspection and to take a wood sample for radiocarbon dating. The canoe was again sunk into the deep silt. Interest was generated by the Early Classic radiocarbon date.

The canoe was raised again from the boat slip in May 2013 (Figure 12). Rene Villanueva and his camera crew from Belize LoveTV collected film footage for an episode of Belize Watch, which aired May 26 on LoveTv and LoveFM radio. Unfortunately, the canoe had broken into several pieces since we had first discovered it. After it was raised again in 2013 for viewing and 3D surface scanning, the canoe was submerged in deep silt in the boat slip at the Eleanor Betty Site and held in place by pvc pipes to keep it from moving (with approval of the Belize Institute of Archaeology).

Before returning the canoe to the sea, pieces were taken to the 3D imaging lab at our base station in Belize for 3D surface scanning. The aforementioned break of the canoe resulted in three canoe fragments. Using standard transport preservation methods, all three pieces were plastic wrapped in water before being digitally preserved by a high-resolution, color, 3D scanner, the Creaform VIUscan. The handheld, portable scanner was ideal for base station scanning with power from a generator. Scanning took place over three days and consisted of front and back scans of two large canoe fragments and a smaller one (Figure 13). The three fragments were similar in composition, consisting of a flat darkened side that indicated both a slow burnout in addition to tool markings. The opposing side abundantly more-water logged and in contact with organic materials (including plant life and worms); it was therefore perforated and decomposing at a faster rate. To complete the scanning process, wood was temporarily patted dry and dotted using reflective dots in the standard scanning tessellated pattern (Figure 14). Since the scanner uses ultraviolet reflection, more detailed areas were scanned at night. The digital scans were taken to LSU for post-processing. Excavations are planned to further expose the canoe, to excavate below it, and to excavate what appears to be another canoe nearby.

Discussion

The Eleanor Betty wooden canoe, along with the K’ak’ Naab’ canoe paddle, indicate the Paynes Creek Maya had developed a transportation infrastructure for the distribution of salt produced at over 100 Paynes Creek salt works (McKillop 2005a, 2010, 2011, 2012; Sills and McKillop 2010, 2013). The standardization of the salt production vessels supports a model of mass-production of salt (see McKillop 2002). The overwhelming abundance of briquetage compared to other objects as well as the absence of burials typical of ancient Maya
communities, underscores that focus of activity was the production of salt. Who were the consumers? The presence of Warrie Red water jars with unit-stamped decorations typical of inland cities in southern Belize (such as Lubaantun and Puiliba) and adjacent Guatemala (such as Seibal, Altar de Sacrificios and sites in the Petexbatun region), indicate inland-coastal communication and trade (McKillop 2002). Mold-made figurine whistles typical of inland cities such as Lubaantun also figure in the artifact assemblages at the Paynes Creek salt works, further linking inland consumers of salt—a biological necessity in short supply at nearby inland cities—to the Paynes Creek Salt Works (McKillop 2002).

The context of the Eleanor Betty canoe suggests that it may also contribute to our understanding of the ancient salt industry in terms of the production of salt: Was the canoe used as a container to leach brine or water through salty soil to enrich the salt content prior to evaporating the brine in pots over fires? The archaeological deposits continue below the canoe, but the depth and composition of the archaeological material remains to be identified by excavation. The nearby earthen mounds at Site 50 may be the discard piles of leached soil (Watson et al. 2013). Certainly, ethnographic, historical, and archaeological case studies of salt production using vessels to evaporate brine over fires include enriching the brine prior to evaporation: In some cases, salty water is leached though salty soil; In other cases, solar pans are combined with leaching water through salty soil. The obvious reduction in fuel needs in the evaporation process drives the brine enriching methods.

Conclusions

Ancient Maya sea trade is documented by the occurrence of prehistoric Maya settlements on offshore islands around the Yucatan coasts of Mexico and Belize (Andrews et al. 1989; Graham and Pendergast 1989; Guderjan and Garber 1995; Healy et al. 1984; McKillop 2005b; Sabloff and Rathje 1975), by the presence of marine resources at inland sites (McKillop 1984), by the discovery of a Late Classic wooden canoe paddle from the K’ak’ Naab’ site (McKillop 2005a), and by the discovery of a wooden canoe from the Eleanor Betty site, a Classic Maya salt work in Paynes Creek National Park, southern Belize. The discovery of the canoe and the paddle were made possible by their preservation in mangrove peat created by red mangroves (Rhizophora mangle) that grow in salt water and keep pace with sea-level rise, by extending their prop roots above the water (McKillop, Sills, and Harrison 2010a, 2010b). The mangrove peat created an oxygen-free environment that preserved wood, including the wooden buildings used for salt production, and the wooden canoe and paddle, examples of the transportation infrastructure used to distribute the salt to inland consumers.

The use of 3D surface scanning of wooden artifacts during field research in Belize, as well as selected 3D printing of replicas of artifacts, facilitates research, helps preserve waterlogged objects, and promotes sharing of archaeological finds with the interested public. Salt-water saturated artifacts of wood and pottery from the Paynes Creek underwater sites are kept in plastic bags filled with water so they do not deteriorate in the air. Three-dimensional scanning in the field provides accurate 3D digital replicas of artifacts, while the originals are stored in caches of deep silt in the lagoon for future study. Exhibitions of 3D printed replicas of artifacts, such as the K’ak’ Naab’ canoe paddle, bring the ancient past of the Maya to modern communities, thereby helping to protect the past through sustainable archaeological tourism (McKillop and Sills 2013a, 2013b).

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References Cited


Li, Shuicheng and Lothar von Falkenhausen (editors) 2010 Salt Archaeology in China, volume 2: Global Comparative Perspectives. Science Press, Beijing, China.


2005b In Search of Maya Sea Traders. Texas A & M University Press, College Station, Texas.


2012 “Constructing and Using a GIS for Fieldwork: The Underwater Maya Project.” Research Reports in Belizean Archaeology 9: 267-278


McIlroy, Heather, E. Cory Sills, and Jessica Harrison 2010 “Ancient Vegetation and Landscape of Salt Production in Paynes Creek National Park, Belize.” Research Reports in Belizean Archaeology 7: 245-252.

Pendergast, David M.
1979 *Altun Ha, Volume 1*. Royal Ontario Museum, Toronto.

Reina, Ruben and John Monaghan

Sabloff, Jeremy A. and William L. Rathje (editors)

Sills, E. Cory and Heather McKillop


Smith, C. Wayne

Strong, William D.
1935 *Archaeological Investigations in the Bay Islands, Spanish Honduras*. Smithsonian Miscellaneous Collections 92(14).

Trik, Aubrey

Watson, Rachel, Heather McKillop, and E. Cory Sills
27 DWELLING AND IDENTITY IN AGUACATE: PERSPECTIVES ON ANCIENT MAYA HOUSEHOLDS FROM TOLEDO, BELIZE

Claire Novotny

The central goal of the Aguacate Community Archaeological Project is to evaluate social identity and economic integration among rural Maya households in the Toledo district of southern Belize during the Late Classic period (AD 570-850). This paper reports on the findings of a pedestrian survey of Aguacate community lands, excavations at the site of Kaq’ru’ Ha’, and preliminary artifact analyses including ceramics, lithics, and burials. Excavations and analyses were undertaken in order to enhance our understanding of how rural settlements negotiated burgeoning regimes of power concentrated at local political centers, including Uxbenká, Pusilha, Nim Li Punit, and Lubaantun. Given the accepted idea that households are foundational economic units and the building blocks of society, these data provide crucial information about the hinterlands and further our understanding about regional interactions and identities in southern Belize.

Introduction

The Toledo district of southern Belize is a crucial region in which to examine social identity among ancient Maya households during the Classic period because of its cultural and geographic marginality. It is often the spaces and regions in-between perceived centers of power and influence, that produce dynamic expressions of identity through their diverse social relationships. To that end, the central goals of the Aguacate Community Archaeology Project (ACAP) are to illuminate the ancient economic and social relationships between political centers and hinterland settlements in southern Belize, and investigate the construction of social identity during the Classic period. Excavations were conducted at a complex multi-component site called Kaq’ru’ Ha’, located on Aguacate community land.

In the first section, I describe a conceptual framework rooted in theories of practice (Bourdieu 1977; Heidegger 1996; Hendon 2010; Ingold 2000), which emphasize the process of identity formation; second, I review the results of excavation and the preliminary artifact analysis from Kaq’ru’ Ha’, with attention to architecture, ceramics, and burials; third, I use these data to present preliminary interpretations of socio-economic integration and identity in the southern Belize region.

Conceptual Framework

At the heart of this study is an archaeological analysis of the social and economic lives of ancient Maya households. Through Cynthia Robin’s research at Chan (Robin 2012) and in other areas of Mesoamerica (Hutson 2010; McAnany 2004; Sheets 2002), it is clear that households are the basic building blocks of social life and economic support in complex societies (Ashmore and Wilk 1988). Households provide pivotal material data such as architectural design (Canuto and Fash 2004), ceramic and lithic assemblages (Hendon 2010; LeCount and Yaeger 2010), and mortuary programs (McAnany et al. 1999; Robin 2012) from which to infer interaction and change over time. Drawing on these material correlates of social and economic integration between site centers and hinterlands, this paper explores how these relationships might have transformed or reinforced a local identity.

I engage these questions and frame my data analysis of household archaeology with the concept of dwelling (Heidegger 1996; Ingold 2000). The dwelling perspective emphasizes that “the landscape is constituted as an enduring record of the lives and works of past generations who have dwelt within it” (Ingold 2000:189). Dwelling inscribes the past and present onto the landscape, and makes this inscription permanent and available to future people. Through the process of dwelling, household practices produce and re-produce social life through materiality (Hutson 2010:7; Robin 2012). These materials, and the tasks that produced them, are inscribed on a landscape that is a dynamic representation of sociality (Van Dyke 2008:277). Kaq’ru’ Ha’ is a significant locale that marked the landscape for the ancestral Maya of southern Belize; as a community center it signified a gathering place for scattered hilltop homesteads.
Through dwelling, household practices produce and re-produce social life; the engagement of people and objects in everyday life allows for the transformation of society over time, and informs inequality, identity, and political-economic relationships. Considering southern Belize as a social landscape – the cultural and spatial creation of place that is encoded in materiality (Bourdieu 1977; Heidegger 1996; Strang 2008: 52) - helps us think about the kinds of identities that were manifested through dwelling in the region during the Classic period.

**Kaq’ru’ Ha’ in a southern Belize Context**

Aguacate community land is located in the Toledo district, between the ancient political centers of Uxbenká to the northeast and Pusilhá to the southwest (Figure 1). The political centers of Pusilhá (Braswell et al. 2005), Uxbenká (Prufer et al. 2011), Lubaantun (Hammond 1975a), and Nim Li Punit (Fauvelle et al. 2012) were constructed along major rivers or overland corridors, suggesting that they each controlled a route from the Caribbean coast inland to the Maya Mountains and beyond to the Alta Verapaz and Petén regions of Guatemala. Southern Belize is rich in natural resources that were traded to the central Maya lowlands, such as raw material for paints, dyes, mirrors, and ceramics, as well as important food resources such as cacao, fish, and salt (e.g., Braswell et al. 2005; Hammond 1975a; McKillop 1996).

Uxbenká is the oldest occupied site in the region, while Nim Li Punit has an Early Classic occupation phase (Braswell 2012). These sites expanded and flourished during the Late Classic period. Significant survey work among the settlement groups surrounding Uxbenká confirms that there was a substantial rural population outside the site centers, some occupied as early as the Pre-Classic period (Prufer et al. 2011).

At Kaq’ru’ Ha’, against a dramatic cliff face overlooking Aguacate Creek, the ancient Maya constructed three wide platform terraces to support eight structures, both residential and administrative (Figure 2). Ceramic chronology suggests that Kaq’ru’ Ha’ was used as a gathering place since at least the Early Classic period (AD 250-500), while at least one residence was episodically remodeled to include the burial of seven individuals throughout the Late Classic period (AD 550-900). Preliminary analysis of plentiful obsidian from the Guatemala highlands, abundant local chert, as well as a two pieces of worked jadeite from the Motagua Valley in Guatemala, indicates that site residents were integrated into local and regional economies. The cliff face was a site of ritual deposition containing possibly curated ceramic vessels and at least two distinct burials. Although textual analysis from a rural Maya site is unexpected, two vessels include painted bands of glyphs.

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**Figure 1.** Map of southern Belize, showing sites mentioned in the text.

**Figure 2.** Map of Kaq’ru’ Ha’.
The following preliminary analysis of the landscape, architecture, and artifacts from Kaq’ru’ Ha’ addresses the nature of the relationship between the hinterlands and political centers. Given that there was a relatively brief period of expansion for the political capitals, what impact did this political expansion have on the rural populace? Did this expansion reinforce a local identity or inspire a shift in a regional one?

Preliminary Analysis
Settlement survey and landscape
Survey and mapping of Aguacate community land in 2012 recorded twelve sites (Figure 3). The survey reinforces the settlement pattern present in the rest of the region, in which settlements are located on hilltops and along ridgelines (Hammond 1975b; Prufer et al. 2011). Groups consist of one to three structures 1.5m high on average, and built from limestone cobbles. In the study area, Kaq’ru’ Ha’ is the largest site in terms of size and number of structures. While the ancient Maya terraced a natural north-facing hillside to enhance the size of the structures, the site is not built on a hilltop but rather on a hillside that forms the edge of the floodplain of Aguacate Creek. In fact, during severe floods the waters skirt the edge of the lower platform but do not flood the site.

Kaq’ru’ Ha’ seems to be strategically positioned on the landscape in several ways. The site overlooks Aguacate Creek, which empties into a major drainage – the Moho. In addition, it sits along a historically well-traveled corridor to the present-day border with Guatemala. This fits with a regional pattern in which sites are positioned strategically to take advantage of east/west passages (Dunham et al. 1989; Hammond 1975b; Leventhal 1992). Finally, Kaq’ru’ Ha’ is constructed on a natural hillside leading to a dramatic cliff face weathered with small niches and overhung edges. Multiple burials and an extensive midden with large re-fit sherds suggest that the area was used for ritualized deposition. When cleared of vegetation, the limestone cliff face would be visible for miles, and would reverberate sound.

During the Classic period, Kaq’ru’ Ha’ would have been a noticeable and significant place on the landscape. It is strategically positioned along east/west riverine and overland passages and is placed in reference to a distinctive geologic feature. Adding to its prominence on the landscape is the monumental architecture that raises the site above the valley floor. The site plan of Kaq’ru’ Ha’ is in keeping with the southern Belize tradition of using the natural topography to accentuate site cores (Braswell et al. 1995; Dunham et al. 1989; Hammond 1975a; Leventhal 1992; Prufer et al. 2011).

Architecture
The most architecturally complex site, Kaq’ru’ Ha’, was selected for excavation (see Figure 2). During the 2012 and 2013 field seasons, salvage and stratigraphic excavations were conducted at Structures A, B, C, G, as well as at two middens at Kaq’ru’ Ha’. A multi-component site, the eight structures are supported by wide platform terraces for gatherings and include households and ritual spaces. The following discussion of the architecture of Kaq’ru’ Ha’ will highlight Structures A, B, and C.

The architecture is monumental both in the size of the limestone blocks used in constructing the platforms and the size of the platforms themselves, indicating control over a significant labor force. Platform 1 is 20m x 40m, supports two probable residences, Structures G and D, and includes an open patio space. Platform 2 is south of Platform 1 and is 10m x 20m and 4m high. It supports Structure A, a residence and ritual space, and Structure B, a residence, and includes a patio space partially
paved with flat limestone slabs. Platform C is 5m x 10m and supports three residential structures (C1, C2, and C3) arranged around a small patio. Expansive open spaces at the site suggest that residents hosted groups of people for celebrations or commerce. Increasingly restricted terrace space may reflect a hierarchy at the site, with the summit of Platform C as a space reserved for exclusive interactions.

Structure A is one of the largest at the site at 3m, including the platform on which it is constructed which brings the height to 7m. Excavations during the 2012 and 2013 seasons revealed six construction phases, a potentially Early Classic period origin, and a possible shift in its function between the Early and Late Classic periods. This shift is best exemplified by the sequential interment of seven individuals as part of the later remodeling events, indicating that the building was ritually significant for residents (see burial section, below).

Structure B is a small rectangular building on the east side of Platform 2; it faces Structure A across a partially paved terrace space. Only 1m in height, it had two construction phases and was built of modified limestone blocks. A step on the west side of the structure led down to the paved surface of Platform 2.

Structure C is the most monumental architecture at Kaq’ru’ Ha’. Its northern edge rests on Platform 2, and rises ~6m above the rest of the site, meeting the natural hillside at its northern edge. It supports three small structures whose one-course basal walls are visible on the surface. Though excavations were limited here, only one construction phase was documented.

The size, elaboration, construction materials, and renovation of architecture are ways that archaeologists interpret social differentiation and identity (Hendon 2010:102). As an outward expression of a co-residential group, architecture signals difference. Kaq’ru Ha’ was constructed to mark a particular place on the landscape, to host community gatherings, and to house a family lineage.

While use of the natural topography fits with the regional pattern, the architecture displays a few anomalies. First, the site plan is open and oriented to the north. Monumental architecture in southern Belize tends to form “closed” plazas that restrict access to rituals or elite gatherings (Hammond 1975a). Open patio terraces at Kaq’ru’ Ha’ suggest an emphasis on large, unrestricted gatherings of people. Restricted space at the summit of Structure C could point to a social hierarchy, though that is also an open space with only three structures on it. Any performative displays that may have occurred would be visible to people on any of the lower platforms.

Structures have multiple construction phases, though the life history of Structure A seems to be the most significant. Structure A took on a ritual function over the course of its history with the sequential interment of seven individuals. While burying individuals in western structures is not unheard of in the Maya area (see A. Novotny 2012 for an example from Chan), multiple burials usually occur in eastern buildings (Ashmore 1991; Becker 1971). However, the cardinal directions were symbolically charged for the ancient Maya (Ashmore 1991:200); east/west directionality was an important cosmological principle in Maya site planning because it commemorated the path of the sun, which connected the earthly and supernatural realms during its transition across the sky (Ashmore 1991:201). Therefore, multiple burials in the western building may be referencing a Maya cosmology that highlighted the life-sustaining cycle of the sun from birth (east) to death (west).

The renovation of Structure A over time resulted in it being the largest building at the site, suggesting considerable investment in labor and maintenance. Most likely, Structure A became a mausoleum for a family lineage during the Late Classic period. Maintaining a genealogy of place (McAnany 1995:161) may have become more significant for the hinterlands with the burgeoning of political centers during this time.

**Lithics**

Abundant chert cores, nodules, flakes, and debitage were recovered from all contexts at Kaq’ru’ Ha’ (e.g. surface collections, middens, burials, looters’ pits). While a local source is currently unknown, chert cobbles have been observed in Aguacate Creek. In total, 912 chert cores, flakes, debitage, hammerstones, and unworked nodules were recovered from Kaq’ru
Ha’. Lithic analysis is ongoing, so it is difficult to say what type of tools were being manufactured; only three chert bifaces were found in midden contexts at the site. Obsidian cores, flakes, and prismatic blades indicate that residents were importing blank cores and finishing the tools themselves. It seems that residents were crafting chert tools for a variety of uses and importing obsidian cores before shaping them into prismatic blades. This suggests access to knowledge about how to work obsidian and potential crafting of chert tools and judging from the amount of chert, crafting stone tools could be part of the local economy. Crafting has been argued to be a source of social power and identity for elites and non-elites in Maya society (Bartlett and McAnany 2000:103; Hendon 2004:274).

Ceramics

Types established by Norman Hammond at Lubaantun were used in this preliminary analysis (Hammond 1975c). Ceramic evidence for a Late Classic occupation phase is strongly represented at Ka’q’ru’ Ha’, though there is evidence for an Early Classic occupation evidenced by basal flanges – one recovered from a floor context and one from a midden. Late Classic types were found in mixed and unmixed contexts, and include several broken but complete polychrome vessels recovered from Burials 3 and 8. Types include Turneffe Unslipped jars, Remate Red bowls and jars, limited Puluacax Unslipped jars, Zacatel Cream Polychrome dishes and bowls, and a Saxche Orange Polychrome tripod dish. The Zacatel Cream Polychrome and potential Saxche/Palmar Orange Groups are well-established as Late Classic period (Hammond 1975c:294).

One of the Saxche/Palmar polychrome vases has a band of glyphs painted around the rim. It is a primary standard sequence that may provide the name of the commissioner or owner (Mark Zender, personal communication 2013). It is unclear whether the text is legible or pseudoglyphic, however, the presence of texts at a rural site suggests cultural communication and perhaps gifting (Wanyerka 2009:419).

Other evidence of gifting includes two ceramic figural plaques – one recovered from between the paving stones in front of Structure B and one from midden material associated with the same structure. Hammond identified figural plaques and their molds at Lubaantun (Hammond 1975c). Phillip Wanyerka (2009:416-426) argues that these were mass-produced and given as gifts from Lubaantun kings to commemorate ritual events, such as fire dedication rituals and period ending ceremonies. Wanyerka (2009:419) further suggests that these plaques were emblematic of social identity because they display elites and non-elites engaged in everyday activities. The two recovered from Structure B at Ka’q’ru’ Ha’ are fragmentary, but depict individuals kneeling on benches with cartouches incised along their edges. The cartouches may have been glyphic texts once, but are too eroded to be read now. The presence of two figural plaques in the hinterlands suggests that lineage members from Ka’q’ru’ Ha’ shared a regional identity and worldview with elites living in political centers if they were participating in important ritual events at Lubaantun.

Based on the Lubaantun sequence, we know that Ka’q’ru’ Ha’ was occupied from at least AD 700-890, though an Early Classic phase is indicated by Dos Arroyos Polychrome vessels, orange polychrome vessels, and basal flanges. Ongoing ceramic analysis will refine the chronology and compliment the work being done at Nim Li Punit and Uxbenká. Again, when viewed from the perspective of dwelling, the ceramics suggest not only a long-term occupation, but an emphasis on using vessels that are both local and regional.

Burials

Mortuary analysis in southern Belize is currently limited to tombs found in the site centers (Braswell and Gibbs 2006; Hammond et al. 1975). Excavations at Ka’q’ru’ Ha’ and in the settlements surrounding Uxbenká are expanding our knowledge about a regional mortuary program. Mortuary evidence, including burial locations, architecture, body positioning, and grave goods are sensitive indicators of social identity (Knudson and Stojanowski 2011). With this new evidence from rural sites, a mortuary pattern for southern Belize is emerging, especially regarding body positioning. The ancient Maya referenced the cardinal directions
in architecture (Ashemore 1991), caches (Robin 2012), inscriptions (Bricker 1983), and titles (Martin and Grube 2000:17), therefore body positioning in burials can be interpreted as an important cultural expression linking the deceased to an overarching cosmological worldview (Freidel et al. 1993). In the Maya world there are precedents for regionally patterned body positioning in burials, most notably the Belize River Valley, where 89% of individuals were interred in a prone position with their heads oriented to the south (Freiwald 2011:317). In southern Belize, individuals are interred in a supine position with their heads to the north. To date, this pattern holds for elite tombs as well as simple cyst graves at Uxkenk’á (Willa Trask, personal communication 2013), Pusilhá (Braswell and Gibbs 2006:277), and Lubaantun (Hammond et al. 1975:62).

In all, thirteen individuals have been excavated at Kaq’ru’ Ha’. Seven individuals were interred in Structure A (Burials 6-13), one in the terrace west of Structure B (Burial 1), three in the patio of Structure C (Burials 4-5) and two in a niche in the cliff face (Burials 2-3) (Figure 4). All of the individuals were interred in an extended supine position, and ten of the thirteen were oriented to the north (preservation was too poor to establish body position for Burials 2 and 11). Preliminary osteological analysis conducted by Willa Trask established that twelve of the thirteen were adults between the ages of 18-35, with one subadult aged 8-10. The single individual not oriented to the north was recovered from a midden on the south side of the structure. Orientation was determined from long bones, which were positioned east/west. Determining the sex of the individuals was impossible due to poor preservation.

While body treatment seems fairly consistent across the site, grave types and grave goods varied. The individuals in Structures B and C (Burials 1, 4, and 5) were interred in simple cyst graves dug into the natural hillside as the platforms were being constructed. Burials 2 and 3 were interred in simple cysts in a niche in the cliff face. Burial 2 was disturbed by a looters’ pit, so any grave goods were likely taken prior to excavation. Burial 3 had an eroded polychrome vase associated with it. A Saxche Orange polychrome vessel with a single human phalange and a limestone rock was cached above Burial 3. While the burials in Structure C had no grave goods, Burial 5 was comprised of two adult individuals, evidenced by two sets of long bones. Burial 1 consisted of a sub-adult interred beneath the paving stones in the center of Platform 2 with a poorly preserved red-slipped bowl in addition to several deer bones and a jaguar canine (Willa Trask, personal communication 2013).

Seven individuals were interred in Structure A during sequential remodeling events. Burial 6 was encountered in a midden on the south side of the structure. A simple cyst was excavated in which the individual was placed in an east/west orientation. Burial 7 was encountered along the center line of the structure in a supine position oriented with the head to the north. This individual was laid across four partially modified limestone slabs and covered with a layer of soil mixed with chert flakes and debitage. Two vessels – one eroded polychrome vase and one black-slipped plate – were excavated south of the individual; however, they were recovered from a deeper stratum and could be associated with a possible burial beneath the unmodified limestone blocks, which remains unexcavated. Burial 8 was encountered west of...
Burial 7 and included the only formal burial architecture at the site—a stone-lined crypt with five flat limestone capstones. This individual was also oriented with the head to the north, and was interred with an eroded Saxche Orange polychrome tripod plate positioned over its feet and a jade earflare close to where the cranium would have been had it preserved. Burial 9 was discovered east of Burial 7 on top of the limestone blocks and was poorly preserved. Orientation to the north was established through positioning of the long bones. Burial 10 was northeast of Burials 7, 8, and 9, and included two adult individuals, based on the number of long bones. Burial 11 was a poorly preserved interment northwest of Burial 8 close to the surface. A small black-slippered bowl was associated with the remains.

The burial sequence in Structure A will be clarified when radio-carbon dates taken from bone collagen are returned. Based on stratigraphic and ceramic evidence, Burial 6 was the initial interment, followed by the individuals in Burial 8 and 10, then 7 and 9, and finally Burial 11 (Figure 5). The tripod plate in Burial 8 dates to the Late Classic period, suggesting that the structure was built previous to the Late Classic, when there was a shift in the building’s function.

In the Maya area, mortuary practices can be seen as emblematic of community ritual and social identity (Freiwald 2011; McAnany 1995, 1999). Consistent body positioning may reinforce Leventhal’s (1992) assertion that southern Belize maintained distinctive, region-wide traditions.

**Conclusion**

In Mesoamerica, the field of social and material production is the household (Ashmore and Wilk 1988), thus settlement patterns, domestic and public architecture, artifacts, and mortuary practices are reliable indicators of how identity is produced and reproduced. Preliminary analysis of materials from Kaq’ru’ Ha’ provides insight into the ways that identities were formed during the Classic period. Residents were crafting stone tools from local and imported materials, participating in regional pottery traditions and exchange, hosting and attending community events, and burying their dead in a locally patterned, meaningful way.

Based on the preliminary analyses presented here, the residents of Kaq’ru’ Ha’ may have been comprised of a local elite family who were able to strategically mobilize a regional identity with the rise of centers of power during the Late Classic. The presence of imported styles of pottery as well as the jade earflare could signal an increase in wealth during this time period. A shift in the use of an elevated, western structure at the site from a residence to a mortuary shrine during the Late Classic period suggests a shift in the social and political environment during this time. By interring relatives in a specific location, leading families could maintain their legitimacy and claim to surrounding land (McAnany 1995:161). Perhaps the residents of Kaq’ru’ Ha’ were experiencing social and economic pressure from political centers and responded by indelibly marking the landscape as their own with a mortuary shrine.

The dwelling approach emphasizes the practices that create meaningful relationships...
between people in a social landscape. The ongoing analyses of these materials suggest that the residents of Ka’q’ru’ Ha’, though living in the hinterlands, were participating in regional economic, social, and political spheres. Through these data and future analyses, we are moving towards a more textured understanding of southern Belize social identity.

Acknowledgements
I am very grateful to NICH and the Belizean Institute of Archaeology, especially Dr. Jaime Awe and Dr. John Morris, for their continued support of this project. Dr. Patricia McAnany was instrumental in starting this project and encouraging it as it progressed. I would like to thank the Aguacate community, especially Alcalde Abraham Kan and Chairman Salvador Ical and the village council, for their support. Tumul K’in Center of Learning hosted us during the 2012 season; the staff and students welcomed us as part of their community, for which I am grateful. This project was funded by a National Science Foundation DDIG (Award #1232353), the UNC Chapel Hill Graduate School, the UNC Institute for the Study of the Americas, and the Mellon Foundation. This project would not have been possible without a group of skilled and resilient volunteers: Meg Kassabaum, Alf Berry, Todd Carlson, Matt Stirn, Rebecca Sgouros, Whitney Goodwin, Dawn Crawford, Paige Schull, Meg Leary, AJ Meyer, Anna Novotny, Mikael Fauvelle, Mia Cancarevic, Meghan Devito, and Drew Montgomery. Special thanks to Jillian Jordan and Willa Trask for their help in the preliminary artifact analysis.

References Cited

Alcock, Susan, and Ruth M. Van Dyke

Ashmore, Wendy

Ashmore, Wendy, and Wilk, Richard

Bartlett, Mary Lee and Patricia A. McAnany

Becker, Marshall

Bourdieu, Pierre

Braswell, Geoffrey E., and Sherry A. Gibbs

Braswell, Geoffrey E., Christian M. Prager, and Cassandra R. Bill

Bricker, Victoria

Butler, Judith


Dunham, Peter S., Thomas R. Jamison, and Richard M. Leventhal
Novotny

315

Fauvell, Mikael, Geoffrey E. Braswell, and Megan R. Pitcavage
2012 Dynastic Capital, Minor Center, or Both? Recent Investigations at Nim Li Punit, Toledo District, Belize. Research Reports in Belizean Archaeology, vol. 9, pp. 51-59.

Freidel, David, Linda Schele, and Joy Parker

Freiwald, Carolyn

Hammond, Norman

Hammond, Norman

Hammond, Norman

Hammond, Norman, Kate Pretty, and Frank P. Saul

Heidegger, Martin

Hendon, Julia


Hendon, Julia, and Rosemary A. Joyce

Hutson, Scott

Ingold, Timothy

Knudson, Kelly, and Christopher M. Stojanowski (editors)

LeCount, Lisa, and Jason Yaeger (editors)

Leventhal, Richard M.

Lohse, John C., and Fred Valdez, Jr.

Martin, Simon, and Nikolai Grube

McAnany, Patricia A.

1995 Living with the Ancestors. University of Texas Press, Austin.


McAnany, Patricia A., (editor)

McAnany, Patricia A., Rebecca Storey, and Angela K. Lockard
McKillop, Heather

Novotny, Anna C.

Prufer, Keith M., Holly Moyes, Brendan J. Culleton, Andrew Kindon, and Douglas J. Kennett

Robin, Cynthia (editor)

Sheets, Payson (editor)

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VanDyke, Ruth M.

Wanyerka, Phillip Julius

Willey, Gordon R., William R. Bullard Jr., John B. Glass, and James C. Gifford
28 CONTEXTUALIZING UXBENKÁ: CERAMIC ANALYSES FROM SITE CORE AND HOUSEHOLD CONTEXTS

Jillian M. Jordan and Keith M. Prufer

Southern Belize is one of the last parts of the Maya Lowlands without a regional ceramic typology. In its absence, the Uxbenká Archaeological Project (UAP) has undertaken an ambitious AMS radiocarbon program and developed an absolutely dated chronology with which to anchor major cultural developments. These data indicate that the construction of monumental architecture began during the Late Preclassic Period and occupation continued into the Terminal Classic making Uxbenká the earliest and longest occupied site in the region. Relying solely on C14 dates, however, is detrimental to our understanding of cultural processes and does little to further our understanding inter-polity relationships. In this paper, we will discuss the results of ceramic analyses from site core and household contexts. These data refine our understanding of the extent and duration of occupation at Uxbenká as well as its position in regional interaction spheres and relationships with polities outside of southern Belize. The integration of the chronological information derived from ceramic analyses with our extensive AMS radiocarbon data allow us to assess the timing of site formation and abandonment as well as the timing of the arrival of particular ceramic groups at Uxbenká.

Introduction

The Uxbenká Archaeological Project began in 2005, and, after many years of survey and excavation in the site core and surrounding settlement area, recent efforts have focused on understanding the ceramic assemblage. Until now, virtually all chronological information was derived from an ambitious, high-precision radiocarbon program which indicated that construction of monumental architecture in the site core began around the Late Preclassic/Early Classic Transition and declined sometime during the Terminal Classic Period (Aquino et al. 2013, Culleton et al. 2012). In this paper, we will discuss temporal trends, generated from the integration of the independently constructed radiocarbon and ceramic chronological sequences, and regional spatial patterns within and beyond southern Belize.

Uxbenká is located in the fertile foothills of the Maya Mountains near the modern Mopan Maya village of Santa Cruz in the Toledo District. It is the earliest and longest occupied site in what is today a peripheral and sparsely populated region of the Maya Lowlands (Prufer et al. 2011). The three other major centers in the region, Pusilha, Lubaantun, and Nim Li Punit, are located along a corridor running southwest to northeast along the foothills in an area of highly fertile agricultural lands (Figure 1). The site core is comprised of 9 groups of monumental architecture located atop modified hilltops (Figure 2). The site core is surrounded by a vast hinterland comprised of 130 mapped settlement groups (Figure 3) of varying architectural complexity ranging from single structures to groups comprised of over 10 structures arranged in formal plaza groups. Our current count only represents a fraction of the entire settlement for the site, with over 60 groups discovered in 2013 alone based on ground-truthing recently acquired LiDAR data (Kalosky and Prufer 2012; Prufer and Thompson this volume).

Like the site core, all of the settlement groups, referred to as SGs, are located on hilltops. The bulk of the ceramic assemblage discussed in this paper was recovered from fill contexts in both the site core and settlement groups. We are aware that construction fill contexts can be problematic when constructing chronologies (see Chase and Chase 2005); however, few primary contexts have been identified at Uxbenká. This is likely due to the
extensive looting of the site as well as UAP research goals that have focused on the excavation of smaller units, generally not placed on primary axes where one might expect to find caches and/or tombs, to get a complete AMS chronological sequence. We used only ceramic recovered from stratified, site core deposits to define the ceramic chronology. It has proved extremely difficult to assign dates to settlement groups because many mounds were built in a single construction phase. In fact, there are a number of settlement groups with no diagnostic sherds. Finally, because of steep topography, acidic soils, and annual milpa burning, our collections tend to be small and poorly preserved.

**Defining the Uxbenka Ceramics**

Ceramic analyses at Uxbenka have primarily been concerned with creating an internally significant ceramic typology for chronology building as well as to understand relationships between Uxbenka and other sites in southern Belize and beyond. Because of poor preservation, we emphasize formal
characteristics of the assemblage, but surface treatment and decoration are also useful. We determine types by comparing the Uxbenká assemblage to published ceramic typologies (Gifford 1976; Graham 1994; Hammond 1975; Laporte 2007; Sabloff 1975; Smith and Gifford 1966) and direct comparison of the assemblage to those of Lubaantun, Nim Li Punit, and Pusilha. We employ Petén classificatory names because of similarities between the Uxbenká assemblage and ceramics from the southeastern Petén dating to the Late Preclassic and Early Classic Periods. We have retained the classificatory names established by Hammond (1975) for Lubaantun for the Late and Terminal Classic Periods in order to facilitate comparison among southern Belize sites. Ideally, we hope to amass data from all of the sites in southern Belize into a single uniform format.

Chronology Derived from AMS Radiocarbon Dates

The Uxbenká Archaeological Project initiated an ambitious AMS radiocarbon dating program to create an absolute temporal framework to anchor cultural developments (Aquino et al. 2013; Culleton et al. 2012; Prufer et al. 2011). All of our information about the site’s development and decline are tied to these dates. Over-reliance on single proxy chronologies, however, can be detrimental to our understanding of cultural processes and hinder comparisons, particularly between sites that do not employ a similarly ambitious radiocarbon dating program. Likewise, chronologies relying solely on ceramic data often assign temporal designations based on comparisons to published typologies from distant sites, which can be problematic for sites in peripheral regions like southern Belize (Jordan 2013).

A single Middle Preclassic radiocarbon date from Uxbenká, associated with a buried paleosol and highly eroded and non-diagnostic ceramic fragments, was recovered from an excavation unit designed to investigate agricultural fields (Culleton et al. 2012). However, no further ceramic evidence of a Middle Preclassic occupation has been found to date. Previously published Bayesian age models suggest that the construction of monumental masonry architecture began at Uxbenká about

AD 1 (Culleton et al. 2012). Nonetheless, we have no ceramics dating to before about AD 200/300. These ceramic data are supported by a more recent age model, developed by Valorie Aquino (Aquino et al. 2013). That model was derived from a total of 24 AMS dates in Group B and estimates that the initial clearing of Group B began at AD 230-323 (Figure 4).

Late Preclassic to Early Classic Transition

The earliest ceramics at Uxbenká belong to the Sierra Group and are consistently
comingled with Petén Gloss wares, although in smaller quantities than described by Juan Pedro Laporte (2007) for his Early Classic Peripheral Chicanel complex. The persistence of Chicanel waxy wares into the Early Classic has been documented in other parts of Belize as well (Kosakowsky and Pring 1992, 1998; Sullivan and Sagebiel 2003). We have found no purely Late Preclassic contexts at Uxbenká with the possible exception of deeply buried contexts in Group A that require more detailed analysis. Although it is possible that the co-occurrence of these sherds is due to recovery from construction fill, the consistent intermixing suggests that initial settlement began around the Late Preclassic/Early Classic transition. Moreover, modal and decorative attributes highly diagnostic of the Protoclassic Period have not been found at Uxbenká (Brady et al. 1998). The Uxbenká assemblage does have a number of basal flange orange polychrome bowls which may fall into Protoclassic 2 ceramic period, however we prefer to place these within the Tzakol ceramic sphere. This suggests to us that this Early Classic ceramic assemblage dates to before A.D. 300, consistent with the radiocarbon dates.

We have divided the Early Classic into two phases: Early Classic I and Early Classic II. Early Classic I, which dates from AD 200/250 to AD 400/450, is characterized by the intermixing of waxy wares and Petén Gloss wares. In addition to the traditional waxy slipped Sierra Group sherds, the Uxbenká Early Classic Period assemblage contains a large number of Sierra forms made with locally available materials resulting in a thick, matte appearance. The most common form is one that resembles Laguna Verde Incised with groove incised rims though lacking the distinctive waxy finish. The Early Classic II begins with the disappearance of waxy wares around AD 400/450. These ceramic phases should be considered tentative as we are still working on defining the Early Classic at Uxbenká.

Santa Cruz Red Ceramic Group

By far, the most common Early Classic type is the newly established Santa Cruz Red Group which is the precursor to the Late Classic Remate Red Group. The surface treatment is a matte buff to red, thick, flaky slip similar in texture to later locally produced monochrome red ceramics. Many of the bowls have sharply everted rims (Figure 5) and closed bowl forms are often characterized by a roughened exterior (Figure 6). The Santa Cruz Red Group is present throughout the Early Classic assemblage. Paste characteristics were recorded for all sherds though a final determination is awaiting ongoing petrographic analyses. Preliminary analyses of 20 thin sections indicate that the most abundant inclusions are calcite, dolomite, quartzite, sandstone, and muscovite. Early Classic sherds, particularly the earliest in the sequence, are tempered with large, crystalline calcite. This temper choice declines slowly over time and is virtually absent by the end of the Early Classic II Period.

The Early Classic assemblage most closely resembles that of the neighboring southeastern Petén with Aguila Orange, Balanza
Black, Orange Polychromes, and Triunfo Striated (Laporte 2007). Unfortunately, the majority of the Early Classic polychromes are eroded and highly fragmented which precludes us from placing them into a ceramic group at this time. Uxchenká was the only major site occupied during the Early Classic I Period in southern Belize. Recent work at Nim Li Punit by Dr. Geoffrey Braswell indicates that Nim Li was occupied during the Early Classic Period though slightly later than Uxchenká. To date, members of that project have not identified any Sierra Group ceramics or any of the sharply everted rims that characterize the Early Classic I occupation of Uxchenká (see Fauvelle 2012). Claire Novotny’s work at Aguacate suggests a possible Early Classic I occupation though this assessment needs to be confirmed with a more comprehensive comparison of the two assemblages. In general, the Uxchenká assemblage appears to be a more localized phenomenon characterized by the persistence of everted rims well into the Early Classic and the prevalence of a thick, matte rather than thin, glossy slip.

Nearly all excavated structures and plazas in the site core have an Early Classic component. Conversely, evidence for Early Classic occupation of the settlement is sparse. Ceramic analyses have greatly enhanced our understanding of the extent and duration of occupation of many of the settlement groups that, until this point, yielded at most a single radiocarbon date. While analysis of ceramics recovered from household contexts is a relatively new endeavor, it is clear that there are spatial patterns with respect to the earliest occupation of Uxchenká. The earliest materials were recovered from household located around Group A and Group I, two loci of Early Classic activity.

**Late Classic Occupation**

The radiocarbon and ceramic chronologies are more consistent for the Late Classic Period. Both indicate that Uxchenká is primarily a Tepeu 1 and 2 site with ephemeral Terminal Classic occupation. The most abundant Late Classic Groups are the Turneffe, Remate, Chacuum, and Puluacax Groups with some Hondo (Fauvelle 2012; Hammond 1975). The Chacuum Ceramic Group is identified as a Late Classic phenomenon at Lubaantun although these sherds are present throughout the Uxchenká ceramic assemblage indicative of an Early Classic origin, perhaps at Uxchenká. Like in the Early Classic, the most abundant ceramics are the monochrome red Remate Group. A small sample of Remate jars have radiate incising, which is present on earlier Santa Cruz Red ceramics, and triangle and s-shaped stamps. None of the more elaborate stamps, such as monkey and bird motifs, have been identified at Uxchenká (Hammond 1975).

Late Classic pottery of Uxchenká is similar to complexes from the Petén, but the ceramic assemblage reflects an increased southern Belize regionalism and independence of local polities. Although Puluacax Unslipped is often cited as a purely southern Belize phenomenon, Laporte (2007) reports the presence of this type at sites.
in the southeastern Petén suggestive of continued interaction but at a lesser degree than during the Early Classic Period. There are some vessels that are more similar to the Tinaja and Azote Groups but the majority of the Late Classic assemblage exhibits the closest similarities to Lubaantun (Hammond 1975) and Nim Li Punit (Fauvelle 2012). The majority of the Late Classic polychrome assemblage is fragmentary and eroded. Both Zacatal and Palmar polychromes are present at Uxbenká, but the locally produced cream slipped vessels with a deep, red paste, similar to the Louisville Polychrome Group at Lubaantun, are most abundant (Figure 7). Palmar polychromes are most abundant in tomb contexts at Uxbenká (Figure 8). There do not seem to be strong ties with the Belize River Valley with the exception of the importation of Belize Red vessels during the Terminal Classic Period (Hammond et al. 1976; Jordan 2013).

Terminal Classic and Historic Occupation

Currently, the only Terminal Classic ceramic markers at Uxbenká are molded vessels—of which there are few, coarse paste orange bowls (Figure 9)—and Belize Red. Geoffrey Braswell has suggested that Belize Red is a Terminal Classic marker in southern Belize based on contextual evidence from Lubaantun, Nim Li Punit, and Pusilha (see Chase and Chase 2012). Belize Red is relatively rare at Uxbenká (we have recovered less than 40 sherds from all major site core groups) and, when present, is only found in humus contexts. In Group B, Belize Red is limited to contexts above the uppermost level of pavers (Aquino 2013). Bayesian age modeling indicates that these contexts date to AD 795-955, which places Belize Red within the Terminal Classic Period (Aquino et al. 2013). The presence of a single McRae Impressed sherd from above the pavers, which dates to post-780 AD in the Belize Valley (Gifford 1975; LeCount 1996), further supports the Terminal Classic date for Belize Red at Uxbenká and likely southern Belize in general (Chase and Chase 2012).

Additionally, Hammond (1975) reports a dramatic decline in the presence of cream slipped polychromes at Lubaantun at the transition between Tepeu 2 and 3, which he uses to define the Early and Late Facets of the Columbia Complex. The likely locally produced cream slipped polychromes at Uxbenká are present in nearly all upper levels further supporting the lack of a significant Terminal Classic occupation. We are currently unable to distinguish between Tepeu 1 and 2 ceramics due to a continuation in form and low sample sizes in these levels; however everted rims on bowls and square lips continue from the Early Classic and will likely prove useful in defining the Late Classic at Uxbenká. Interestingly, these rim forms are present at Nim Li Punit but are absent at Lubaantun, which is likely due to the lack of an Early Classic occupation at the latter site. In addition to the Late and Terminal occupation of the site, Uxbenká has a considerable historic component consisting of thin walled bowl and
jar forms with clear paddle and anvil forming technique and uneven rims (Figure 10). Historic ceramics have been recovered from the surface of numerous SGs as well as in the site core. Future analyses will focus on defining Historic Period ceramics, both chronologically and spatially, to understand this understudied period of Belizean history.

Figure 11. Ceramic Figurine from SG 42.

Evidence for Ceramic Figurine Production at Uxbenká

Many figurines, including but not limited to the ballplayer or boxer motif often associated with Lubaantun, have been recovered from both site core and settlement contexts. There is great variety in the Uxbenká figurine assemblage and other ceramic figurine motifs include a woman carrying a ceramic vessel over her shoulder (Figure 10) and a jaguar. Like at Lubaantun (Hammond 1975: 371), ceramic figurines at Uxbenká were mold made and similar to plaques as they are all thin with flat backs. Hammond (1975) notes that all of the figurines recovered from Lubaantun and the surrounding hinterlands date to the Late Classic which is not surprising as Lubaantun is a short-lived, purely Late Classic polity. At Uxbenká, some evidence exists for the production of figurines prior to the Late Classic Period. A figurine fragment was recovered from deep within a small structure in Group L in firmly dated Early Classic levels (Thompson et al. 2013).

Two ceramic figurine molds, recovered from Group G and SG 24 (Figure 11), suggests that ceramic figurine production was not an activity solely practiced by Lubaantun potters in southern Belize. The presence of ceramic figurine molds is the best direct evidence of production. In addition to Lubaantun, ceramic figurines have been found in the site core at Aguateca, Altar de Sacrificios, El Chal, Ixtonton, Lagatero, Quirigua, Palenque, and Seibal (Halperin 2007: 263-264). The ceramic mold from SG 42 also indicates that the ballplayer motif, so often associated with Lubaantun, was also produced at nearby Uxbenká.

Discussion and Conclusion

The preceding assessment provides a chronological overview of the Uxbenká ceramic with reference to potential relationships with regions outside of southern Belize. Currently, the only evidence of interaction with other parts of Belize is the importation of Belize Red vessels during the Terminal Classic and, to some extent, the distribution of stamped jars which extends north into caves in the Chiquibul and to Caracol (Chase 1994; Hammond 1975). Although there are similarities with other regions, particularly the southeastern Petén, the Uxbenká assemblage is also distinct. For example, horizontal and outflared everted rims persist well into the Early Classic and surface treatment is generally matte and flaky rather than glossy.

It has been difficult to understand the Early Classic occupation of Uxbenká because it is the only site, with the possible exception of the recently excavated Aguacate, which was occupied during the Early Classic I Period. Although there are true, waxy slipped Sierra sherds present in the lowest levels of the site core, the majority of the Sierra form sherds are slipped using locally derived resources resulting in a thick, matte slip similar to the Santa Cruz Red and Late Classic Remate Groups. This suggests to us that the inhabitants and potters of Uxbenká were certainly aware of the Chicanel ceramic tradition but they were unable to create a perfect version of its surface finish.

Interestingly, Nim Li Punit boasts many bolstered shoulder bowl forms while there are
none at Uxbenká. Form has been documented ethnographically as an important indicator of identity and the complete lack of a dominant form from Nim Li Punit at Uxbenká suggests that while these two sites were similar in terms of overall ceramic assemblage they probably formed distinct polities. Several studies have emphasized that sites in the Southern Belize Region share similar patterns in architecture and settlement, including the lack of vaulted architecture and extensive use of the natural topography, that are distinct from other areas of the Maya Lowlands. While this is certainly true, and the ceramics indicate certain regional traits shared by Uxbenká, Lubaantun, and Nim Li Punit, they also suggest the existence of distinct identities, economic networks, and political structures. Future work on the Uxbenká ceramic assemblage will focus on further defining the chronology as well as understanding the extent of similarities and differences in ceramic assemblages between sites in southern Belize.

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References Cited


Jordan and Prufer

Hammond, Norman, G. Harbottle, and T. Gazard

Jordan, Jillian M. and Keith M. Prufer
2013 Integrating Ceramic and AMS 14C Chronologies at the Classic Maya Center of Uxbenká, Belize. Paper presented at the 78th Annual Meeting of the Society for American Archaeology, Honolulu, HI.

LeCount, Lisa J.
1996 *Pottery and Power: Feasting, Gifting and Displaying Wealth Among the Late and Terminal Classic Lowland Maya*. Unpublished Ph.D. dissertation, UCLA.

Kalosky, E.K. and Keith M. Prufer

Kosakowsky, Laura J., and Duncan C. Pring


Laporte, Juan Pedro

Prufer, Keith, Holley Moyes, Brendan Culleton, Andrew Kindon, and Douglas Kennett

Sabloff, Jeremy A.

Smith, Robert E. and James C. Gifford
1966 *Maya Ceramic Varieties, Types, and Wares at Uaxactun: Supplement to Ceramic Sequence at Uaxactun, Guatemala*. Middle American Research Institute Publication 28 125-174.

Sullivan, Lauren and Kerry L. Sagebiel

Thompson, Amy E., Chuck Mustain, and Shannon Lucernoni
THE CHAN CHICH ARCHAEOLOGICAL PROJECT AND THE BELIZE ESTATES ARCHAEOLOGICAL SURVEY TEAM, 2013 SEASON

Brett A. Houk, Krystle Kelley, David Sandrock and Kelsey E. Herndon

The 2013 season of the Chan Chich Archaeological Project, had three main research agendas: continued plaza excavations in the Upper Plaza at Chan Chich, mapping and excavations at Structure A-5 in the Main Plaza at Chan Chich, and the initiation of an archaeological survey of the surrounding Gallon Jug and Laguna Seca parcels. Two consecutive seasons of excavations in the Upper Plaza have provided important data on the construction history of the longest-occupied group at the site. The stratigraphic sequences from the 2012 and 2013 seasons have been correlated with the sequence documented in 1997 for Tomb 2. Research at Structure A-5 demonstrated the effectiveness of Structure from Motion (SfM) mapping of both mounds and excavation units. The work also determined that the area north of Structure A-5 was a functional plaza at least by the Late Classic period. Importantly, the excavations at the structure documented multiple, though poorly dated, construction episodes.

The first season of the Belize Estates Archaeological Survey Team began investigating the Gallon Jug and Laguna Seca parcels. Survey crews recorded nearly 200 structures and four new sites, in addition to revisiting sites recorded in the early 1990s. Remarkably, the 2013 survey found a completely unlooted site with a stela and structures over 5 m high.

Introduction

The Chan Chich Archaeological Project (CCAP) included investigations in the Main Plaza and Upper Plaza at Chan Chich and initiated the first season of a regional survey project. Chan Chich is approximately 4 km east of the border between Guatemala and Belize in the southwestern corner of the Gallon Jug Ranch (Figure 1). The boundary between Gallon Jug Ranch and Yalbac Ranch passes through the ruins of Chan Chich, south of the Upper Plaza. In the spring of 2013, Bowen and Bowen, Ltd. sold approximately 100,000 acres of Gallon Jug Ranch to Yalbac Ranch for sustainable logging. Yalbac Ranch renamed the newly acquired section Laguna Seca. The survey investigations investigated portions of both the Laguna Seca and Gallon Jug parcels. This article summarizes the results of the three research agendas.

Investigations at Chan Chich

The major architecture at the site, composed of the largest structures and plazas, is centered on the Main Plaza and the Upper Plaza (Figure 2). The Main Plaza is square in plan, covers 13,080 m², and is the third largest plaza in the Three Rivers adaptive region (Garrison 2007:Table 6.3) and the second largest in the eastern lowlands, behind only La Milpa’s Great Plaza. Structure A-5, extending 64 m from east to west, forms the northern edge of the Main Plaza, while the massive range building,

Structure A-1, forms the southern boundary of the Main Plaza and the northern side of the Upper Plaza. With its tightly restricted access, the Upper Plaza, was arguably the home of the site’s ruling dynasty. Structure A-15, the tallest building at the site, dominates the southern side of the Upper Plaza.

Chan Chich Upper Plaza Investigations

The 2013 season of archaeological excavations in the Upper Plaza of Chan Chich constituted the second half of a research project that began in 2012, and spanned two seasons.
Figure 2. Map of the site core of Chan Chich.
The Upper Plaza is built upon a natural rise overlooking the Main Plaza of the site and offers an opportunity to explore the very early construction history here at the architectural core. Krystle Kelley directed both seasons of investigations as her thesis project, building on work conducted by the CCAP team in the late 1990s (Houk et al. 2010; Robichaux 2000). Over the 2012 and 2013 seasons, Kelley’s teams conducted exploratory excavations in the plaza to better define the construction sequence and architectural evolution of the Upper Plaza.

The research design for the 2013 season was based on findings in the Upper Plaza during the 2012 season of the CCAP, specific details of which can be found in Kelley et al. (2012). Crews opened 14 new suboperations and reopened two suboperations from the previous season in 2013. Spatially, these suboperations extend from the northernmost end of the plaza to the southernmost edge, providing a nearly complete north-south cross section of the plaza architecture as shown in Figure 3. Work in 2013 specifically targeted Burial 10, which had been exposed near the end of the 2012 season but not excavated.

The 2012 excavations documented different stratigraphy in the northern end of the plaza compared to the center and southern sections, indicating an architectural break.

**Figure 3.** Map of the Upper Plaza at Chan Chich showing locations of excavation units and cultural features mentioned in the text.
Excavations in 2013 encountered this break in the form of an elevated platform buried in the northern portion of the plaza in Subops CC-10-H, -R, and -T. It is possible this platform represents a buried structure that once formed the northern edge of the Upper Plaza but was subsequently buried by a Late Classic expansion of the group. Table 1 shows the stratigraphic sequence north of the platform’s face, which includes the fill of the platform, and Table 2 shows the stratigraphic sequence south of the platform.

A significant goal of the proposed research was to tie the 2012 and 2013 stratigraphy into the sequence documented by Robichaux (2000) and Houk et al. (2010) in the area of Tomb 2, a Terminal Preclassic interment in the southwestern corner of the plaza (see Figure 3). Houk et al. (2010) interpret the tomb as a chamber cut through a sequence of Late Preclassic floors and into bedrock, covered with capstones at the level of bedrock, and then capped by a low shrine. Excavation data from Subop CC-10-O, located immediately east of Tomb 2, provide a close correspondence, although excavators documented more floors in Subop CC-10-O than Robichaux (2000) encountered and Houk et al. (2010) reported in the tomb excavations (see Table 2). Most importantly, comparing the elevations of the floors recorded by Robichaux (2000) to those excavated in 2013 indicates that the floor in use, immediately prior to the creation of Tomb 2, was the compact dirt surface (see Table 2) that extends over all of the tested portion of the Upper Plaza south of the platform in Subops CC-10-H, -R, and -T.

Excavating Burial 10 required reopening the southern half of Subop CC-10-A and expanding the excavation area with Subop CC-10-G to the south. The burial cut through plaster floor Lot CC-10-A-7b and was capped by plaster floor Lot CC-10-A-6, suggesting it dates to the early part of the Late Preclassic period, making it the oldest burial documented thus far at Chan Chich. The bone recovered from Burial 10 was extremely fragmentary and very brittle, but included eight human teeth and 19 domestic dog teeth. The human teeth are from one individual of unknown age and sex. The dog teeth are likely from one animal (Norbert Stanchley, personal communication, 2013). The artifacts associated with the burial comprise a piece of mica, some ceramic sherds, lithic flakes, mussel shell, and spire-opped jute.

**Structure A-5 Investigations**

Because the Main Plaza is home to Chan Chich Lodge, very little archaeological research has been undertaken on the buildings surrounding the Main Plaza. In 2013, with funding from the National Geographic Society/Waitt Grants (NGS/Waitt) program, the CCAP targeted one of these buildings, Structure A-5.
Table 2. Stratigraphic Sequence in Central Portion of Upper Plaza.

<table>
<thead>
<tr>
<th>Lot Description</th>
<th>Lot #</th>
<th>Tomb 2 Floor*</th>
<th>Top Elevation</th>
<th>Ceramic Assessment</th>
</tr>
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<tr>
<td>Topsoil/Final Plaza Floor</td>
<td>Lot 1 of Subops CC-10–A, -B, -D, -E, -G, -H, -P, -Q, and -R</td>
<td>N/A</td>
<td>125.9 m</td>
<td>Late Classic</td>
</tr>
<tr>
<td>Compact Dirt Surface</td>
<td>CC-10-A-3, CC-10-B-3, CC-10-D-3, CC-10-E-3, CC-10-G-3, CC-10-H-7, CC-10-O-2, CC-10-P-3, CC-10-Q-4, CC-10-R-4</td>
<td>F4</td>
<td>125.0 m</td>
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<tr>
<td>Plaster Floor</td>
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<td>F3</td>
<td>124.83 m</td>
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</tr>
<tr>
<td>Plaster Floor</td>
<td>CC-10-A-5, CC-10-D-5, CC-10-E-4, CC-10-G-5, CC-10-H-11, CC-10-O-4</td>
<td>F2</td>
<td>124.74 m</td>
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</tr>
<tr>
<td>Plaster Floor</td>
<td>CC-10-A-6, CC-10-D-6, CC-10-E-5, CC-10-G-7, CC-10-O-5</td>
<td>F1</td>
<td>124.63 m</td>
<td>Late Preclassic</td>
</tr>
<tr>
<td>Plaster Floor</td>
<td>CC-10-A-7b, CC-10-D-7, CC-10-G-7, CC-10-O-6</td>
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<td>124.58 m</td>
<td>Middle Preclassic</td>
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<tr>
<td>Plaster Floor</td>
<td>CC-10-D-8, CC-10-O-7</td>
<td>N/A</td>
<td>124.52 m</td>
<td>Preclassic</td>
</tr>
<tr>
<td>Bedrock</td>
<td>--</td>
<td>Bedrock</td>
<td>124.3 m</td>
<td>--</td>
</tr>
</tbody>
</table>

*A-Houk et al. (2010:Figure 5)

A-5, for investigation. The building was unexcavated prior to 2013. Structure A-5 borders the Main Plaza on the north. The mound measures approximately 64 m long by 14 m wide, at its base, and is 4.5 m tall. The summit of the mound is flat and approximately 5 m wide. While Guderjan (1991:38) speculated that “collapsed vaulted rooms once faced into the plaza,” the flat summit of the mound suggested that the structure could be a platform and not collapsed rooms. Investigations included mapping and remote sensing funded by the NGS/Waitt Grants program and excavations conducted by the CCAP. When the Main Plaza was cleared by hand during construction of Chan Chich Lodge in the 1980s, crews removed all of
Figure 4. Topographic map of Structure A-5 produced from SIM DEM, rectified map based on topographic map and excavation data, and architectural reconstruction drawing by Gary Smith based on mapping and excavation data.
the trees from Structure A-5, except for one large tree near the mound’s southwest corner. Today the mound is covered in grass, making it an excellent candidate for the remote sensing survey. Additionally, the entire mound is visible from the air, unobstructed by the jungle canopy. This proved beneficial for the Structure from Motion (SfM) mapping technique employed during the investigations.

The objective of the NGS/Waitt Grants study was to test a new technique for mapping Maya mounds and predicting the location of buried architecture (Houk et al. 2013). This study was the first to use this combination of methods to investigate a Maya building and is therefore novel. Basically, the project proposed that by combining high-resolution ground penetrating radar (GPR) data with detailed topographic/mapping data it would be possible to overlay the GPR data onto a three-dimensional model of the mound and identify buried architecture (walls, floors, benches, cavities, etc.). This technique can be applied to other hand-cleared structures at Chan Chich (and other sites), including the massive Structure A-1 on the southern side of the Main Plaza. Houk et al. (2013) describe the methodology employed in detail.

The SfM mapping utilized over 800 digital photographs, which were processed into 12,000,000 data points to create a digital elevation model of the mound (Figure 4). Crews used the same technique to document individual excavation units. The mapping data immediately clarified the final form of Structure A-5: a wide southern stairway, which faces into the Main Plaza, and a narrower northern stairway climb to the top of the mound, indicating the final phase of construction was a platform. Subsequent excavations documented a low masonry wall surrounding the perimeter of the summit. The structure likely included a perishable superstructure composed of pole and thatch (see Figure 4). Importantly, the presence of a stairway on the northern side of the building indicates that the space north of the mound was a functioning plaza, which is now referred to as the North Plaza. Previously, it was assumed that this area was an unmodified section of natural hill.

Although the intent of the NGS/Waitt grant was to use GPR data to predict the nature of buried architecture at the mound and to use excavations to test the GPR predictions, processing the data is still ongoing. Given the complexity of the methodology, the excavation data will ultimately be used to interpret the GPR data.

Excavations through the central platform’s final phase documented dry-laid fill to approximately 60 cm below surface covering an eroded floor surface across a 4-x-4-m excavation block. Below this surface, excavations encountered a complex arrangement of architectural core faces, stripped of their facing stones, and crudely built construction pens, which held dry-laid fill. Excavations through the final phase of the southern stairs similarly found evidence of earlier construction phases that had been stripped of their facing stones. A buried room was encountered beneath the stairs; it had been infilled with rubble as part of a subsequent construction phase. Therefore, the preliminary interpretations of Structure A-5 are that it underwent multiple construction phases during its period of use. In at least one case, the Maya removed the facing stones from the building prior to expanding the platform. The final phase was apparently built in the Late Classic, based on ceramics in fill, and occupied into the Terminal Classic, based on ceramics on the surface. A Postclassic incensario discovered on the surface of the southern stairway demonstrates visitation to the site following its Terminal Classic abandonment; this discovery adds to the previous examples of Postclassic offerings at Chan Chich (Guderjan 1991) and elsewhere in the region (Harris and Sisneros 2012; Houk et al. 2008).

Survey Investigations

Supervised by David Sandrock, the Belize Estates Archaeological Survey Team (BEAST) conducted survey on Gallon Jug Ranch and the Laguna Seca parcel of Yalbac Ranch (see Figure 1) during the summer 2013 field season. Both of these properties are former holdings of the Belize Estates Land and Produce Company, hence the project's name. The main goal of BEAST is to update the inventory of sites on the property, building on work by Guderjan et al.
Table 3. Updated Inventory of Sites on Gallon Jug and Laguna Seca.

<table>
<thead>
<tr>
<th>BE Number</th>
<th>Site Name</th>
<th>Original Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chan Chich</td>
<td>Guderjan (1991)</td>
</tr>
<tr>
<td>2</td>
<td>Kaxil Uinic (E’kenha)</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>3</td>
<td>Punta de Cacao</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>4</td>
<td>Gallon Jug</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>5</td>
<td>Laguna Verde</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>6</td>
<td>Laguna Seca</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>7</td>
<td>Quam (Qualm) Hill</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>8</td>
<td>Wamil</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>9</td>
<td>Sierra de Agua</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>10</td>
<td>Gongora Ruin</td>
<td>Guderjan et al. (1991)</td>
</tr>
<tr>
<td>11</td>
<td>Ix Naab Witz</td>
<td>BEAST 2013 Season</td>
</tr>
<tr>
<td>12</td>
<td>La Luchita</td>
<td>BEAST 2013 Season</td>
</tr>
<tr>
<td>13</td>
<td>Montaña Chamaco</td>
<td>BEAST 2013 Season</td>
</tr>
<tr>
<td>14</td>
<td>Sylvester Village</td>
<td>BEAST 2013 Season</td>
</tr>
</tbody>
</table>

(1991). In 2013, BEAST surveyed two seismic lines, revisited sites previously recorded by other projects, and conducted targeted survey based on information supplied by informants.

American Seismic cut six transects in 2012 for seismic surveys related to oil exploration (see Figure 1). BEAST investigated Lines 1 and 3 during the 2013 field season. The transects cross several different environmental and topographical settings, including the La Lucha and Rio Bravo escarpments. Line 1 measures 26 km long, extending from the Booth’s River marsh on the east to the Guatemalan border on the west. Line 3 is 12 km long and also extends to the Guatemalan border. The project also revisited several sites recorded by Guderjan et al. (1991) to assess their current conditions, verify their maps, and update their locations. The survey team assigned BE (for Belize Estates) numbers to larger sites, defined as those with four or more structures, at least one of which is 4 m or taller, not within 1 km of another recorded site, and to named sites recorded by Guderjan et al. (1991).

During the 2013 field season, BEAST recorded 184 structures, not including individual structures from the four previously recorded sites that were revisited, and documented four new BE sites. An updated inventory of sites is presented in Table 3. Crews encountered the majority of structures, 99 in total, and Ix Naab Witz (BE-11) along Line 1. Most of the newly discovered structures occur in a 1.6-km long stretch beginning 1 km east of the Gallon Jug-Blue Creek road. These structures comprise a sizable and dense settlement area with structures.
of varying size and form. Because BEAST did not encounter a similar mound density anywhere else in the surveyed areas, it is possible the structures are part of a larger, as yet undiscovered Maya site.

The largest newly discovered ruin is Ix Naab Witz, a site located on a 100-m tall hill, approximately 1.5 km east of the Rio Bravo and 1 km west of the Gallon Jug-Blue Creek road. The site occupies a stand of upland forest, and the surrounding areas below the hill-slope are primarily transitional forest vegetation. The site core is unlooted and comprises 15 structures around two plazas, with a connected courtyard to the north and a plazuela group to the southwest. The site has one small, uncarved stela, and the tallest mound is approximately 6 m high.

Conclusions

The CCAP succeeded in meeting its research goals for the 2013 season and laid the foundation for future avenues of investigation. Two consecutive seasons of excavations in the Upper Plaza have provided important data on the construction history of the longest-occupied group at the site. The next phase of investigations will expand beyond the plaza to relate the earliest structures in the group to the stratigraphic sequence documented in the plazas. Ideally, it will be possible to trace the evolution of dynastic architecture at the site, beginning with the versions of Structures A-15 and A-21 that are associated temporally with Tomb 2 and the compact dirt surface. Future excavations may also target the platform encountered in Subops CC-10-H, -R, and -T.

The NGS/Waitt grant-funded research at Structure A-5 demonstrated the effectiveness of SfM mapping of both mounds and excavation units. The work also determined that the area north of Structure A-5 was a functional space at least by the Late Classic period. Importantly, the excavations at the structure documented multiple, though poorly dated, construction episodes. This finding suggests that the other buildings surrounding the Main Plaza likely have more complicated constructions sequences than initially proposed.

With the initiation of BEAST, the CCAP is beginning to fill in blank areas on the map of northwestern Belize and improve our understanding of settlement patterning and density. The 2013 survey found a completely unlooted site with a stela and structures over 5 m high. Given the ubiquitous depredation that has occurred to similarly sized ruins in the region, Ix Naab Witz represents a singularly important find. Proposed work in 2014 will continue to survey cut seismic lines and attempt to locate El Infierno, a large site reported in the 1970s and suspected to lie within 1 km of the Guatemalan border (see Guderjan et al. 1991).

Acknowledgments

The authors wish to thank the staff of the Institute of Archaeology for considering this paper for publication, in addition to encouraging and permitting the research reported here from Chan Chich and the Belize Estates Archaeological Survey Team. We are extremely grateful to the Bowen family for continuing to allow our working at Chan Chich. We are very grateful to the staff of Chan Chich Lodge, particularly Ms. Letty Martinez, for being so kind and helpful and to the manager of Gallon Jug Ranch, Mr. Alan Jeal, for being extremely supportive of the field school and archaeology in general on the property. We would also like to thank Mr. Jeff Roberson of Yalbac Ranch for facilitating our investigation of the Laguna Seca parcel. The mapping and remote sensing work at Structure A-5 was funded by a grant from the National Geographic Society/Waitt Grants program (Grant Number W261-12). The survey work was funded by a generous contribution from Mr. Leroy Lee of American Seismic, LLC, and we are extremely grateful for his support. We would like to thank Dr. Chet Walker and Mr. Mark Willis of AGI, LLC for conducting the mapping and remote sensing work and Northwest Geophysics, LLC for generously loaning Dr. Walker a ground penetrating radar for use during the survey. Other specialists deserving thanks are Mr. Gary Smith for his architectural drawing of Structure A-5, Dr. Carolyn Tate for her ceramic sherd illustrations, Mr. Norbert Stanchley for his assessment of our faunal remains, and Dr. Fred Valdez, Jr. for his ceramic analysis. Finally, we would like to thank the students and staff of the Chan Chich Archaeological Project and all the departments and offices at Texas Tech University that provided support in 2013.
References Cited

Garrison, Thomas G.

Guderjan, Thomas H.

Guderjan, Thomas H., Michael Lindeman, Ellen Ruble, Froyla Salam, and Jason Yaeger

Harris, Matthew C., and Vincent M. Sisneros

Houk, Brett A., Hubert R. Robichaux, and Fred Valdez, Jr.

Houk, Brett A., Lauren A. Sullivan, and Fred Valdez, Jr.

Houk, Brett A., Chester P. Walker, Mark Willis, and Kelsey E. Herndon

Kelley, Krystle, Kevin A. Miller, and Ashley Booher

Robichaux, Hubert R.

“PLANT THOU NO ROSES AT MY HEAD”: A DISCUSSION OF THE MIDDLE FORMATIVE PERIOD BURIED DEPOSITS AT KA’KABISH, NORTH-CENTRAL BELIZE

Helen R. Haines, Alice Gomer, and Kerry Sagebiel

Recent investigations at Ka’Kabish have revealed that the site had a dynamic Middle Formative period occupation. Based on the recovered cultural materials it is clear that the inhabitants at Ka’Kabish were active participants in long-distance trade networks that saw the importation of a variety of exotic and high-status items into the settlement. The use of these goods, and others, suggests that the site was engaging in elaborate ritual activities including possible feasting events at this early point in time. Focusing on the on-going excavations into the Group D plaza, we will detail these recent discoveries and attempt to locate them into the broader socio-political landscape of Northern Belize during this dynamic developing time period.

Introduction

The Middle Formative period is increasingly being recognized as an important point in time when social stratification emerged in ancient Mesoamerica. As material from this period is often the result of the earliest occupation of a site, it is often difficult to recover. These deposits are frequently the by-product of small communities, making their location difficult to pinpoint under later Classic period “urban sprawl” and, when found, are often buried deep beneath centuries, if not millennia, of later constructions, thereby making large scale excavation and recovery of material problematic. Despite these problems, many sites in Belize, and throughout the Maya world, are adding annually to our increasing corpus of information about the Middle Formative period; research no doubt spurred on by increased realisation as to the importance of the Middle Formative period for understanding key aspects of social development.

At Ka’Kabish, deposits and possible structures dating to the Middle and Late Formative periods have been discovered at several locations in the site core (Figure 1). These areas include two discrete plaza zones (Group D Operations 1 and 8), within a major temple (Structure D-9), and potentially within two other temples (Structures D-4 and FA-6). Currently, Ka’Kabish consists of roughly 90 structures clustered in several discrete plaza groups, surrounded by what appears to be a large, and long-term domestic settlement zone. Regrettably, these groups now number only eight, as in the intervening time between our 2012 and 2013 field seasons we lost two groups due to agricultural development.

Geologically, the core area of the site is on a limestone ridge, approximately 100 metres above sea level, and over 75 metres higher than the site of Lamanai, its nearest neighbour, located 10 km to the southeast (Figure 2). To the west, roughly 25 km away, the land rises suddenly 80-90 metres to form the Rio Bravo Escarpment (Lohse 2004:121). The location of Ka’Kabish on this ridge top was likely strategic as well as practical. In terms of its practical location, the ridge top allowed the settlement to situate itself well above the rich dark alluvial soil which surrounds the site; this land currently is known to suffer inundations during heavy rains, and it is likely did so in the past as well.

![Figure 1. Ka’Kabish Site Core noting locations of Middle and Late Formative Period deposits.](image-url)
Strategically, the location afforded the occupants a vantage point from where they could see, and be seen by, inhabitants in the surrounding area. The site is clearly visible from both the Rio Bravo Escarpment and the top of the High Temple at Lamanai, as well as from several other cleared fields across the region.

Locations of Formative Period Deposits

The best evidence for Middle Formative period occupation at Ka’Kabish comes from the south-east quadrant of Group D. Investigations in this area focused on two areas, Structure D-9 and the plaza to the north of Structure D-9 (Operation 8). Work on the pyramid temple consisted of mapping and collecting of material found in a large looters’ trench that penetrated the building (reported on at the 2011 BAS by Haines and Aimers, and more thoroughly in Ms. Cara Tremain’s MA thesis). Investigations into the plaza just north of Structure D-9 consist of a series of contiguous 2x2 metre units, the first of which was excavated in 2010 with additional units being added each succeeding year.

Material recovered from these investigations suggest that this area of the site was not only the location of what is possibly the earliest occupation at Ka’Kabish, but also that the area remained important throughout the Formative period and into the Early Classic period. Excavations suggest there was an initial period of continuous rebuilding episodes during the Middle Formative and into the early facet of the Late Formative period, followed by successively more infrequent constructions until the end of the Early Classic period. Recent excavations conducted this year suggest that the final occupation of the area may date to the early Post-Classic period, likely a domestic reoccupation of the area. The area evinced a lack of early Late Classic material, a factor noted in investigations of other areas of the site.

The material we will be discussing in this paper comes from the lowest three levels of the Group D, Operation 8, plaza excavations. Specifically, we wish to discuss the discovery of a burial and its associated artefacts that were placed in four pits carved into the bedrock. This interment and the accompanying mortuary items not only form the most conclusive evidence we have for Middle Formative occupation at Ka’Kabish but provides us with insights into broader questions of origins of social stratification, early trade and exchange, and ideas of place and place-making.

Plaza D Burial Deposit

Three circular pits and one long, north-south oriented trench comprised the extent of the burial deposit (Figure 3). Based on the clustered nature of the long-bones and dispersed nature of the teeth to both sides (north and south) of the clustered bones we believe the interment was of a secondary nature. Preservation of the human remains, by virtue of their location in the north-south trench on the bedrock and being surrounded by a dense, damp, clay-like soil was very poor, making aging and sexing of the individual impossible. That the individual was a personage of importance to the community is evinced by startling array of long-distance trade goods discovered in the trench around the body as well as in the three surrounding pits.

Over five hundred shell beads derived largely from Strombidae species, were recovered in association with the burial (Haines n.d.; Lockett-Harris 2013; Stanchly n.d.). Twenty-three relatively large, roughly shaped beads that appear to have been cut primarily from the outer walls of the Strombidae shell were recovered from the northern pit (Cluster 3), while an additional 37, more finely cut beads of various sizes were recovered from the pit to the east of
the burial trench (Cluster 1). Cluster 2, located in a side depression of the southern pit, contained the largest collection (i.e., over 150) shell beads. These beads were clearly part of a necklace on which an unusual jade pendant, to be discussed below, was suspended. Additionally, 300 beads were recovered during the course of excavation that could not be associated with certainty to any particular cluster or specific contextual location beyond that of the grave.

The grave and surrounding pits also contained a total of 17 “jade” or greenstone objects (Figure 3). Of these only four were found in actual association with the grave. The remaining pieces, nine were found in the pit at the south end of the burial trench while the exact location of the other four pieces could not be determined, having been found during sorting. The quality of the material varied dramatically from greenish-white flecked stone to pure-even coloured glassy materials. The colour of the material also varied and shades included the whitish-green mentioned above, deep green, bright apple-green, and even a few pieces of “Olmec blue” jade. These pieces included a series of small round-ish beads, several tubular beads, three pendant-style beads (one of which was “claw-shaped” pendant piece similar to the jade “bobs or pendants” noted in Plate 57 of Drucker and colleagues’ 1955 publication), eight chunks or semi-worked pieces, and three plaques. Each plaque was distinct with one being the pale Olmec-blue jade mentioned previous (centre), another being a deep green but polished so thin as to be translucent (upper right), while the third was a pale green “spoon-shaped” pendant (Figure 4). This latter piece, found in association with the shell bead necklace in Cluster 2, is perhaps the most noteworthy as these object, while not unknown, are quite rare.

Jade spoons are assumed to be associated with Olmec culture due to the discovery of numerous, smaller tri-lobed ornaments at La Venta in the late 1940s and early 1950s by Drucker (Drucker 1952; Drucker et al. 1959). However, examination of the La Venta objects, while similar in shape, reveals that they not only lack the distinctive depression that characterizes these objects but many are convex in cross-section. Referred to as “spanglers” by Drucker (Drucker 1952; Drucker et al. 1959) these pieces are quite small, the largest being 20.5 mm, and were likely sewn directly on clothing, based on the numerous holes which were drilled straight through the objects.

A few “spoons” have been noted with Olmec designs (see Benson and de la Fuente 1996: Catalogue #99), which along with the La Venta pieces, have resulted in these objects being generally attributed to the Middle
Formative period (Andrews 1986:39; Coe 1965; Proskouriakoff 1974; see also Andrews 1987 for suggestion of a later date). However, the vast majority of these pieces, including the one from Guerrero, lack clear archaeological provenience, as they have been seized from looters, or purchased on the art market and donated to museums by private collectors, factors that make accurate ascription to a culture or time period speculative.

The few items with provenience include one from Uxbenka, Belize, that was recovered from a looters’ trench and is now in the Belize National Museum in Belize City (Healy and Awe 2001), one from the Sacred Cenote in Chichen Itza from whence it was dredged in the part of the last century (Coggins 1992), and a series of seven specimens Andrews was able to track to Chacsinkin in the Northern Yucatan where the looters who excavated them told him where they were found, although he himself never saw any in context (Andrews 1987). Two other potential “spoons” were recovered from burials at Chalcatzingo, Mexico, however, these were heavily worn and flattened making thier form and function highly debatable (Thomson 1987). Other than the Ka’Kabish pendant, only one other similar pendant has been recovered from a secure archaeological context. This object was excavated at Ceibal where it was discovered, along with a shell pectoral, beneath an upside down cache vessel in a Xe-Real context (Castillo Aguilar and Inomata 2011:100; see also pp 104-105 figures 12.5 and 12.6). Although slightly earlier than the Ka’Kabish deposit, the Ceibal material substantiates the early date at Ka’Kabish and supports a Middle Formative period age for these pieces in general; however, I would note that, while these pieces may be Formative in date we should not yet presuppose that these are Olmec in origin.

The Ka’Kabish bedrock deposit also yielded a variety of ceramic material, including a single intact ceramic vessel, identified as a Consejo Red-Striated bowl by Dr. Sagebiel. This bowl was recovered in association with the burial (Figure 5). Placed in an inverted position the vessel was found to be devoid of any macro-finds. Other ceramic material from this lowest level below Floor 1 consisted of over 3,000 sherds, the majority of which are consistent with Swasey-Bladen ceramic Groups such as Copetilla (unslipped), Consejo (red), Machaca (black), and Chicago (orange) (Gomer 2013). The Consejo Group at Ka’Kabish consists of a bright red slip over a white underslip or well-prepared surface. The paste is consistently light brown/buff or light orange with angular calcite inclusions and a distinct gray core. The most common bowl form has flared sides, a direct rim, and a square or round lip. However, in this same level, there are also a significant number of sherds that belong to Lopez-Mamom ceramic groups, including Joventud (red), Chunhinta (black), Pital (cream), and Muxanal (red-on-cream). The tentatively identified Joventud Group at Ka’Kabish has a thick, dark red to
Table 1. Radiocarbon dates from Operation 8, Units 1 and 2 (NSF-AMS Arizona Facility).
(Note: Level 16 in Unit 1 is the same strata as Level 12 in Unit 2)

<table>
<thead>
<tr>
<th>AMS Sample #</th>
<th>Project Sample ID</th>
<th>d13C</th>
<th>F</th>
<th>14C age BP</th>
<th>Calibrated 2 sigma</th>
<th>Context</th>
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</thead>
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<td>AA96420</td>
<td>KKB-282-2011-2</td>
<td>-27.4</td>
<td>0.7374 + 0.0034</td>
<td>2,447 +/- 37</td>
<td>754-408 BC</td>
<td>Unit 1, Level 16</td>
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<td>AA96421</td>
<td>KKB-353-2011-3</td>
<td>-28.8</td>
<td>0.7372 + 0.0034</td>
<td>2,449 +/- 37</td>
<td>755-409 BC</td>
<td>Unit 2, Level 12</td>
</tr>
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<td>AA96422</td>
<td>KKB-353-2011-4</td>
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<td>0.7400 + 0.0034</td>
<td>2,418 +/- 37</td>
<td>750-399 BC</td>
<td>Unit 2, Level 12</td>
</tr>
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<td>AA96423</td>
<td>KKB-353-2011-5</td>
<td>-26.1</td>
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<td>2,466 +/- 37</td>
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<td>AA100166</td>
<td>KKB-520-2012-2</td>
<td>-26.8</td>
<td>0.7424 + 0.0048</td>
<td>2,393 +/- 52</td>
<td>753-388 BC</td>
<td>Unit 2, Level 12</td>
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<tr>
<td>AA100168</td>
<td>KKB-438-2012-4</td>
<td>-26.3</td>
<td>0.7308 + 0.0038</td>
<td>2,520 +/- 42</td>
<td>799-511 BC</td>
<td>Unit 2, Level 16</td>
</tr>
</tbody>
</table>

purple, waxy slip on a pinkish paste, which may include crushed sherds or grog. Forms such as ovate spouts and dishes and bowls with outflared sides, widely everted rims, and round, thickened lips are common. Also common in this level are bowls of Guitara Incised that are decorated with the double-line break motif along the interior rim.

In this same level, along with clearly identifiable Consejo Red and likely Joventud Red, there are also sherds that may be transitional between Consejo and Joventud. In particular, there are Consejo Red sherds with grog inclusions, more typical of Joventud and Sierra, and Joventud Red sherds that appear to have a white underslip, typical of Consejo. This material, along with the intact vessel, and supported by radiocarbon dates, suggests a Middle Formative date for this deposit.

What was also quite notable about the burial, other than the wealth of jade objects and density of ceramic pieces, was that immediately above the burial, planted in the floor above the internment was a triangular “marker stone”. This marker projected roughly 35 cm above the floor, clearly a visible reminder to people in the plaza of the subterranean internment. The marker stone at Ka’Kabish also impacted, although less noticeably, on Floor 2, a refurbishment of the plaza surface. It is likely that it was even more noticeable originally as when we encountered it the top had been broken off.

Possible Evidence of Middle Formative Feasting Activities

Surrounding the stone at Ka’Kabish, in the fill between Floors 1 and 2, were the remains of 25 partially re-constructible vessels (with 50% or more of their rims intact) along with 12 intact or fully restorable vessels. These vessels were sealed below a thick layer of plaster that comprised the subsequent plaza floor. The majority of recovered vessels were small- to medium-sized shallow serving bowls, although a few deep bowls and jars were also recovered. These ceramics were a mix of Swasey-Bladen, Lopez-Mamom, and what appears to be transitional Joventud-Sierra or Sierra Group types. These Joventud-Sierra sherds have a mix of Joventud and Sierra attributes, most common are Joventud forms with a redder Sierra slip. These dishes may have formed part of a feasting ritual that took place as part of the plaza construction that sealed, and also obscured, the burial marker. Four carbon samples recovered from the fill in and around these vessels yielded a combined calibrated date range of 762 – 399 BC (2 sigma with +/- 37 yrs; AA96420, AA96421, AA96422, AA96423) with the period of overlap from these dates being 750-409 BC (Table 1).

Associated Architectural Features

In 2012, the excavation units in the Plaza-D south (Operation 8) area were extended to determine the extent of the Middle Formative ceramic deposit. However, rather than finding
more vessels, we discovered the floor that capped the deposit was associated with a low 35 cm high platform (Figure 6). The platform was built with three courses of roughly cut stones and coated in a thick, roughly 8 cm layer of plaster. Approximately 4 metres of the north side of the platform was cleared, exposing a rounded north-east corner of the building. Badly melted, heavy stucco was encountered on the face of the platform approximately 1 metre west of the corner, and directly in line with the earlier stone marker, burial, and ceramic deposit. It is possible that this is the remnants of stucco decoration. Also in front of this building, in the fill that buried it and immediately above the two previously discussed Middle Formative layers, we recovered an excellent sample of Late Formative ceramic material that we will discuss shortly.

The 2013 field season excavations focused on exposing more of this structure. However, in lieu of the expected building platform a much larger structure, one that had been remodelled at least once, was uncovered. It is possible that the building platform encountered in 2012 was a remodelling that put a forward extension on the front of this new platform. We have yet to recover conclusive dates for these platforms, although additional Late Formative material was recovered from the matrix that buried these new architectural features. Currently, it appears that what may be the initial primary platform continues below Floor 2 (the floor that caps our late Middle Formative deposit) suggesting that the building may date to that period. Due to the length of the field season and the expanse of the area excavated these units were unable to be completed to bedrock, rather halting at this level (Floor 2). Future excavations in this area are planned for the forthcoming field seasons.

The Late Formative plaza deposit excavated in previous seasons and originally examined by Dr. Jim Aimers, were re-examined by Dr. Sagebiel in conjunction with the related Late Formative deposits excavated during the 2013 field season (Aimers and Haines 2011; Haines and Aimers 2011). In these collections we recovered a large number of small (on average roughly 10 cm diameter) shallow bowls, mostly Sierra Red. Although further investigations of the ceramics in Plaza D need to be made in order to definitively conclude that it was a persistent locale for ritual feasting, preliminary analysis of both the Middle and Late Formative collections suggests that feasting was going either at, or near, these structures.

Discussion

The discovery of Middle Formative Period platforms, while frequently difficult to access due to their being deeply buried beneath later construction episodes, are not uncommon. Contemporary examples of Middle Formative period platforms and deposits are known from both within the Northern Belize Swasey/Bladen sphere as well as in the Cunil cultural sphere to the south and the Xe-Real sphere to the west.

At the nearby site of Cuello, Hammond uncovered a series of low platforms – approx. 40 cm to 60 cm high – that were constructed during the Bladen period (ca. 900-650 BC). These platforms were placed above earlier, 20 cm high platforms that, like the one discovered at Ka’Kabish, were also constructed with rounded corners (Gerhardt 1988). At Cuello, two burials were found associated with one of their platforms. Interesting, neither burial contained jade ornaments although both contained shell beads. Small numbers of jade beads – usually one or two – were encountered in other Bladen period burials at Cuello. While no “spoons” like the one discovered at Ka’Kabish were recovered at Cuello, a semi-clam-shell pendant was recovered in the burial of an 8-year old child dated to 660 cal. BC (Hammond 1999; Hammond et al. 1992). This object, while superficially similar at first glance was actually “recut ... into a fat T-shape (an IK emblem?)” (Hammond 2013 personal communication) and lacks the distinct depressions or “bowls” of the so-called “spoons”. However, it, along with other jade objects recovered from Swasey/Bladen phase deposits at Cuello (Robin 1989), indicate that the importation of carved jade items this region of Belize during the Middle Formative period was a well-established practice.

Numerous other sites in Northern Belize also have deposits dating to the Middle Formative period including Blue Creek (Haines 1996, 1997a, 1997b; Haines and Blom 2001),
Cerros (Robertson and Friedel 1986), Chan Chich (Robichaux 1998, 2000; Robichaux et al. 2000; Valdez Jr., 1998; Valdez Jr. and Houk 2012), Colha (Buttles 1992; Sullivan 1991; Valdez Jr., 1987, 1994), Dos Hombres (Brown 1995; Houk 1996), K’axob (Lopez-Varela 2004; McAnany 2004; McAnany and Lopez-Varela 1999; McAnany et al. 1999), Lamanai (Powis 2002), Nohmul (Kosakowsky and Pring 1998), and San Esteban (Rosenswig 2008, 2009) among others. The vast majority of material from these sites, with the exceptions of Cuello and Cerros, and a single burial at Lamanai are limited to domestic refuse reused as plaza fill. Material from these sites indicates that the occupants of these centres, including Ka’Kabish, were largely-participating in the Northern Belize Swasey-Bladen cultural sphere.

At Cahal Pech in the Belize River Valley, platforms in connection with Cunil ceramics were discovered at the bottom of Plaza B (Awe 1992; Cheetham 1998). One of these structures (B-IV 10c-sub) was slightly more elaborate, consisting of a 20 cm high stone and plaster platform on which a plastered pole and thatch building was constructed. The interior of this structure was decorated with red painted walls and housed a plaster bench and has been interpreted as having a “higher status” than the other platforms or being a “ritual structure” (Awe 1992). This evidence, along with material from Cival and elsewhere (see Estrada-Belli 2011 and Rosenswig 2010), highlights the fact that roots of social differentiation and ritual activity were firmly situated in the Middle Formative period.

Conclusions

Based on the recovered material it is clear that Ka’Kabish had a thriving occupation during the middle and latter parts of the Middle Formative period (ca. 800 – 400 BC). They were actively engaged in long-distance trade that brought a wealth of items, including unique pieces such as the jade spoon, into the community. Although we have focused our discussion in this paper strictly on the Formative period, preliminary analysis of subsequent layers suggests that the occupants at Ka’Kabish continued to use this specific locale for ritual feasting events into the Early Classic period. While the exact nature of these feasting events is unclear, and may always remain so, it seems more than coincidental that these events and structures are located in close spatial, if not temporal, association with this particularly rich burial. We may be looking at evidence of community place-making and the reinforcement of social identity through the continued veneration of a respected ancestor, if not community founder, as reified through feasting events and the construction of ritual platforms.

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References

Aimers, James J., and Helen R. Haines

Andrews, E. Wylyls, V.


Awe, Jaime J.

Benson, Elizabeth P., and Beatriz de la Fuente (editors)
Buttles, P. J.

Castillo Aguilar, Victor, and Takeshi Inomata

Cheetham, David

Coe, Michael D.

Coggins, Clemency

Drucker, Philip

Drucker, Philip, Robert F. Heizer, and Robert J. Squier

Estrada-Belli, Francisco

Gerhardt, Juliette C.

Alice Gomer

Haines, Helen R.


Haines, Helen R., and James J. Aimers

Haines, Helen R., and Rebbecca Blom
2001 Final Excavations of the Formative Deposits at Structure 9, Blue Creek Ruin, Belize. In Working Papers from the 1998 and 1999 Season at Blue Creek, edited by T.H. Guderjan and R. Lichenstein. Maya Research Program and Texas Christian University, Fort Worth, TX.

Hammond, Norman, A. Clarke, and Francisco Estrada-Belli

Hammond, Norman

Healy, Paul F., and Jaime J. Awe
2001 Middle Preclassic Jade Spoon from Belize. Mexicon 23(3):61-64.

Houk, Brett A.
1996 The Archaeology of Site Planning: An Example from the Maya Site of Dos Hombres, Belize. Ph.D. dissertation, University of Texas, Austin.

Kosakowsky, Laura J.
1987 Preclassic Maya Pottery at Cuello, Belize. Anthropological Papers of the University of
Arizona 47. The University of Arizona Press, Tucson.

Kosakowsky, Laura J. and Duncan C. Pring

Lockett-Harris, Joshuah

Lopez Varela, Sandra


Lohse, Jon C.

McAnany, Patricia A.


McAnany, Patricia A., Rebecca Story, and Angela K. Lockard

Powis, Terry G.
2002 An Integrative Approach to the Analysis of the Late Preclassic Ceramics at Lamanai, Belize. Ph.D. dissertation, University of Texas, Austin.

Proskouriakoff, Tatianna
1974 Jades from the Cenote of Sacrifice, Chichen Itza, Yucatan. Harvard University, Peabody Museum of Archaeology and Ethnology, Memoir 10(1). Cambridge, MA.

Robertson, Robin A., and David A. Friedel

Robichaux, Hubert R.


Robichaux, Hubert R., Jennifer Jellen, Alexander Miller, and Jennifer Vander Galien

Robichaux, Hubert R. and Michelle Arroyo

2009 The Emergence of Complexity and the Middle to Late Formative Occupation of San Estevan, Belize. Research Reports in Belizean Archaeology, Vol. 6:100-108.


Stanchly, Norbert
Sullivan, Lauren A.
1991 Preclassic Domestic Architecture at Colha, Belize. MA thesis, Department of Archaeology, University of Texas at Austin, Austin.

Thomson, Charlotte W.

Valdez Jr., Fred


Valdez Jr., Fred, and Brett Houk
Introduction

Mortuary rituals of the ancient lowland Maya have been prominent foci of research since the earliest archaeological studies. Ricketson’s (1925) early descriptions of Maya lowland burials were followed by work such as Alberto Ruiz’s comprehensive summary (1965), and tests of hypotheses concerning social status and wealth as reflected in the Maya mortuary practices (Rathje 1970). Since then researchers have widened their analyses across sites and regions, focused on the behavioral contexts associated with Maya burial practices (Becker 1988, Coe 1988), conducted more detailed analyses on the contents and skeletal remains found within burials (Krejci and Culbert 1995; Whittington and Reed 1997), and perhaps most importantly have highlighted the importance of Maya burials as a means of maintaining links with deceased ancestors (McAnany 1995, 1998). Additionally, members of the Blue Creek project have recently used mortuary data to strengthen understanding how power, legitimacy and authority are created and maintained (Guderjan 2007; Guderjan and Hanratty 2007; Guderjan, Diel, Giacometti and Andrews in press).

In this report, we discuss the implications of a Terminal Late Preclassic burial, Tomb 5, from Blue Creek in Belize. Tomb 5 is a complex interment that reveals important information regarding Maya mortuary ritual, and social and economic status during this period of transition between the Preclassic and Classic periods. Tomb 5 is not a typical vaulted masonry tomb. Instead it was placed in a chamber dug into limestone bedrock, similar to a chultun.

Early Settlement History at Blue Creek

The earliest occupation of Blue Creek is in the Middle Preclassic period (650-350 B.C.) and deposits of this age have only been found under Plaza A, in front of Str. 9 and in a basal excavation in the Chan Cahal residential group. The Late Preclassic Period is marked by the Chicanel related ceramics (350 B.C to A.D. 100) and at this time, Blue Creek began to develop as an integrated social unit. The first monumental architecture was constructed in Plaza A, a burial in a chultun was found in front of Structure 25 and occupational deposits were recovered from both Chan Cahal and Sayap Ha. These two adjacent residential areas are located near the base of the Bravo Escarpment and separated from the base of the escarpment by a low-lying wetland, the Chan Cahal fields, which were later ditched by Maya farmers.

Additionally, a Late Preclassic midden marked by Sierra Red ceramics was discovered under the Early Classic plaster floors of the Str. 37 Courtyard. This marks the earliest occupation of this elite non-royal residential group (Guderjan and Hanratty 2006). It later grew in size as its residents grew in importance through the Classic period. Similarly the entire top of Deadman’s Hill was covered with a 50 cms or so thick deposit of Late Preclassic ceramics, overwhelmingly Sierra Red.

While the Late Preclassic period saw the beginnings of what would soon be recognizable to us as Blue Creek, the Terminal Preclassic-Early Classic period (A.D. 100-150 to A.D. 250) saw an explosion in population, large scale monumental construction and the founding of lineages in most residential groups. Markers of
this period include distinctive formal variants on older typological patterns. In Plaza A, the first phase of Structures 1 and 4 were built and in Plaza B, the first phase of Str. 9 was built. At the base of Str. 4, a cache of obsidian blades may well mark the accession of Blue Creek’s first king.

Most importantly, the lineages that were to have central roles for the next several centuries took control of the prominent living spaces. Kin Tan is an elite residential group west of the central precinct that consists of several separate residential units, all of which have been investigated and includes tombs or burials of founders, all of which that can be determined, were adult males, typically in the range of 40 years old and all dating to this period. All of the residential units are situated on erosional remnant hilltops overlooking the deep, rich soil filled bajitos which surround them.

The Discovery of Tomb 5

In December of 1998, in the aftermath of Hurricane Mitch, a bulldozing operation for marl for road construction inadvertently opened the top of an intact underground chamber, Tomb 5, dating to the Terminal Late Preclassic period, dated at Blue Creek to AD 100/150-250. The burial is located approximately 4.25 kilometers northeast of the central area of the Blue Creek central precinct (Figure 1), and is situated on a seventy-meter tall, karstic erosional remnant in the Rio Bravo floodplain. This hill has been the scene of intermittent quarrying activity for the last two to three decades, as well as a location for both historic and contemporary construction, by the local community. Importantly, the hill overlooks the conjunction of the Rio Azul and Rio Bravo where they form to become the Rio Hondo.

The initial surveys of the hilltop revealed that much of the area had been disturbed. A recent, concrete house foundation was found as well as extensive areas that had been stripped to bedrock by quarry activity. The historic foundation had been cut directly into a badly damaged Early Classic period (A. D. 250-600), masonry structure. In 1996, a Late Preclassic period (350 BC- AD 100/150) midden sealed below the Early Classic floors was tested (Haines and Suther 1997) which contained a typical assemblage of mostly Sierra Red ceramics. Additionally, this midden covered the unimpacted part of the hilltop, approximately 200 square meters to the south and west of Haines and Suther’s excavations. We had previously received reports of burial chambers on this hill, but it was the accidental discovery of the Tomb 5, a Late Preclassic burial that led to further work. Initial recovery, description, and excavation of the grave goods were done rapidly in order to secure the material before it was further looted; but, some valuable data were no doubt lost. Subsequent excavations were carried out to map and determine the extent of the chultun chamber and shaft, and to recover any grave goods missed in the initial recovery.

Description of Tomb 5

The burial chamber is roughly circular in plan, approximately two meters in diameter and 1.6 meters high. The entrance shaft was approximately one meter in diameter and east of the chamber (Figure 2). The chamber entrance
Figure 2. Planview and Profile of Tomb 5 Chamber.
at the base of the shaft was sealed by four large, limestone slabs secured with mortar. Presumably at one time the shaft entrance was also sealed, as there was little soil in the fill of the shaft, although no capstone was located. Included in the heavy boulder and cobble fill of this shaft were a number of freshwater shells including apple snails (Pomacea flagellata), jute (Pachychilus sp.), and the pearly fresh water mussel (Nephronaias sp.), as well as a prismatic obsidian blade and a bifacially worked broken chert tool.

Inside this chamber were the partial burials of three individuals laid on top of a 5-10 cms thick bed of fish (Figure 2). The primary burial was laid in an extended supine position with a tightly flexed bundle burial at its feet. Twenty-eight ceramic vessels were placed in a tripartite arrangement around the primary burial, some of which contained parts of a third individual. Jade, hematite, and obsidian artifacts as well as cloth fragments and copal were also found.

Skeletal Remains

The primary interment (Burial 34) is an adult male placed in an extended supine position with his head to the east and with arms outstretched at about a 45 degree angle to the body and legs crossed at the ankles, right over left (Figure 2). Approximately 20 percent of the skeleton was recovered. Postcranial remains included portions of the clavicles, humeri, radii, ulnae, innominates, femora, tibia and fibulae. The only cranial material recovered were a portion of the maxillary alveolus and portions of the mandibular body and left ascending ramus. The skull was apparently crushed when the tomb was discovered. The sex determination was based on the robustness of the long bone fragments. Age was estimated between 20 and 35 years from the degree of occlusal wear on the recovered premolar and molar dentition. All observable epiphyses had been fused. Recovered teeth included 12 dental crowns representing 4 incisors, 2 canines, 3 premolars, and 3 molars, and 18 root fragments. Calculus was present in trace amounts on two of the recovered dental elements. No carries or enamel defects were observed. No intentional modifications were noted on the anterior dentition.

Highly unusual cut-like defects were observed on the left clavicle, distal left ulna and exterior alveolar surface of the mandible. These defects indicate intentional disarticulation or postmortem alteration of the body possibly related to funerary preparation or ancestor worship. There is also the possibility that the cut marks were the result of sharp trauma occurring at the time of a violent death. Other pathologies, noted on Burial 34, included healed fractures of a right metatarsal and left metacarpal and degenerative joint disease on a single toe phalange.

The individual was wearing a necklace of 28 jade beads (ranging in weight from 0.3 gms to 14.8 gms), with an additional 27 beads found scattered around the neck area, as well as a bracelet of 12 jade beads on the right wrist. Surrounding this individual, at the ends of each arm, around the head, and at the feet, were three groups of grave offerings. The skeleton was covered with a sprinkling of powdered hematite, an obsidian blade was underneath the pelvis, and the entire skeleton was lying on a bed of what appeared to be fish bones. To the northeast of the head, at the end of the right arm was a collection of ten vessels (BC#s 5702-5711), including seven bowls, two jars, and a large tetrapod spouted vessel. At the end of the left arm, to the southeast of the head, was a group of nine vessels including five bowls and four jars (BC 5701, 5712-19). Three of the bowls from this group contained the remains of the secondary Burial 36. One bowl (BC 5717) held the articulated remains of the lower section of a human torso, while a second bowl (BC 5713) contained a human coccyx, and a third vessel (BC 5723) contained human phalanges. To the west, at the feet of the primary individual, was a collection of nine vessels including six bowls, two jars, and a dish. Two of these vessels (BC 5725 and 5726) were placed lip-to-lip and contained 56 jade beads (48 complete, 8 fragmentary) and one bead of carved shell.

Placed among these pots at Burial 34’s feet was a tightly flexed and possibly bundled burial (Burial 35) with its head pointed to the northeast. Approximately 40 percent of the skeleton was recovered. Cranial remains included portions of the left and right eye orbit,
zygomatic, mandible, parietal and occipital bones. Recovered postcranial remains included portions of the clavicles, scapulae, humeri, radii, ulnae, vertebrae, ribs, innominates, femora, and tibiae. The individual was determined to be male from metrical and morphological observations of the femoral head, and was between 25 and 40 years, based on the degree of closure of the neurocranial suture closures. The only pathology was a healed fracture of the right fourth metatarsal. In addition, the proximal portion of the right ulna as well as the humeral fragment displayed enhanced muscularity possibly due to a specialized occupational activity that called for increased extension of the forearm. This individual was found associated with a loose greenstone bead and seven loose jade beads, which may have been part of a bracelet, as they are similar in shape to those found with the bracelet with Burial 34.

The third burial located in the chultun, Burial 36, was found within three bowls (BC 5713, 5717, 5723) placed at the left hand of the primary interment. Postcranial remains included portions of the vertebrae, ribs, sacrum, coccyx, ulnae, and phalanges. No cranial material was recovered. It is likely that Burial 36 was actually parts of 2 individuals based on the age-related development of the recovered vertebral centra and the presence of a portion of sub-adult clavicle.

**Faunal and Floral Remains**

Very well preserved macro-botanical remains were found in several vessels, including beans and maize kernels. A preliminary botanical analysis has been conducted by Norbert Stanchly, and many of the ceramic vessels were apparently used to store offerings of food, serving similar functions to those found in Preclassic burials at Cuello in northern Belize (Robin and Hammond 1991; 220) and also in caves in Belize (Moyes 2000, 2006).

Steven Bozarth analyzed phytolith samples taken from within four different ceramic vessels (BC #s 5703, 5705, 5711 and 5721. Domesticated *Cucurbita* rind phytoliths were discovered in two of the vessels (BC 5703 & 5721), suggesting that squash was placed in these vessels as offerings. Phytoliths from maize cobs were found in one pot (BC 5721) and phytoliths from the maize plant were found in three of the vessels as well (BC 5703, 5705, & 5721) also suggestive of both cobs and parts of the maize plant utilized as funerary offerings. Taxonomically unidentifiable fruit phytoliths were found in two of the vessels (BC 5703 & 5705), and all four vessels showed evidence of leaves of an arboreal tree. Finally two vessels (BC 5705 & 5711) had traces of red ochre, which became visible after the extraction process for the phytoliths.

Most of the faunal remains were from the five to eight centimeter thick bed primarily of fish bones that rested directly on the bedrock and underling the entire burial of the extended individual (Burial 34). Approximately 60% (2,882 of 4,299 total) vertebrate remains were fish bones and most of these were *Petenia splendida*, a cichlid that is locally known as “bay snook” or “blanco”. There are also smaller cichlids (Family *Cichlidae*, Genus *Cichlasoma*, Species unknown), and catfish (Family *Ariidae*, species unknown). Local catfishes include the blue catfish (*Ictalurus furcatus*) and possibly some representatives of the pimelodid catfishes (Family *Pimelodidae*, Genus *Rhamdia* occurs in the area). There were also 2 stingray spines (Class *Chondrichthyes*, Order *Rajiiformes*). An analysis of fish body portion distribution indicates that whole fishes were deposited within the burial, and this, coupled with the total absence of heat altered fish bone, suggests that fish were included as offerings, rather than debris from feasting or middens. Mixed in this bed of fish remains were a number of bones from an as yet unidentified species of bird. Of the 73 bird bones examined, almost all are of the black throated bobwhite (*Colinus nigrogularis*) which is a quail and member of the Family *Phasianidae*). At least 7 individuals are represented by various body portions, mostly wing and leg bones. The MNI count is based on 7 left humeri and could be higher.

Mammal, reptile, bird, and amphibian bone were also recovered and mammal bones are the second most common vertebrate. Unfortunately, heavy fragmentation of these bones precludes species identification except in a few cases. Mammals include armadillo (represented by dermal scutes) and many rodent species (Family *Cricetidae*). It is probable that
the presence of armadillo (only one individual is present) is cultural in origin, however the rodent bones are most likely intrusive.

Birds are represented by only a few specimens but interestingly there are paired elements found within one of the vessels within the burial; left and right wing bones of a medium-sized bird (species unknown) were found in one vessel. Reptile bones are few in number as well and all are gecko (Family Gekkonidae), and most likely intrusive. Amphibians are represented by a single long bone of a frog (species unknown--the specimen is too fragmented).

Invertebrate remains include local land snails and freshwater shell as well as worked marine shell and stingray spines. The land snails are recent and intrusive. Freshwater shell includes both apple snails (Pomacea flagellata) and jute (Pachychilus sp.). Marine shell includes many worked conch shell specimens, however identification to specific species is difficult due to cultural modification.

The Ceramics of Tomb 5

The twenty-eight whole vessels from the chultun burial were examined by Laura Kosakowsky, in order to better understand the ceramics of the Terminal Late Preclassic Linda Vista Ceramic Complex (AD 100/150-250), which is a part of the Floral Park Ceramic Sphere (Kosakowsky and Lohse 2003). The ceramics from this burial are most similar in form and style of decoration to the Cauac and Cimi Complexes at Tikal (Culbert 1993), including elaborate organic resist trickle as well as imitation Usulutan wipe-off decoration (Figure 3). They are also very similar to C’oh complex pottery from Cerros (Robin Robertson, personal communication) which Robertson dates as between 200-50 BC (Robertson 1986). If so, this tomb likely predates the general Late Preclassic growth of Blue Creek and may represent the death of an important person related to Cerros in some way. Also, similar "Protoclassic" ceramics are found throughout the Maya lowlands (Pring 2000) in restricted contexts (Kosakowsky 2005). As mentioned above, the vessels placed in the burial also probably no longer held preserved foodstuff and many showed a high degree of use-wear.

Interestingly, the ceramic types represented in this burial (see Table 1) appear to be of restricted use, as they are not found in other excavated contexts at Blue Creek, mimicking the distribution of “Protoclassic” or Terminal late Preclassic ceramics at other sites in northern Belize (Kosakowsky 2005).

Tomb 5 as a Symbolic Cosmogram

Tomb 5 forms a cosmogram or a symbolic recreation of the Maya universe. This is the same cosmogram that has been demonstrated to exist in dedicatory caches at Blue Creek (Bozarth and Guderjan 2004; Guderjan 2004) and elsewhere (Garber, et al. 1998). The Maya

Table 1. Type-variety designations of vessels from Tomb 5, Blue Creek. All are Terminal Late Preclassic, Linda Vista Complex (A.D. 100/150-250).

<table>
<thead>
<tr>
<th>Blue Creek #</th>
<th>Ceramic Type and Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC #5701</td>
<td>Sacluc Black-on-Orange: Unspecified Variety</td>
</tr>
<tr>
<td>BC #5702</td>
<td>Laguna Verde Incised: Grooved Incised Variety</td>
</tr>
<tr>
<td>BC #5703</td>
<td>Unnamed Hematite on Red (with Usulutan style decoration)</td>
</tr>
<tr>
<td>BC #5704</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5705</td>
<td>Flor Cream: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5706</td>
<td>Sierra Red Group (with graffiti)</td>
</tr>
<tr>
<td>BC #5707</td>
<td>Flor Cream Group: Unnamed Trickle</td>
</tr>
<tr>
<td>BC #5708</td>
<td>Flor Cream Group: Unnamed Trickle</td>
</tr>
<tr>
<td>BC #5709</td>
<td>Sierra Red: Big Pond Variety</td>
</tr>
<tr>
<td>BC #5710</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5711</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5712</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5713</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5714</td>
<td>Sierra Red: Sierra Variety (with graffiti)</td>
</tr>
<tr>
<td>BC #5715</td>
<td>Sierra Red: Big Pond Variety</td>
</tr>
<tr>
<td>BC #5716</td>
<td>Sacluc Black-on-Orange: Unspecified Variety</td>
</tr>
<tr>
<td>BC #5717</td>
<td>Puletan Red and Unslipped: Puletan Variety</td>
</tr>
<tr>
<td>BC #5718</td>
<td>Sierra Red: Big Pond Variety</td>
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<tr>
<td>BC #5719</td>
<td>Sierra Red: Big Pond Variety</td>
</tr>
<tr>
<td>BC #5720</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5721</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
<tr>
<td>BC #5722</td>
<td>Caramba Red-on-Red-orange: Unspecified Variety</td>
</tr>
<tr>
<td>BC #5723</td>
<td>Sierra Red: Big Pond Variety</td>
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<tr>
<td>BC #5724</td>
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</tr>
<tr>
<td>BC #5725</td>
<td>Sierra Red: Sierra Variety</td>
</tr>
<tr>
<td>BC #5726</td>
<td>Society Hall Red: Society Hall Variety</td>
</tr>
<tr>
<td>BC #5727</td>
<td>Sierra Red: Sierra Variety</td>
</tr>
<tr>
<td>BC #5728</td>
<td>Sierra Group: Unnamed Trickle Variety</td>
</tr>
</tbody>
</table>

Setting the stage for the fourth creation was the previous third creation. It was during this creation that the Lords of the Underworld killed the uncle and father of the Hero Twins. They angered the Xibalbans by playing the ballgame too loudly. So, the Xibalbans killed them and buried them under the ballcourt and hung the father's decapitated head on a tree. The skull

view of the cosmos reflects elements of the creation story told in the Popul Vu. The creators, Xpiyakok and Xmukane, had already made and destroyed the world three times before the present and fourth creation. The creation was made possible with the utterance of a "word and the appearance of the thing embodied by the word" (Freidel, Schele and Parker 1993:63).
then magically impregnated the daughter of one of the Lords. She sought refuge in the world of people and gave birth to the twins, Hunahpu and Xblanke. They eventually went to Xibalba and defeated the murderer of their father and resurrected their father and uncle.

When the creators began again with the fourth creation, they knew that corn and water would make up humanity but did not know where to find corn. They heard of a place full of food named the "Witz Mountain" or "First-True-Mountain" or "Split-Mountain" which rose from the Primordial Sea. The maize there was molded into the first four humans and the water became their blood.

Almost everything in Maya life is linked to this creation story and symbolic recreations of the Maya cosmos. Freidel, Schele and Parker (1995) have demonstrated that Classic Maya public architecture is, in fact, a re-enactment of the landscape of creation. Maya temples are the symbolic Witz Mountains rising from the plazas which themselves are symbolically the Primordial Sea. Further, Kent Reilly has shown that this arrangement dates to the origins of complex society in Mesoamerica. The Olmecs at La Venta originated this symbolic recreation by making the Witz Mountain a volcano and "painting the Primordial Sea green" with large serpentine mosaics (Reilly 1994).

If in fact Maya temples are Witz Mountains, what then of the dedicatory caches that have long been taken to be results of rituals designed to embed these buildings with some sense of sacredness? Certainly, a general understanding of the variability and votive nature of Maya caching activities has long existed (see Coe 1959; Chase 1988). However, James Garber and his colleagues demonstrate that an Early Classic cache in a residential patio group at the site of Blackman Eddy in the Belize Valley is a recreation of the Maya cosmos (Garber, et al, 1998). In this cache, which consisted of two blackware bowls placed lip-to-lip, the lowest level of materials consisted of a white marl with chert flakes representing the underworld and its nine lords. The second level consisted of burnt twigs and a rodent skeleton, representing the earth. The upper part of the cache represented the sky and the heavens by capping the materials with the inverted upper bowl.

Garber’s assertion makes sense in light of the placement of dedicatory caches into the symbolic Witz Mountain that is a Maya temple. However, there was a critical problem with empirical data and replicability of the idea. We have long known the enormous variability that are involved in such dedication caches. In some cases, there were elements of both the land and sea in these lip-to-lip placements. However, more commonly than not, there was no evidence of materials from either the land or the sea or both. While archaeologists commonly assumed that caches also contained perishable materials and that their absence was a matter of preservation. By conducting microscopic analysis of biosilicates, Bozarth and Guderjan demonstrated that sponge spicules, biosilicate remains from coastal sponges, were consistently abundant in a series of Late Preclassic and Early Classic caches from Blue Creek (Bozarth and Guderjan 2004; Guderjan 2004a). Importantly, the context of these caches did not affect the outcome. Caches from public architecture, elite residences and non-elite residences consistently incorporated sponges into the cosmogram.

So, the three-part cosmogram consists of the representation of the primordial sea, the earth base materials connected to the Witz Mountain, and the domed shaped roof of the sky. In dedicatory caches, sponges and other marine materials such as shell, stingray spines, and coral represent the primordial sea. The earth-based materials include jade and other stone artifacts. Finally, the dome of the sky is represented by the inverted bowl capping the cache (Figure 4) (Bozarth and Guderjan 2004; Guderjan 2004).

While caches are placed in buildings at their initial use, tombs represent the transition of an individual from this world to the underworld. The great dome of the sky can be depicted as a turtle shell or the dome of a vaulted room or tomb. The watery underworld is also often portrayed by water related iconography as the case of the looted Tomb 1 at the site of Rio Azul in Guatemala (Adams 1999:81). Similarly, components of the cosmogram can be seen in modern rituals (Bascope 1990; Freidel, Schele, and Parker 1995; Gabriel 2004) and ancient rituals in caves (Moyes 2000, 2006). In the case of Tomb 5, the primordial sea is clearly
represented by the bed fish upon which the body was laid. Objects such as the 104 jade artifacts represented the earth and the offerings of bird wings and domed ceiling of the chamber represented the dome of the sky.

The three-part dome shaped cosmogram is linked by the world tree that rises from the primordial sea and the underworld, through the earth and into the cosmos (Freidel, Schele and Parker 1995). In its earthly aspect, the world tree also has quadripartite directional meaning with each of the cardinal directions being important. The organization of public architecture has been shown to conform to a model of this directionality (Ashmore 1991). Paxton has argued that this directionality is not only apparent at the intra-site organizational level by at the regional level as well (Paxton 2001) and Mathews and Garber argue that this directionality is an integrative devise at both macro and micro levels (Mathews and Garber 2004).

In Tomb 5, the primary interment was placed cruciform and oriented to the cardinal directions as a quincunx. The feet are pointed towards the west, the direction of the dying sun entering Xibalba. It is here that a venerated ancestor and a cache of jade beads were found along with nine vessels, possibly a reference to the Bolontiku or nine lords of the night. To the east is the head oriented towards the entrance to the chultun chamber and the reborn sun emerging from Xibalba. The body of the primary interment is descending into Xibalba feet first following the path of the setting / dying sun, to the west. This conforms with the concept that the quadripartite horizontal figure is actually a representation of a vertical relationship, i.e. the horizontal plane is rotated 90 degrees to where north becomes conflated with up or zenith and south becomes conflated with down or nadir (Coggins 1980). As the rotation occurs along the east to west axis the relations of these directions do not change. One interesting aspect of this rotated interpretation is that the grave good assemblage at the end of the left arm in the south position becomes associated with down / nadir / the underworld and this is where we find the remains of second individual. If this placement of the primary individual’s body does represent this individual’ path / passage into the underworld / Xibalba, then this is simply a physical example of iconographic themes seen in Late Classic contexts that depict a ruler's descent into the underworld.

Conclusions

It is still uncertain whether this burial is related to the earliest days of Blue Creek as an integrated community or whether it predates that time. However, Terminal Preclassic-Early Classic, Blue Creek was already a large and
complex community. Initial construction of the monumental architecture of the core area was well underway as was the "footprint" of the public complex as it would grow to be over the next centuries (Guderjan 2004b). The site's location at the headwaters of the Rio Hondo provided ample access to riverine trade and a setting offering some of the most fertile soils in the southern lowlands (Guderjan 2007; Guderjan, Baker and Lichtenstein 2003; Luzzadder-Beach and Beach 2007). As a consequence, large quantities of jade and other exotic materials were imported into Blue Creek (Guderjan 2007). The community was composed of a series of bounded, spatially discrete residential components. These were not identical to each other by any means. In fact, each residential component was unique in its access to agricultural lands, wealth, power and internal stratification (Guderjan 2007; Guderjan, Baker and Lichtenstein 2003; Guderjan, Lichtenstein and Hanratty 2003). In some cases, it has been possible to use the contexts of important burials to determine the individual's role in Blue Creek society (Guderjan, Diehl, Giacometti and Andrews, in press; Guderjan and Hanratty 2007). However, Tomb 5 was not located in one of these residential components. It was located on top of a large hill that was apparently used intensively for such chultun-style burials and was also intensively occupied in the Late Preclassic and Early Classic periods. Unfortunately, we have little further information about these occupations.

From this area, goods traveling from the coastal trade networks of the Bahia Chetumal and the Caribbean would have been transshipped and carried overland for trade into the Central Peten. Several possible docking locations are within view of the hilltop and one dock has been positively identified just upstream and out of view on the Rio Azul (Barrett and Guderjan 2006). The hill was also nearly surrounded by large scale, ditched agricultural fields. While the construction dates for these field complexes is still uncertain, the nearby Chan Cahal fields are believed have been constructed in the Early Classic period (Beach, et al., 2009; Beach, et al. in press; Beach, et al., in press; Beach, Luzzadder-Beach and Lohse 2013; Guderjan, et al., 2010; Guderjan, et al., 2009; Luzzadder-Beach and Beach 2008 a, b).

Even if the ditched fields postdate Tomb 5, the lands where the ditches were later built were important agricultural resources at the time of Tomb 5's construction.

While the overall context is somewhat uncertain, the material assemblage provides evidence for the relatively high and powerful status of the primary individual. From the longest distance come jade and obsidian. The jades recovered all appear to be Motagua Valley jadeite and fit within the range of variability found in the Jades, SA, Quarry 1 (Mary Lou Ridinger, personal communication to Guderjan 1999). From more regional trade spheres, goods and ideas are present from the Peten and the Caribbean. Several of the decorative elements found on the ceramics are seen prevalent during the Cimi Complex at Tikal. A note of interest, as mentioned previously, on the ceramic assemblage is that many of the vessels present appear to have been well used during their utilitarian life before deposition as grave furniture. The presence of use-wear on these vessels may indicate that these items were the personal possessions of the primary interment. From the Caribbean, a variety of marine articles (worked shell and coral) are present. Also present in the marine assemblage is at least one broken stingray spine, which was likely to have been used in ritual blood-letting ceremonies of the elites (Schele and Friedel 1990).

Though the social standing of the primary individual interred in this chultun-style burial will most likely be subject of continued debate, several points about this individual can be made. First, though significantly removed from the core area of the Blue Creek site, the strategic location of, and place making activities at the chultun-style burial argue for a person of considerable power and influence. Furthermore, the royal burials of a site do not always occur in one place within the core area of the site in question. At Tikal, in Peten Guatemala, there is a shift from North Acropolis to Mundo Perdido, where the rulers of Tikal changed the area of the site core where members of the royal line were to be buried (Harrison 1999). Additionally, there is some evidence to suggest that royal burials did not always occur within the confines
of a site's core area. In the aftermath of Hurricane Mitch a potentially royal chultun-style burial was discovered outside the central core area of Copan, Honduras. Additionally a rich and potentially royal chultun-style burial was recently discovered at some distance from the core area of El Mirador (Richard Hansen, personal communication to Guderjan 2000). The individual in Tomb 5 was clearly able to access and exploit materials from both regional and long distance trade networks. When all of these points are considered collectively, it is clear that the individual was an elite member of Maya society, and that the site of Blue Creek was already well established within a regional geo-political network by the end of the Late Preclassic period.

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References Cited


Coggins, Clemency
1980 The Shape of Time: Some Political Implications of a Four Part Figure. *American Antiquity* 45:727-739.

Chase, Diane

Culbert, T. Patrick

Scott L. Fedick, Jennifer P. Mathews, and Kathryn Sorensen
2012 Cenotes as conceptual boundary markers at the ancient Maya site of T’isil, Quintana Roo, México. *Mexicon* 34:5:118-123.

Gabriel, Marianne

Garber, James F. W. David Driver, Lauren A. Sullivan, and David M. Glassman

Guderjan, Thomas H.

2004a Public Architecture, Ritual and Temporal Dynamics at the Maya Center of Blue Creek. *Ancient Mesoamerica* 15:2:1-17.


Guderjan, Thomas, Timothy Beach, Steve Bozarth, Colleen Hanratty, Sheryl Luzzadder-Beach, and Timothy Preston

Guderjan, Thomas, Timothy Beach, Sheryl Luzzadder-Beach, and Steve Bozarth

Guderjan, Thomas H., Lori Diel, Antoine Giacometti, and Elizabeth Andrews
In Press Maya social organization and the implications of a non-elite burial at Blue Creek. In Living on the Edge. Papers on the Archaeology of the Maya Center of Blue Creek, Belize. Edited by Thomas Guderjan and Aubrey O’Toole. BAR International Series.

Guderjan, Thomas H. and C. Colleen Hanratty

Guderjan, Thomas H., Jeffery Baker and Robert Lichtenstein

Guderjan, Thomas H., Robert J. Lichtenstein, and C. Colleen Hanratty

Haines, Helen R. and Sandy Suther

Harrison, Peter D.
1999 *The Lords of Tikal*. Thames and Hudson, New York.

Kosakowsky, Laura J.

Kosakowsky, Laura J. and Jon C. Lohse

Kresjci, Estella and T. Patrick Culbert
Luzzadder-Beach, Sheryl and Timothy Beach

Mathews, Jennifer and James F. Garber

McAnany, Patricia


Moyes, Holley


Paxton Meredith

Powis, Terry G., Fred Valdez, Jr., Thomas R. Hester, Jeffrey Hursli, Stanley M. Tarka, Jr.

Pring, Duncan

Rathje, William

Reilly, F. Kent, III

Ricketson, Oliver G.

Robertson, Robin

Robin, Cynthia and Norman Hammond

Ruz L., Alberto

Schele, Linda and David A. Freidel

Whittington, Stephen L. and David M. Reed
Maya archaeology has dominated the focus of archaeological projects in Belize. However, the potential for studying the historic past of this country is emerging. This study aims to elucidate the development of burial styles and mortuary materials within the cemetery on St. George's Caye. A historical analysis was completed to better understand the colonial funerary enclosures of the island, including the box tomb, pinch toe coffin, and sarcophagus of Thomas Potts. The investigation and interpretation of burial structures within the St. George's Caye cemetery were successfully completed by utilizing previous archaeological examinations, reviews of corresponding archaeological and historical publications, oral histories, and related global archaeological digs. This confluence of data has supported the evolution of burial styles and personal objects within the St. George's Caye cemetery.

Burial Styles
Graves without Mortuary Furniture

The earliest burials on St. George's Caye, found within the confines of the modern cemetery, are characterized by the lack of a coffin-like structure. Remains from multiple individuals in Burials 9 through 11, excavated in the summer field season of 2011, are in the extended position, yet lack any evidence of coffin interment. No organic material, such as wood or cloth, was located in association with these burials. In addition, the elevation of the remains in Burials 9 through 11 is not any higher than the surrounding burials that still contain remnants of wooden coffins. The combed and scattered nature of the remains also suggests a lack of containment of the skeletal elements while buried. Many of the remains within the cemetery are combed, but are located within a coffin or a stain that represents a degraded coffin structure, now long eroded by natural formation processes. With regard to confined burials only, Burials 9 through 11 represent the only interments within the cemetery that did not include evidence of a coffin enclosure.

Early graves in American colonies share this coffin-lacking appearance. The burial ground at the Jamestown, Virginia settlement in colonial America, dating to between 1610-1630, based on recovered European artifacts, provides insight into burial styles of nascent British settlements. According to William M. Kelso, one of the main archaeologists who excavated the Jamestown settlement, the most haphazardly created and interred burials within the cemetery represent the earliest use of the property. Having only just established the colony in 1607, persistent Native American attacks and drought-induced famine quickly thinned the English population in the New World. In discussing the cemetery, Williams notes that the "misalignment, careless disposal, shallowness of some graves, and the possible 1610 beginning date for the cemetery suggest that some burials indeed could date back as early as the 'starving time' winter of 1609-1610" (Kelso 2006:164). The infamous winter in the early history of the colony left only 60 alive out of the original 215 that began the winter season. Such harsh conditions and a lack of resource suggest that many were left to be buried without anything.

The earliest burials within this cemetery were comprised of 63 graves, which contained the remains of 72 individuals. Of those individuals, only seven were buried within coffins, one of which was made out of a shipping container (Kelso 2006). The "rest of the people were unceremoniously wrapped only in shrouds or were completely uncovered" (Kelso 2006:166). Coffins were expensive to manufacture, and were most likely created by the local carpenter or handyman within the community (Kelso 2006). This left the remaining population to either be buried in shrouds of cloth or wear nothing but their own skin. The desperation within the community to survive the earliest years in the New World is clearly found in the absence of traditional
English burial practices. The issues faced within the early Jamestown settlement were most likely not shared with those on St. George's Caye, a hundred or more years later. However, the lack of a strong economic and agricultural system on the island and mainland British Honduras explains the haphazard interment of individuals in Burials 9 through 11.

Pinch Toe and Rectangular Coffins

The most frequent burial interment style encountered while excavating within the St. George's Caye cemetery is the wooden coffin. Two varieties of the coffin were revealed through excavation, including the pinch toe and rectangular forms. These styles consistently match the specific funerary practices found in England between the seventeenth and nineteenth centuries.

The use of the wooden coffin in British society dates back to at least the fourteenth century (Litten 1991). However, the use of this funerary enclosure was limited to the nobility until the middle of the sixteenth century (Litten 1991). Julian Litten, an author who has written extensively on the burial traditions of the British, asserts that the "private coffin...was an item indicative of status, a luxury unattainable for the majority" (Litten 1991). Prior to the sixteenth century, commoners would typically bury the dead in a burial shroud. This consisted of a cloth wrapped around the entire body and tied at the head and feet.

The wide use of coffin interments for the majority of the population begins around 1575 (Litten 1991). The style included a gabled lid with a form fitting, hexagonal shape to the coffin. The gabled lid, or convexly angled lid, was a continued style from the pre-1575 aristocratic burial coffins. Prior to 1575, many nobles were buried in a rectangular wooden coffin with a gabled lid. This new funerary containment form arose throughout Britain in the latter half of the sixteenth century, yet "no distinct regional trends in basic coffin style existed" (Litten 1991:90).

The hexagonal coffin shape is synonymous for the pinch toe style. This shape, with the gabled lid, remained popular in Britain until ca. 1660-75 (Litten 1991). The new style, a pinch toe coffin with a flat lid, took some time to reach the more rural communities in the United Kingdom. Litten provides the example of a sculptor, who, in 1717, depicted a resurrection scene with a gabled coffin (Litten 1991).

This change in England's funerary tradition coincides with political reforms in the late seventeenth century. An act passed in 1660 decreed that any person to be buried must be wrapped in wool, as opposed to "linen...flax, hemp, silk, hair, gold or silver" (Litten 1991:74). This act, combined with an act in 1678, enforced the necessity for this interment material. If this decree was not followed, a fine of £5 would be levied on those interring the deceased (Litten 1991). However, this allowed for the wealthier individuals to simply reserve funds in their will for this fine, and pursue other funerary materials.

Not only were the acts of 1660 and 1678 significant for their encroachment into funerary practices, but also for their influence on funerary commerce. These acts indirectly created a prosperous industry with regard to clothing adornments and ornamentation on the body and within the coffin structure. Trends for wrapping the deceased in shrouds eventually developed into open-back gowns. This style was popular circa 1700-1770 and eventually led to funerary gowns in the late eighteenth century (Litten 1991). The increase in variation of mortuary dress, clothing, and designs changed rapidly between the eighteenth and nineteenth centuries in Britain.

Non-wood organic materials such as cloth were discovered within the St. George's Caye cemetery during the summer 2012 field excavations. Remnants of black fabric were found under the lid and along the sides of the Burial 21 coffin. Samples were collected but remain in Belize for future analysis. However, finding cloth attached to the coffin is a diagnostic feature, providing a date range for the interment. Wrapping a coffin in fabric represents a specific style common in England beginning ca. 1750. This continued as a popular funerary trend until the introduction of polished coffin exteriors in the mid-nineteenth century (Litten 1991). The fabric covering style became especially popular with coffin-makers during this time. The cloth could mask carpentry mistakes made during construction or cover...
aesthetically unpleasant pieces of wood used to build the enclosure (Litten 1991).

Evidence for the coffin exterior style transformation, from gilded to flat lidded coffins at the St. George's Caye Archaeology Project is currently nonexistent. The majority of coffin lids within the cemetery on St. George's Caye did not withstand the ruin inflicted by natural processes. The ones that did survive, Burials 19 through 21, appear to have been constructed with a flat lid. Typically, gilded coffin lids were constructed with metal nails or tacks down the apex of the lid. When found in an archaeological context, even in caustic soils or environments friendly to degradation, the metal elements usually preserve and remain in-situ within the soil matrix. Unfortunately, corroded metal objects are encountered frequently during excavations within the cemetery and often represent secondary deposits from natural processes. No linear nail or tack fragments have been observed above alleged coffin interments at the St. George's Caye Archaeology Project.

Increased coffin variation was not limited to the interior properties of the interment structure. The exterior decoration, material, and style varied considerably between the late seventeenth century and the late nineteenth century. As discussed previously, the hexagonal or pinch toe coffin became widely used by the majority of the English population by around 1700. The parish coffin, a wooden coffin used to transport the deceased poor to their resting place, was almost never used by the eighteenth century (Litten 1991). The major factor in England that influenced a change in funeral tradition was the constant public visibility of dead bodies transported to burial grounds during the plague of 1665 in London, England (Litten 1991). The funerary industry boom, fully developing between 1700 and 1725, allowed for all social classes to be interred within a coffin. However, the wood, cloth and other materials purchased to make a coffin depended on the amount of money the bereaved were willing to pay. The textiles utilized for the construction of elaborate coffins eventually led to a profitable industry beginning at this time in England. Moreover, some carpenters practiced coffin-making as a full-time occupation by 1725 due to the newly profitable business (Litten 1991).

Only one example of coffin variation with regard to shape has been observed within the St. George's Caye cemetery. One rectangular coffin, Burial 19, was discovered in XU 33 during the 2012 summer excavation. The lid was composed of simple horizontal cross-planks as well as the base. Regarding spatial patterning, the rectangular wooden coffin was aligned in a row on the western boundary of the cemetery. It was positioned an almost equal distance of around 250 centimeters from Burial 20 to the south and Burial 18 to the north. This coffin style is an anomaly within the cemetery and cannot be explained by popular funerary trends in colonial England. The rectangular style was only popular among the nobility during the late Middle Ages (Litten 1991). This style represents the earliest preserved coffins of the Middle Ages in England.

In addition to Burial 19, there are a few other coffin burials in the cemetery that are unique in their design. Burial 1, positioned in the southeastern corner of XU 29 and southwestern corner of XU 30, was discovered with a metal chest plate just above the preserved human remains. This chest plate, also referred to as a breast plate or a depositum plate, has yet to be completely deciphered. The material is unknown and only small portions of the inscription are still legible. However, the overall shape, that of a heart, is still preserved. As previously stated, fragments of wood and most of the rivets used to attach the plate to the lid of the coffin are preserved.

The depositum plate is intriguing, not only because it represents the only such coffin ornamentation discovered thus far in the cemetery, but also because the shape is unique. Chest plates became a popular coffin decoration around 1720 in England. The rise in popularity of this style coincides with the previously mentioned funerary industry boom in England. This coffin decoration continued to be a popular burial addition well into the nineteenth century (Mckinley 2008).

The shape of the depositum plate was typically rectangular, however, "a few followed the dictates of heraldry" (Litten 1988:109). Heraldic funerals and mortuary decorations were restricted to the noble or affluent English families. These depositum shapes often
reflected the sex and age of the individual. In particular, "the plate for a young girl was lozenge-shaped, shield-shaped for a boy..., rectangular with a central cartouche for a married woman...and rectangular with a central square panel for an adult male" (Litten 1991:109). Heart-shaped depositum plates are frequently mentioned in literature regarding English burial traditions or English archaeological reports. The few examples found of this design will be discussed below.

The heart shape may be associated with African culture. If so, this would demonstrate a strong tie between the European and African populations within the colonial Bay of Honduras. The aforementioned relationship of Europeans to African slaves was said to have been generally cordial in the eighteenth century. This is unique when compared to other demographic relationships in English colonies (Campbell 2003).

A large African burial ground was discovered and excavated in New York City in 1991 prior to the construction of a Federal building. The cemetery, located in the New York City borough of Manhattan, was eventually dated to have been used from circa 1690 to 1794 and more than 400 burials (Blakey 2010). Archaeologists now believe that more than 15,000 individuals could have been buried within the confines of this property. Unfortunately, much of the burial ground remains under adjacent buildings in Manhattan.

Many scholars have focused on one burial in particular from the African Burial Ground. A heart shape on the preserved lid of the coffin was discovered in this burial. In New York, many of the slaves were Christianized, adopting the use of the pall and the coffin for the deceased, however, the heart shape is argued by many scholars to represent the sankofa, a symbol typically found in western Africa (Seeman 2010). Further still, a recent article, written by Erik R. Seeman, points out that this symbol was not found in western African mortuary practices in the eighteenth century (Seeman 2010). Instead, the symbol may reflect an interesting synthesis of Anglo and African cultures in the mortuary context of the eighteenth century.

The use of the heart shape on the coffin lid is noted by Seeman to have occurred on Anglo coffins as well. Three examples were provided from small family plots ranging from Virginia to Massachusetts. The author notes how this heart adornment was not "uncommon" on Anglo coffins, yet he can only provide these few examples in the American colonies. In addition, these are the only heart adornments discovered throughout the entirety of the research conducted for this paper. It is possible that the heart shape motif on the St. George's Caye coffin, a design only found in the American colonies from the early eighteenth century to the early nineteenth century, represents a specific community's religious symbol. The image could have been brought by an individual who emigrated from the American colonies to St. George's Caye. This scenario is quite possible since the burial of the coffin most likely occurred during this temporal range.

Other evidence for the synthesis of Anglo and African cultures is present within the cultural material of the St. George's Caye cemetery. As previously mentioned, a Spanish Real, dated to 1721, was discovered resting on the skull in Burial 3. The coin was intentionally placed on the skull, made evident from the preserved black fabric found underneath the coin. The tradition of placing a coin in a burial has roots in "the classical world [where] a single coin was customarily placed in the mouth of the deceased in order to pay Charron's fee for ferrying the dead across the River Styx" (Parrington et al. 1986:61). Explaining the development of this practice in a historical archaeological context is much more complicated than the classical origin.

Many authors blindly ascribe the mortuary practice of placing the coin on the head, particularly with regard to historical contexts, as a definitively African cultural practice. However, recent scholarly research conflicts with this hypothesis. In England, the use of the coin in a funerary context is first noted in 1686 (Davidson 2010). Davidson argues that the typical use of the coin in burials of individuals associated with African culture is a "creolization" of Western beliefs (Davidson 2010). He points out that this tradition is widely observed in the excavation of African burials in the United States that date back to the nineteenth century.
The specific placement of the coin on the forehead, as seen in pictures of Burial 3, has not been discussed or encountered during the entirety of this thesis research. Although numerous archaeological reports mention the inclusion and positioning of coins around the body, particularly around the head, none mention the positioning of a coin on the forehead.

**Box Tombs**

The box tomb, also known as the chest tomb, can be generally described as an above-ground, rectangular tomb, with brick sides, and a large stone lid. The large stone slab is also usually carved with an epitaph for the deceased. This burial style arose from the general termination of intramural or in-church burials.

As mentioned previously, The Reformation Period in England not only greatly influenced the funerary industry, but also funerary monument styles and locations. English nobles and social elites began to bury their dead within the church around 1675 (Litten 1991). By this time, Westminster Abbey had become a restricted place for mostly royal burials and rural elites had begun to reserve the communal parish as an exclusive burial tomb (Litten 1991). This left urban churches as the remaining intramural venue for the affluent English.

The location of the burial was directly linked to flaunting one's social status and their closeness to God. The closer an individual was buried to the altar, the closer they were to God and the more visible they were to the public who frequently attended services (Litten 1991). Therefore, a worshipper would pass religious figures and the names of the social elite when entering a church. The public display was not only indicative of social status in death, but also somewhat deified the deceased by their association with powerful religious imagery.

As time progressed and more single interments, vaults, and wall burials were constructed, serious health problems arose within the church. Freshly dead bodies, enclosed in wooden or lead coffins, were often only covered by a stone slab, also referred to as a ledger stone, under the church floor. The close proximity of the church patrons to the freshly deceased was said to have led to "unpleasantness, foul air and nasal offence" (Litten 1991). The combination of less available space for burial and the common stench of the dead fostered the movement of the affluent to outside burial grounds. This transition also coincides with the Cemetery Movement, a cultural and ideological shift toward the location and imagery associated with burials.

The Cemetery Movement arose in response to the lack of space within churches for the affluent and cramped church burial grounds for the remaining population. The origin of the modern cemetery can be traced to the Père-Lachaise Cemetery, just outside of Paris, France (Schechter 2009). Like in England, Paris was having serious health issues regarding the burial of the deceased. Burial grounds in Paris, up until the construction of the Père-Lachaise Cemetery, were located in the heart of the city. These burial grounds were crowded with bodies, often placed in open trenches for months on end (Schechter 2009).

The Père-Lachaise Cemetery typifies the modern cemetery not only for its then rural location, but also for its restrictions for burials. These restrictions include the "provisions that bodies lie only side by side, not atop one another; that cemeteries should be made park-like places [and] garnished with greenery" (Schechter 2009:146). This funerary movement to a more rural setting represents the abandonment of intramural and burial ground interments, an increase in health and safety awareness, and the addition of nature in the resting place. The rural progression was not confined to France. In fact, it spread quickly through England and the United States by the early nineteenth century (Schechter 2009).

Within the United States, the rural cemetery movement coincides with the "beautification of death" trend (LeeDecker 2009). This is synonymous with the use of decoration or ornamentation on burial enclosures. As mentioned previously, the trend began in England during the first half of the eighteenth century, while the deceased elite were still often interred within church vaults. A more distinctive movement found in the United States...
after the Revolutionary War is the use of classical imagery on funerary monuments (LeeDecker 2009). The imagery was intentionally used to parallel the new democratic nation with symbols of the once powerful ancient Roman Empire and Greek democracies.

As intramural burials in England began to wane by the middle of the eighteenth century, similar burial styles began to arise in the burial grounds or newly constructed rural cemeteries. The rise of the box tomb, or any other cemetery monument for that matter, can be attributed, directly, to intramural burials (Gordon 1984). Cemetery monuments from this period often include box tombs, ledger stones, and headstones. Each monument is inspired by similar burial monuments found within the church. The headstone, a vertical stone slab with an epitaph, intentionally imitates the vertical, stone slabs used to cover intramural wall interments within churches (Figures 1 and 2) (Gordon 1984). Ledger stones, long, stone slabs covering a grave in a cemetery, imitate the long ledger stones with epitaphs found on the church floor (Figures 3 and 4) (Gordon 1984). Box tombs also follow this iconographic formula. The above-ground tomb in the cemetery represents the subterranean vault, often with a ledger stone and epitaph (Figures 5 and 6) (Gordon 1984).

The box tomb may be an attempt to imitate sarcophagi intramural burials as well. Many colonial box tombs were said to have had brick sides covered in plaster. This would give the viewer the impression of a homogenous, stone material (Chicora Foundation 2006). Such large stone pieces would have been expensive to purchase for the construction of the tomb. Therefore, the deceased intended to imitate these expensive burials to display a high social status in death.

Box tombs within the cemetery on St. George's Caye follow the same historical criteria regarding the temporal period of use and social status. All of the above-ground monuments were first mapped by Rob Hume in 1872 and all of the tomb epitaphs were recorded by James Purcell Usher in 1907 (Check-Pennell 1989). This map and collection of epitaphs provide invaluable information when discovering and
interpreting tomb materials from archaeological contexts.

The only partially intact brick above-ground tomb structure discovered while excavating within the cemetery was in XU 15, only the bottoms of two brick box tombs were revealed. No diagnostic artifacts were observed while excavating this unit. However, the positioning of the tombs, when compared to the 1872 map, matched the position of the northern tomb to the "grave [that] belongs to Reverend John C. Mongan" (Garber et al. 2010:15). The 1872 map does not record a name for the adjoining box tomb to the south (Garber et. al 2010). The cement burial enclosure and lid found in XU 7 and XU 13 also represent partial materials from box tombs but have not been associated with a tomb on the 1872 map at this time.

**Sarcophagus**

One sarcophagus, an elaborate above-ground tomb, has been documented within the St. George's Caye cemetery (Figures 7 and 8). At least five pictures had been taken of this tomb, erected for Thomas Potts, prior to the arrival of hurricane Hattie which displaced the monument in 1961. Thomas Potts died in 1806, but the date when this distinct monument was erected is not known. A description of the tomb is relegated to the five known pictures of the monument, the 1872 map, and the 1907 epitaph recordings. In these five pictures one can see how the tomb is elevated on a stone platform; held up by lion feet; covered with a convex lid, displaying a detailed relief on at least one side; and mounted with a bust of Thomas Potts on at least one side of the tomb as well.

The pictures suggest that the tomb is most likely made entirely of marble. The intricately carved and decorated monument must have been made outside of the Bay of Honduras. Evidence supporting this claim is found in Mary Check-Pennell's *Historic Cemeteries of Belize City, Belize, Central America*. Mary Check-Pennell, a Peace Corps volunteer, documents the current conditions and complete histories of every known historic cemetery in Belize. Interestingly, the 1989 book notes the condition of the St. George's Caye cemetery as "vanished" (Check-Pennell 1989). In Check-Pennell's
discussion on the history of the St. George's Caye cemetery, she notes how there was only one remaining gravestone, now long gone due to hurricane destruction. This gravestone, marking the grave of Agnes Mary Cuthbert who died in 1892, was said to have come from Britain (Check-Pennell 1989). Agnes was born in Aberdeen, United Kingdom and the granite gravestone was said to have been imported from this area (Check-Pennell 1989). Although the gravestone was most likely set almost a century after the Thomas Potts sarcophagus, it does support the argument that the Potts tomb originated from England. Additional research, specifically at the historical archives at Belmopan, Belize, is needed to identify when and from where the tomb was shipped to the settlement.

Mary Check-Pennell provides several quotes from local islanders in the first half of the twentieth century regarding the tomb of Thomas Potts. Even after the destructive forces of the 1931 hurricane, a local islander in 1951 is said to have observed the tomb in good condition (Check-Pennell 1989). Unfortunately, a decade after this report, the tomb was displaced by hurricane Hattie in 1961. The hurricane hit Belize with sustained winds of between 150 and 230 miles per hour and a tidal surge of 10 to 15 feet above sea level. All of the structures on the island were destroyed, including any remaining above-ground monuments within the cemetery.

A comprehensive description of the Thomas Potts tomb was recorded by Thomas Gann in 1926. In this narrative, he describes the relief on the side of the tomb in great detail saying,

One of the most remarkable [graves] is that of Thomas Potts, who, during the mid-eighteenth century was Chief Magistrate of the Colony. He is interred in a great stone urn, on the back and front of which are inset marble medallions upon which are sculptured his face in profile--grim, bald-headed, long-nosed and bewhiskered. On the front of the urn is depicted in low relief, and with considerable realism, a great fallen mahogany-tree and the stump from which it has just been cut, with a barbecue (or platform of sticks, to admit of the axemen reaching the trunk above the huge spurs) erected around it. Beside the tree stand two naked black slaves, one devoutly praying, the other pointing downwards with one hand, as if to indicate T. P.'s probable destination. In the centre are two more naked slaves, each holding an object more like a polo stick than anything else....In the background are four naked negroes sitting round an immense fire of sticks, in a clearing in the forest, which at first I took to be a further reference to the ultimate destination of the deceased, though it is probably only the cooking-fire of a great camp of slaves, sent out to cut mahogany, in the early days of the Colony, when everything was done by slave labour [Gann 1926:23-24].

The marble medallion discussed by Gann was later discovered in 1978 when hurricane Greta cut a small channel through the caye just south of the cemetery. This is believed to be one of the marble medallions from the Thomas Potts tomb, yet Gann's description of this medallion does not match the one discovered in 1978. His description states that the marble head of Thomas Potts was bald, yet this recent medallion find depicts hair on the man's head (Check-Pennell 1989). However, the shape and absence of any other medallions from the cemetery burials suggests this is, in fact, from the Thomas Potts tomb.

Today, the sarcophagus that once contained the remains of Thomas Potts is said to be buried underneath the resort that encompasses the property directly to the south of the cemetery. This location matches the direction hurricane Hattie traveled, from the northeast to the southwest, when the storm passed over the island (Weaver and Sabido 1997). An archaeological excavation should be performed on this property to restore the tomb to its original location within the cemetery.

Several modern structures are present in the St. George's Caye cemetery today (Figure 9). This includes headstone-like monuments that are aligned in a north-south direction in the center of the cemetery. These do not mark interments, but instead commemorate previous islanders. A large, cylindrical monument rests in the center of
the cemetery, honoring the individuals that fought in the Battle of St. George's Caye in 1798. The only other monument on the property is that of an above-ground tomb. This recently constructed burial was made for a local islander. The tomb is rectangular in shape, made of black, polished stone, and includes an epitaph for the interred. The style of the tomb is a modern variation of the historical box tombs that were once found in the island cemetery. Like the English burials from the eighteenth century onward, the tomb was constructed from foreign, polished stone to display the affluent social status of the deceased.

Conclusion

The archaeological record of the St. George's Caye cemetery reveals specific burial styles and funerary traditions that originated in England, as well as one trend that may have come from the American colonies. The origin and development of the colonial above-ground box tomb, headstone, and ledger stone, first seen within intramural burials, is remarkable. These funerary monument styles are derived from a ubiquitously strong system of social stratification in England that transcended these intermixed cultures found in the early American colonies, Jamaica, and Belize. The first burials on the island, Burials 9 through 11, parallel the conditions of burials found in the early Jamestown, Virginia settlement. The interments on the caye are the only graves that lacked clear evidence for burial enclosures. This is a shared trait with the burials haphazardly interred in the early Jamestown cemetery. In addition, the pathological analysis of these human remains in the St. George's Caye cemetery indicate that these individuals were the most nutritionally deficient. If these interments were buccaneers, this evidence may add credence to the claim that pirates once utilized the caye as a strategic point of attack on Spanish ships.

The development of the Bay of Honduras' economy, from the eighteenth to the nineteenth century, is apparent in the change of burial styles exhumed from the archaeological record. The discovery and excavation of coffin burials within
the St. George's Caye cemetery have not only revealed a template of English funerary traditions that traversed land and sea, these coffin interments also display the chronological use of the cemetery. The transformation from simple pinch toe coffins to elaborate box tombs, the tomb of Thomas Potts, and eventually, the black, polished above-ground tomb in the cemetery today, correlates with the documented cultural, social, and ideological shifts regarding death in England. Even though many of the settlers by ca. 1800 in the Bay Settlement were from the former British American colonies as well as Jamaica, they all shared a confluence of material traditions associated with death that originated in England.

Future research into the topic of culturally-bound burial traditions in historical archaeology should first recognize the serious limitations associated with conducting this research. Testing materials within the St. George's Caye cemetery, specifically coffin wood, preserved coffin cloth, or even human remains would be beneficial for a future analysis of the caye as well as for other cemeteries from this same temporal period. If reliable dates are collected from these samples, a better understanding of the chronological use of the cemetery will be elucidated.

A continuation of thorough cemetery excavations and a systematic survey on the isle will conserve the cultural history and national pride of the original capital of Belize, St. George's Caye. Furthermore, a close examination of graves and funerary remains will undoubtedly reveal that the burial of the dead is more about the living.

References

Blakey, Michael L.

Campbell, Mavis C.

Check-Pennell, Mary
1989 Historic Cemeteries of Belize City, Belize, Central America.

Davidson, James M.

Gann, Thomas

Garber, James F. (editor)
2010 The St. George's Caye Archaeology Project: Results of the 2010 Field Season. Texas State University, San Marcos, Texas.

Gardiner, S.R.

Gordon, A.
1984 Death is for the Living, Edinburgh, Paul Harris.

Kelso, William M.

Litten, Julian


Schechter, Harold

Seeman, Erik R.

Trinity Box Tomb Transformed

Weaver, Peter L. and Oswaldo A. Sabido
MURDER BOTTLES, GREY MATTER AND TREASURE: RESULTS OF THE 2012 FIELD SEASON ON ST. GEORGE’S CAYE

James F. Garber, Lauren A. Sullivan, Jaime J. Awe, Lauren Springs and Matthew Elverson

St. George’s Caye played a critical role in the history and independence of Belize functioning as the country’s first capital. Historical records indicate that the cemetery on the island is the nation’s first English burial ground. Excavations have shown that this burial ground is considerably earlier and more extensive than the historic records indicate. The uppermost burials have been severely disturbed by hurricanes but a previously unknown layer of earlier burials exhibit superb preservation. Excavations were also conducted adjacent to the cemetery and in an area identified as military barracks. Analysis of these remains has revealed details of early English life on St. George’s Caye.

Introduction

The St. George’s Caye Archaeology Project was initiated in 2009 to examine the historical remains on the island. This small caye is located approximately eight miles east of Belize City and served as the focal point and capital of the initial settlement of English woodcutters (Figure 1). The caye also played a critical role in Belize’s history during the Battle of St. George’s Caye which was Spain’s last attempt to take the area by force. Field investigations in the 2012 field season were conducted in the Cemetery and the property immediately to the north.

Cemetery Excavations

Research in previous field seasons yielded significant findings in excavation units placed 50 cm east of the west wall of the cemetery (Figure 2). These findings suggest the presence of a military barracks midden along the current west cemetery wall in the uppermost layers, as well as coffin burials in the lowermost levels. Cemetery excavations of the 2012 field season were conducted in order to examine artifact distribution, in attempt to verify the spatial range of the midden. Another objective of the excavations was to examine burial distribution at the rear or western edge of the cemetery.

Previous investigations have shown that the surface and uppermost 20 to 30 cm of the cemetery has been severely disturbed by storm activity. The investigations have shown that there are three levels of burials (Elverson 2013; Garber et al. 2011, 2013; Springs 2012, 2013; Sullivan et al. 2012). The uppermost layer that is shown on the 1872 map has been almost entirely obliterated (Figure 3). This layer, mostly dating to the 1800s, consisted primarily of box type graves with epitaph slabs similar to the ones that can be seen in Yarbrough Cemetery in Belize City. This upper layer also had the above ground sarcophagus of Thomas Potts shown on the Belize five dollar bill (Garber et al. 2011). The burials of the lowermost level are of the wooden coffin type (Elverson 2013; Springs 2012, 2013). These have not been disturbed by storms except along the southern edge of the cemetery where hurricane Hattie (1961) cut a channel all the way through the caye. The 2012 cemetery excavations would hopefully clarify the spatial and temporal relationship between this lowermost layer of coffin burials and the military midden.

Burial 21

Burial 21 in XU36 consisted of the well-preserved remnants of a decorated and upholstered wooden coffin and virtually
Figure 2. Excavation Units in St. George’s Caye Cemetery, Belize.

Figure 3. 1872 map of St. George’s Caye Cemetery, Belize.
complete human skeleton (Figure 4). The entire coffin was below the water table. It was necessary to run a pump during excavations to lower the water table so that the remains could be recovered. The total count for skeletal elements and ossified cartilage recovered was 211. The coffin is oriented east west. The head of Burial 21 is located at a slightly higher elevation than the toe but the burial depth at the eastern end of Burial 21 extended to 76 cm below surface. Decorative milled wood trim was present along the exterior of the coffin base and top. The basal siding was rectangular in cross section and the top trim was quarter-round in section. Wood milling was a relatively late introduction into Belize and thus these pieces were imported.

This burial displayed an excellent degree of preservation. The coffin wood was well preserved and consisted of planks made of a light yellow wood that appeared to be pine. Samples of this wood are being analyzed to confirm this. Various portions of the lid, including the underside, had the remains of black felt. On the underside, the edges of the felt had black strings that were tacked to the planks. Additionally, beneath the skeleton was a layer of grass or hay-like bedding upon which the body was placed. Coffin hardware was recovered just outside the box in the area of the shoulders (Figure 5).

In addition to excellent coffin preservation, the human remains were in superb condition as well. The skeleton was missing only a few bones of the hands and feet, and additional elements recovered included a pair of pedal sesamoids and approximately 20 pieces of ossified thyroid cartilage. Soft tissue was also recovered in the burial. The base of the coffin was filled with a gelatinous matrix of adipose tissue mixed with the surrounding bedding. Approximately two-thirds of the brain was preserved and could be observed through the base of the skull. This preserved grey matter is a testament to the truly unique preservation conditions. Burial 21 is the deepest burial yet encountered in the cemetery. The entire coffin is below the water table and thus created unusual conditions of no light or air which led to superb preservation.

The individual of Burial 21 represents a middle to older adult male with a stature of 168.4 to 177.0 cm. There is significant evidence of arthritis in the shoulder and spinal column. The lower thoracic and lumbar vertebrae display significant lipping and osteophytic growth. The 10th and 11th thoracic vertebrae are fused together as are the 4th and 5th.

**Feature 1**

This feature consisted of a trash midden characterized by a tight concentration of bottle glass, queen conch shell, ceramic sherds, and faunal bone (Figure 6). Feature 1 was located in Level 2 of XU37 and XU38. The feature consisted primarily of patinated wine/rum bottle bottoms and necks. One whole bottle was
recovered from the northwest corner of XU38 at a depth of 19 cm below surface, slightly higher than all other materials associated with Feature 1. The surface of the bottle exhibited less patina than all other bottle glass within Feature 1 and may not be related. Several conch shells were located within this feature however, no whole conch shells were found. These shells were likely broken in order to procure the meat from within. Cut marks were present on one manatee rib.

Fuzy Property Excavations

The Fuzy property is adjacent to the cemetery and located directly north of its northern wall. It was the location of two 1x1 m excavation units during the 2010 field season (Garber et al. 2011). One of these units, XU16, was located at the south end of the property near the cemetery and contained a high quantity of sea turtle bone. A third unit was placed on the property in the 2012 field season in order to further investigate the occurrence of cultural material within the south side of the Fuzy property. This investigation was also conducted in order to determine if remains of the cemetery at St. George’s Caye extend beyond the modern cemetery walls.

XU34

This 2x2 m excavation unit was established to correspond directly to the row of 2x2 m units parallel to the west cemetery wall and was placed 4 m north of the north cemetery wall. In all, seven levels were excavated in this unit. The uppermost layers of fill consisted of modern debris and coarse sand that had been dredged from the seabed in modern times and distributed across the lot to raise the land surface. At a depth of approximately 30 cm below surface we found what appeared to be the original pre-dredge fill surface. Fine sediments and debris suggested that this surface had been disturbed by storm surge and after-storm pooling. Below this surface numerous artifacts were recovered, indicating a wide range of
activities and time periods. These artifacts included glass sherds, copper pieces, cut turtle bone, clay smoking pipe fragments, iron fragments, porcelain sherds, a porcelain cap, a cut gemstone, a bone gambling die, lead shot and an iron log dog. The log dog is an iron spike with an eyelet and ring at one end (Figure 7). These spikes were driven into the logs. When mahogany was floated down the rivers the logs were held together in a large cluster by running a chain through the ring of the “dogs”.

As noted above, a cut gemstone was recovered that appeared to be a diamond (Figure 8). This gemstone was subjected to X-Ray Fluorescence analysis at the archaeology laboratory at Texas State University. The analysis showed this “gemstone” to be leaded glass. It should also be noted that this “gemstone” is in the shape of what is called the Old Mine Cut. Old mine cut diamonds have a high crown and a small table and are similar to today’s cushion cut. The Old Mine Cut dates to the 1700’s and was most prevalent during the Georgian and Victorian eras (2013 Brilliant Earth). The Old Mine Cut was eventually replaced by the European Cut which was replaced by the Brilliant Cut common on diamonds today. Thus, this “gemstone” is a fake, but an old fake.

Also recovered in XU34 was a circular porcelain cap with the words “S Maw Son &
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Thompson” across the top and the word “London” across the bottom (Figure 9). This cap was part of a nursing bottle from the 1800s. It covered the glass portion of the device. The cap had a long rubber tube going through it to a nursing nipple at the end. Several companies made these and there were several variations (Figure 10). Bottles of this type were first introduced in England in the mid 1800’s. They became quite popular in the late 1800’s. Because of the difficulty of cleaning the tubes, they were a breeding ground for bacteria causing illness and death and these devices became known as “murder bottles”, “the killer”, and “the murderer.” After being declared illegal in Buffalo, NY there was a 50% reduction in the infant mortality rate from Cholera (1899 The Druggist’s Circular).

Conclusion

The 2012 excavations on St. George’s Caye confirmed that the coffin burials extend all the way to the modern back (west) cemetery wall. The precise date of these burials could not be determined. Coffin type burials are present in all areas of the cemetery that have been investigated and all are at or below the water table. It is clear from the stratigraphic relationship of these to the box type graves on the 1872 map (Figure 3) that the coffin burials pre-date the box graves which date to the 1800s. The glass, shell, and bone midden, Feature 1, was recovered in the upper layers and thus post-dates the burials. The wide range of artifacts recovered from the excavations to the north of the cemetery provides interesting clues and insights into the various activities of the early English inhabitants.

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References Cited

Elverson, Matthew

Garber, James F., Lauren A. Sullivan, J. Heath Bentley, Matthew Elverson, and Jaime J. Awe

Garber, James F., Jaime A. Awe, Lauren A. Sullivan, and Jennifer L. Cochran

Springs, Lauren C.


Sullivan, Lauren A., James F. Garber, and Jaime J. Awe

(no author) 1899 The Druggist’s Circular. Newsletter, Boston.
