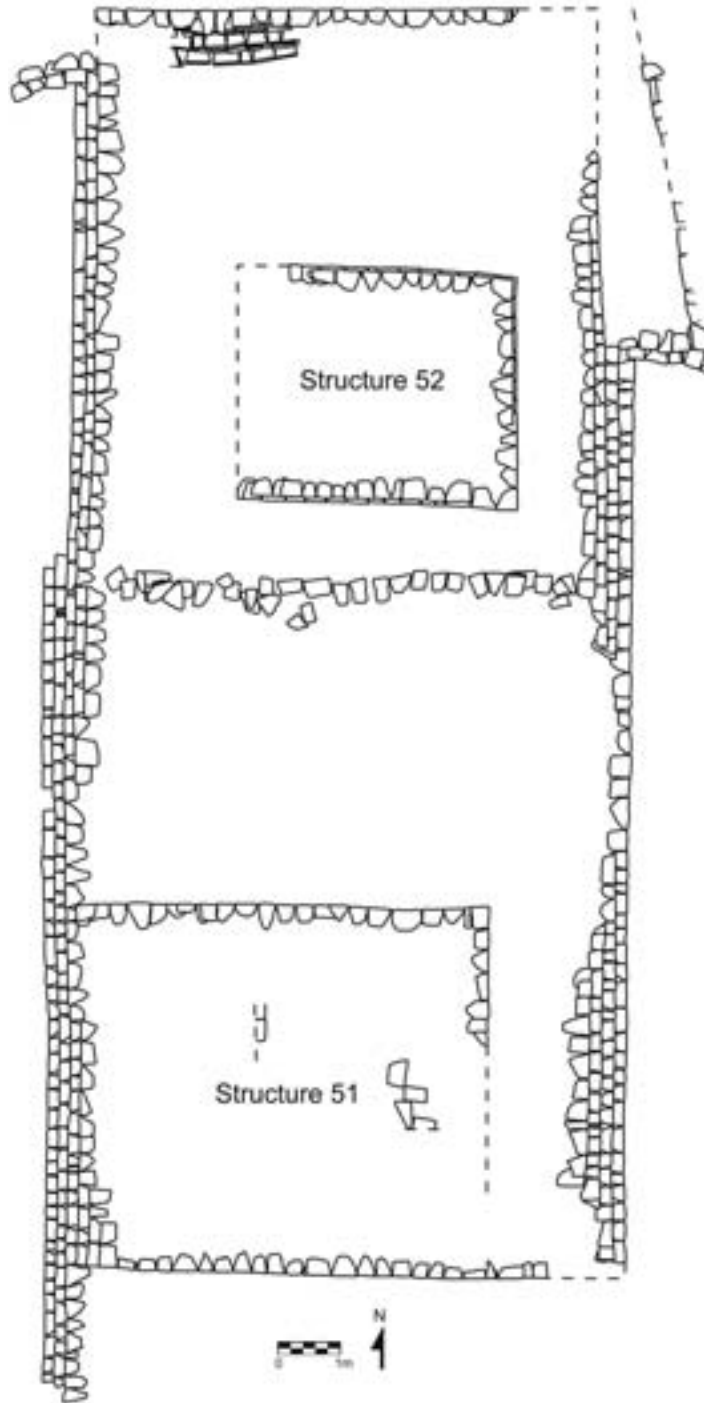


Toledo Regional Interaction Project 2008-2009 Annual Report



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TABLE OF CONTENTS

1. Introduction: Toledo Regional Interaction Project, 2008-2009.....	1
2. Survey at Pusilha, 2008.....	3
3. Toledo Regional Interaction Project 2009 Season: Lubaantun Structures 51 and 52 (Operation3).....	10
4. Identifying the Local and the Foreign: Strontium Isotope and Trace Element Analysis of Companion Burials from Pusilhá, Toledo District, Belize	65
5. References Cited.....	93

1. INTRODUCTION: TOLEDO REGIONAL INTERACTION PROJECT, 2008-2009

This report describes the results of two short field-seasons of archaeological research in Toledo District, Belize, directed by Geoffrey E. Braswell of the Department of Anthropology, University of California, San Diego. That research was conducted over a course of two weeks in June 2008, at Pusilha and throughout the month of June 2009, at Lubaantun. Also presented here is an M.A. thesis based on the chemical analysis of human remains recovered at Pusilha during the 2002 and 2004-2005 field seasons.

The two, short field-seasons described in this report span a transition in our work within Toledo District. This transition represents a change from a project focused on a single site to a regional project designed to understand how the Southern Belize Region was politically and economically integrated. We have therefore changed the name of our program of research from the Pusilha Archaeological Project (PUSAP) to the Toledo Regional Interaction Project (TRIP).

From 2001 until 2008, our research focused entirely on the Late to Terminal Classic royal center of Pusilha. Throughout this period, our goals were to understand the dynastic history of Pusilha, its growth as a dynastic capital, and its relations with distant polities outside of the Southern Belize Region. During the years of the Pusilha Archaeological Project, we mapped a good portion of the site center (Braswell 2001; Braswell et al. 2004, 2006), conducted test-pitting and salvage excavations (Braswell et al. 2002), and excavated seven structures in an around the Gateway Hill Acropolis (Braswell et al. 2004, 2006). Project Co-Director Christian Prager (2002; see also Braswell 2002; Braswell and Prager 2003; Braswell et al. 2004, 2005a, 2005b, 2008; Maguire et al. 2003) documented and translated the many carved monuments of the site, project Co-Director Cassandra Bill (2004; Bill and Braswell 2005; Bill et al. 2005; Braswell 2007; Braswell et al. 2005a, 2005b, 2006, 2008) studied the ceramics, project member Megan Pitcavage (Braswell and Pitcavage 2009; Braswell et al. 2007; Pitcavage and Braswell 2009, 2010) analyzed the human remains, and Karen Nickels (Braswell et al. 2007) studied the faunal collection. Finally, Braswell analyzed the chipped- and ground-stone lithics, figurines, and miscellaneous artifacts (Braswell et al. 2006, 2008). To date, 17 articles and reports have been published in journals (*Ancient Mesoamerica*, *Mexicon*, and *Anthropological Notebooks*) and annual symposia volumes (Belize, Campeche, and Guatemala). Finally, five M.A. theses—all of which appear as chapters in our annual reports—have derived from our work at Pusilha. Chapters 2 and 4 of this document constitute the sixth and final annual report of PUSAP to the Institute of Archaeology of Belize, and Chapter 3 is the first annual report of TRIP.

The limited work conducted at Pusilha in 2008 and described here consisted entirely of mapping (Chapter 2). For two weeks in June of 2008, Pitcavage and Braswell mapped two areas of the site. The first is centered approximately 100 m south of the new school in the village of San Benito Poite. Structures in this group were first noted by Leventhal (1990) and called the “Blank Stela Group.” The other area that was mapped during our 2008 season spans the distance between Ballcourt I (at the end of the Pusilha sacbe) and the famous bridge. PUSAP members cleared and sketched this area in 2001, but did not then have the time to shoot it into our grid with a total station. These

structures constitute two architectural groups: “Christian’s Group” (immediately southeast of Ballcourt I) and the well-known Big Tree Group, first excavated by Thomas Gann (Joyce et al. 1928). In all, 61 structures were identified and mapped in these two areas during the 2008 field season.

Chapter 3 describes excavations conducted at Lubaantun during the first season of TRIP. Throughout the month of June, Pitcavage and Braswell excavated Structures 51 and 52 in Plaza VII, also known as the “Butterfly Plaza.” Pitcavage is the author of this chapter. As described in the report, Structures 51 and 52 actually consist of a single platform that was built in two stages. Small superplatforms, what Hammond (1975) refers to as fore-benches, are located at both the southern and northern ends of this single platform. Excavations reveal that the original Str. 51 platform was built at the same time as Plaza VII; the plaza floor does not extend beneath the Str. 51 platform. In contrast, the Str. 52 “annex” was added later on top of the Plaza VII floor, which is well preserved beneath it. We provisionally date the first of these two construction phases to the early Terminal Classic (ca. A.D. 780-830) based on the ceramics and other artifacts found in a large midden-like deposit within the fill of Plaza VII beneath the Str. 51 platform. Occupation of Str. 51/52 continued into the later Terminal Classic (A.D. 830-950+). Ceramics and faunal remains found scattered around the Str. 51 platform and its annex imply that it supported a residence.

Chapter 4 is the M.A. thesis of Andrew Somerville. It describes trace element and strontium-isotope analyses of human teeth excavated at Pusilha in 2002, 2004, and 2005. His results demonstrate that there are (at least) three distinct strontium “fingerprints” for the analyzed individuals at the site. Most individuals have what is assumed to be the dominant local signature. Two individuals from Bu. 3/1 (the principal figure and Companion 1; see 2004 and 2007 reports) have a different “fingerprint” that is consistent with Copan, Quirigua, possibly Lubaantun, and many other unknown places. Finally, the individual found disarticulated on the final plaza surface (Bu. 4/1; see 2004 and 2007 reports) comes from a radically different place, probably in the Maya highlands. Although strontium data are not sufficient on their own to pinpoint a place of origin, these data do seem to suggest that people who lived, died, and were interred at Pusilha came from multiple locations.

We gratefully acknowledge our benefactors for these two seasons. Field work conducted in 2008 was supported by a grant from the Faculty Senate of the University of California, San Diego (to Braswell) and by the Dean of Social Science’s Graduate Travel Grant (to Pitcavage). Our work at Lubaantun was supported by a second award from the Faculty Senate (to Braswell) and by the National Geographic Society (8654-09; also to Braswell). Mass spectrometry analysis was conducted at the Scripps Institution of Oceanography, UCSD, and paid for by funds awarded to Braswell by the Dean of Social Sciences, UCSD. We also thank our many old friends in San Benito Poite village and new ones in San Pedro Columbia, who worked with us in the field. Finally, we thank Dr. Jaime Awe, Dr. John Morris, and all the staff of the Institute of Archaeology for their continuing support, guidance, and friendship.

2. SURVEY AT PUSILHA, 2008

Two members of the Pusilha Archaeology Project (PUSAP), Director Geoffrey Braswell and graduate student Megan Pitcavage, conducted the last field season of PUSAP at Pusilha, Toledo District, Belize during the last two weeks of June, 2008. During this period, and working with all the male members of the community of San Benito Poite, we cleared and mapped two important parts of the site south of the new school building and north of the Machaca (Pusilha) River. A total of 61 platform structures were mapped in these two areas. This chapter presents two new detailed maps showing these groups and also contains as a foldout our updated, “complete” (that is, all we have surveyed so far) map of Pusilha (Figure 2.1)

THE BLANK STELA GROUP

The northern of the two areas, is found from about 30 m south of the modern school to about 180 m south of it. It was first reported by Richard Leventhal (n.d., 1990). His sketch map of the site (Figure 2.2) contains thirty structures in this area and indicates that a blank stela was found near the corner of one of these structures. Since the first year of the Pusilha Archaeology Project, we have been interested in re-mapping this portion of the site—informally known as the “Blank Stela Group”—and relocating the stela. Unfortunately, the area is covered in incredibly thick secondary growth and overlaps at its extreme northern end with the cemetery of San Benito Poite village. We waited several years to see if this region would be cleared for farming, but because of its proximity to the free-ranging pigs of Poite, it remained overgrown. In 2008, we decided to clear the region, relocate the stela, and survey one of the larger and more-important groups that we have not already mapped.

While clearing and surveying the platforms that constitute the Blank Stela Group (Figure 2.3), three things became evident to us. First, the mounds are still in very good condition and only a few are looted. When we asked the villagers about this, they replied that the reason they were not looted is because they are located very close to the village and people would hear any activity. Moreover, the owner (more accurately, the man who has permanent usufruct rights) of the parcel does not like people digging on his property. This would be an ideal place for later household archaeology studies, an aspect of our project that we may explore in the future. Second, it is very difficult to reconcile Leventhal’s sketch map (Figure 2.2) with our own. We surveyed 32 features and his team found 30, so the maps agree with each other fairly well in this regard. But the orientations of the structures in the sketch map, as well as their distances from each other, do not match up well with our total station survey. For this reason, we are not exactly sure what structure on our map corresponds with the one marked by Leventhal as having a blank stela. Third, we looked over the entire group quite carefully and did not locate any clear candidate for a stela. Instead, we found that many of the larger mounds in this portion of the site have large, square corner stones. Thus, although it is possible that a blank stela was moved in recent decades, we suspect that the possibility raised in Leventhal’s (n.d.) original report that the blank stela is actually a corner stone is correct.

The structures in the Blank Stela Group are arranged in several smaller clusters. At the north and in the cemetery of the modern village are four platforms that are separated from the Blank Stela Group proper. These are shown in Figure 2.1, but omitted from the close-up Figure 2.3 because the cemetery mounds are some distance away from most of the Blank Stela Group. South of the cemetery mounds and on the western edge of the Blank Stela Group are 11 platforms and terrace features arranged with natural topography but only haphazardly with each other (Figure 2.3). Two square mounds, built directly north and south of each other, form the core of this portion of the group. At least four plazuela groups, oriented NS but generally lacking eastern structures, are found along the eastern edge of the Blank Stela Group. We count these as 15 structures and terraced platforms. It is somewhere in here that Leventhal's blank stela should have been located. Finally, a fifth NS plazuela group, lacking both eastern and western structures and consisting of only two mounds and a terrace, is at the south end of the Blank Stela Group at a distance removed from the other clusters of structures.

CHRISTIAN'S GROUP AND THE BIG TREE GROUP

The second area surveyed in 2008 is located between the eastern edge of Ballcourt I (at the end of the sacbe that begins in the Stela Plaza) and the northern platform of the Maya Bridge, known locally as the Pusilha. The 29 structures that we mapped in this region are arranged in at least two formal groups with outliers spread on the ridge top. The westernmost of these groups was located by us in 2001 and is informally known as "Christian's Group," because Christian Prager drew our first sketch map of it. The second group of structures is called "Big Tree Group," a name dating back to the re-discovery of Pusilha in the late 1920s.

Christian's Group contains 12 structures. The four most important of these are arranged as a typical NS-EW plazuela group (Figure 2.4). Four more low platforms were added in the corners of the plazuela. A modified terrace forms the southern edge of the plazuela and continues to the east. Four more low platforms are found south and below this terrace. It could be that the plazuela group itself formed an elite residential group, while the other four platforms supported auxiliary buildings such as kitchens and the residences of retainers.

The Big Tree Group was originally excavated by Thomas Gann and members of the British Museum Expedition (Joyce et al. 1928). The largest structures of the group are in the west (Figure 2.4). In this portion of the group, ten structures are arranged in two parallel NS plazuela groups. The higher plazuela is to the west, and the level of the eastern plazuela floor is about 1 meter lower. A large mound straddles the center between the two plazuelas. It was here that the famous stone mask from Pusilha was found (Joyce et al. 1928). The mound was never backfilled and is in very poor condition.

Three very small platforms are on top of a steep karstic uplift to the southeast of the eastern plazuela group. These platforms were all excavated by Gann, and he found some interesting burials in them (Joyce et al. 1928). Unfortunately, since no sketches are provided in his report, it is difficult to know how he numbered the platforms, or from which each burial was found. Today, all that can be seen are three holes. Finally, three more mounds and a terrace are located on the steep ridge dropping to the bridge to the southeast. The mounds were noted and mapped by Leventhal (Figure 2.1).

CONCLUSIONS

Although we mapped just 61 structures and platform features, these occupy a rather important and central portion of our site map (Figure 2.1). The location and orientation of these platforms is somewhat different than suggested by Leventhal's pace and compass sketch (Figure 2.2). It is, of course, quite difficult to draw an accurate large-scale pace and compass map in the forest, so this is to be expected.

One very important factor is evident. There is a clear NW to SE axis to the site center of Pusilha about which we did not know before the 2008 season. In the NW corner of this axis is the Stela Plaza, which runs SE and downhill to Ballcourt I. Our survey reveals that this axis continues all the way to the Maya Bridge. Christian's Group and the Big Tree Group are oriented along this axis, and the latter ends a mere 40 meters from the northern abutment of the bridge. This may be a result of natural topography, but if so, that topography seems to have been used to connect most of the important groups on the north side of the Machaca River to the bridge.

Unfortunately, we did not locate a blank stela in the Blank Stela Group, but the location of one in a secondary residential group would have been unusual. All the carved stelae known from the site are in the Stela Group, and it is not clear to me that the large stones found by Morley (1938) on the second terrace of Gateway Hill Acropolis are blank stelae (they are still in place). Instead, the stone found by Leventhal (n.d.) probably is a large corner stone from one of the structures. Indeed, it is mentioned as being found at the corner of a platform. The Blank Stela Group is in remarkably fine condition, and should be considered for later excavation. Villagers living near it have been asked to be especially careful in monitoring it for looting activity.

Figure 2.1. Updated map of Pusilha, Toledo District, Belize including survey data collected during the 2008 field season (see foldout).

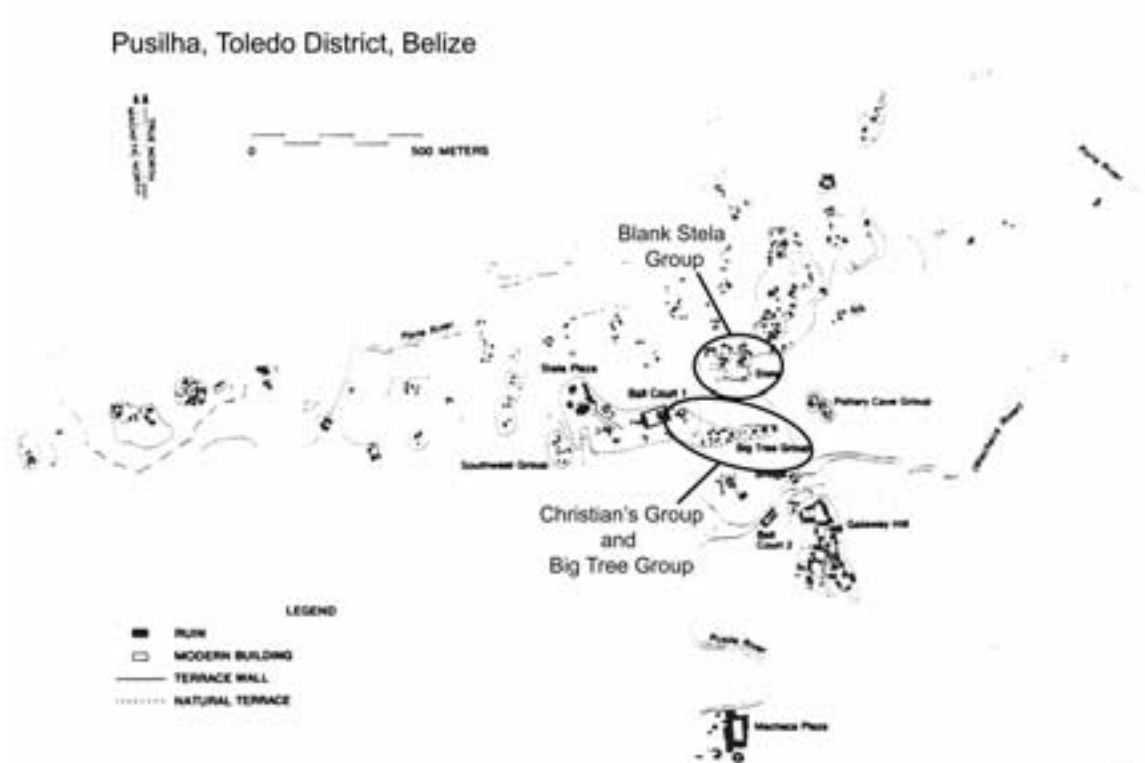


Figure 2.2. Leventhal's sketch map of Pusilha (1990:Figure 8.1).

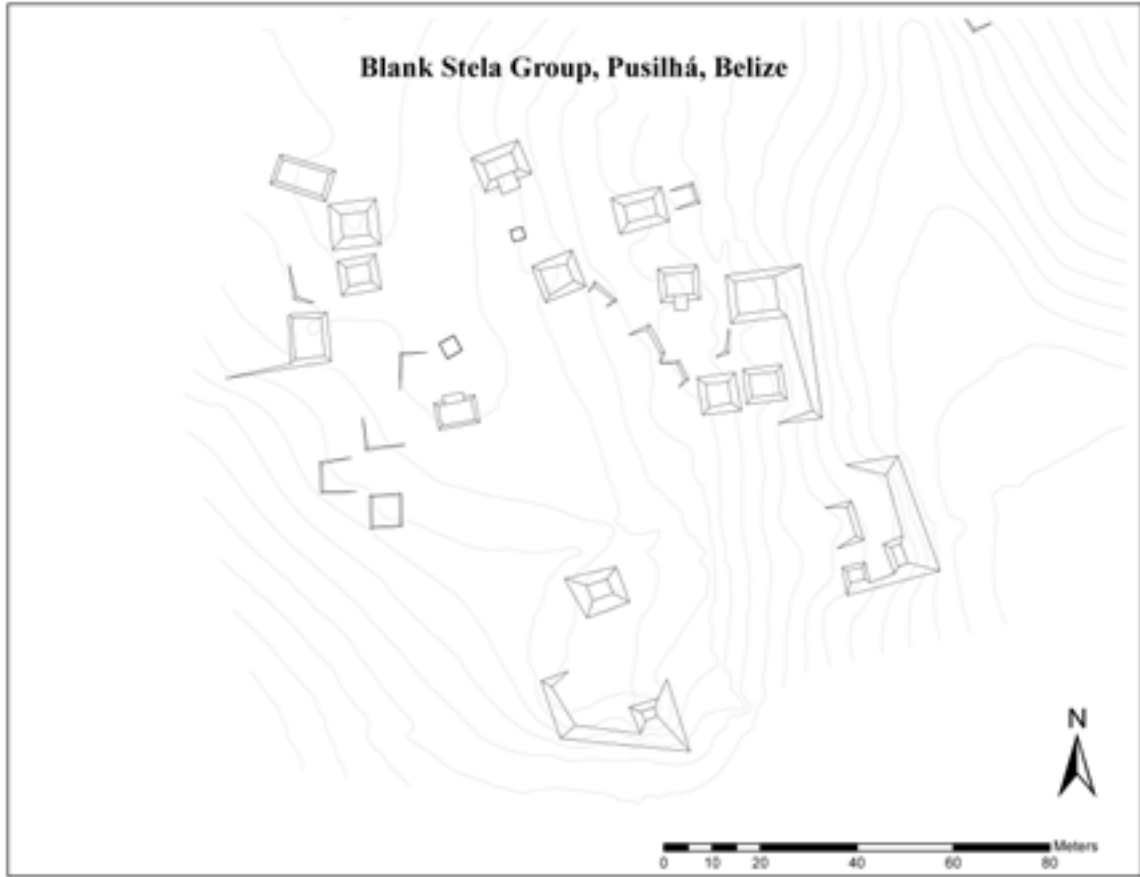


Figure 2.3. Map of Blank Stela Group.

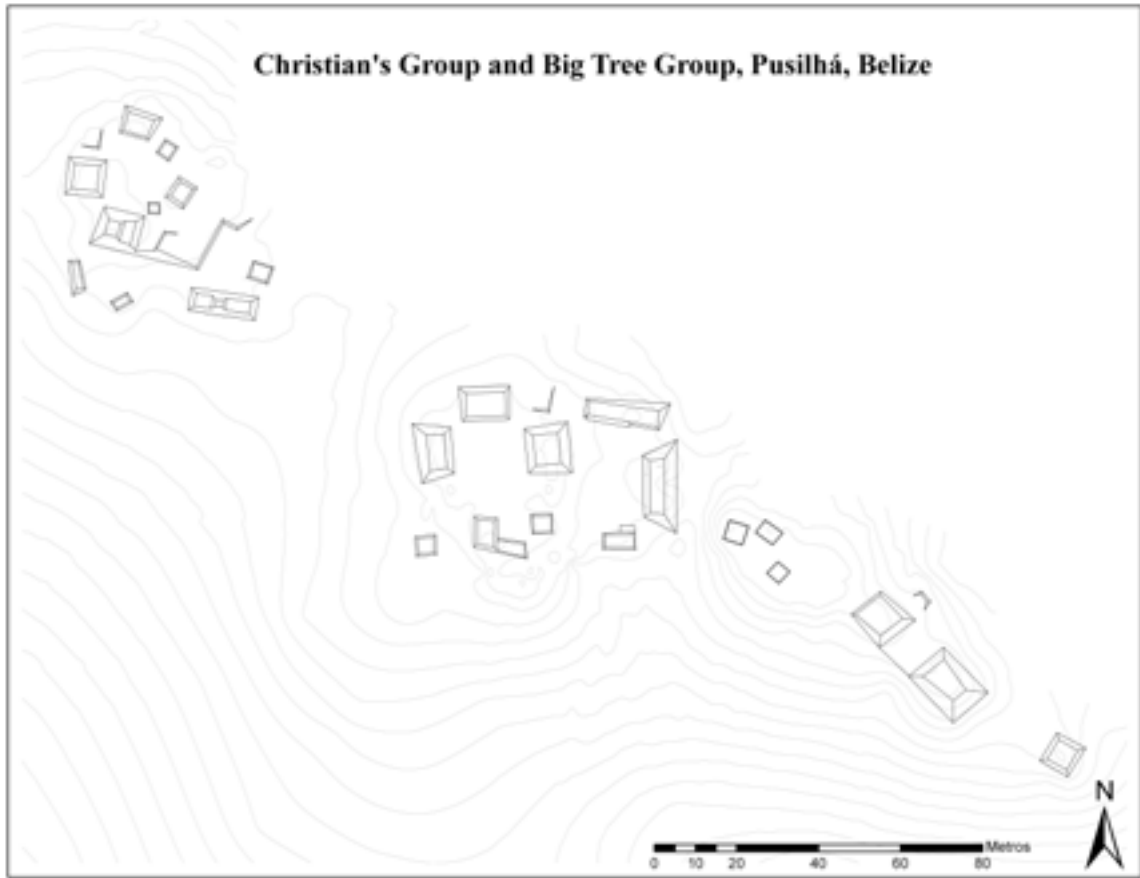


Figure 2.4. Map of Christian's Group and Big Tree Group.

3. Toledo Regional Interaction Project 2009 Season: Lubaantun Structures 51 and 52 (Operation 3)

The 2009 excavation season at Lubaantun, Toledo District, Belize consisted of one excavation operation within the civic-ceremonial center of the site. Two range structures located on the western edge of the site core were subjected to extensive horizontal and vertical investigations. This report documents those excavations.

We conducted our excavations in order to expose two linked structures, Structures 51 and 52, which are aligned along the northwestern edge of Plaza VII, also known as the Butterfly Plaza (Figure 3.1). Plaza VII is an elite residential patio group located at the western edge of the site core. The north end of the plaza is dominated by Structure 44, a small pyramid that probably supported a temple. To the west are four small range platforms. From south to north, these structures are Structures 48, 49, 51, and 52. Finally, a stair leads downwards to a creek in the west and is the main southwest access point for the site. One stair is located along the southern edge of the plaza and the other leads west through a passageway between Structures 49 and 51. At the eastern edge of the Butterfly Plaza, a stair leads up to the temple plaza and the other important civic ceremonial architecture of Lubaantun. The location of Structures 51 and 52 within the site core led us to suppose that these platforms supported elite residences. We therefore anticipated that these structures would contain remains reflecting elite occupation and daily activities.

We organize our excavations at Lubaantun according to a modified version of the Tikal system. That is, we conceptually and spatially divide our work into Operations, Suboperations, and Lots. Operations refer to specific tasks such as the excavation of a platform, a test-pitting program, or salvage work. We are reserving Operation 1 for test-pits that may be dug in the future and Operation 2 for any salvage excavations we may at some time conduct in the many open trenches at the site. Thus, even though the excavations of Structure 51 and 52 constitute the beginning of our research at Lubaantun, we have assigned this task the name Operation 3.

Before excavations began, we created a grid of 2-m by 2-m units on top and off the sides of the Structure 51/52 platform (Figure 3.2). The grid is oriented parallel to the western face of the structure, that is, approximately North-South. Starting at the south of our grid and working north, we assigned to each East-West strip of units a number. Each Suboperation number refers to a unique East-West strip of units. Each North-South strip of squares was assigned a letter, beginning in the southeast and moving westward. Thus, the southeastern most 2-m by 2-m square is called Suboperation 1A. The square immediately north of it is Suboperation 2A, and the square west of that is Suboperation 2B. Occasionally, we added an additional unit east of those in the North-South strip given the letter A. Such squares east of the grid are given the letter Z.

Excavation within each gridded unit was conducted in lots. For the most part, lots correspond with natural stratigraphic layers, with Lot 0 representing any material found directly on the modern surface. But lot numbers were also sometimes assigned to particular features within a square or even to distinguish between horizontally different contexts.

Architectural and cultural features (such as walls, stairs, and special deposits) were assigned feature numbers. The feature numbers include the Operation, the Suboperation in which the feature was first observed, and a feature number. Thus,

Feature 3/9/3 refers to the third feature found in the ninth East-West strip of squares in the grid of Structure 51/52. Table 3.1 contains a list of all our features.

The number of workmen that we employed differed from day to day, but most commonly we excavated in five teams of two with an eleventh man who helped with drawing and measuring. Excavation was conducted using hand trowels, and all soils were screened through ¼" mesh. Excavated artifacts were immediately separated by material (pottery, *jute* shell, other faunal remains, chert, obsidian, human bone, figurines, polished and ground stone, and marine shell artifacts). These were all washed, counted, noted on our lot forms, and rebagged in the field as each lot was closed. Tables 3.2. to 3.10 contain counts of these artifacts by lot. In the case of *jute* shells, we classified each shell as whole or fragmentary, determine their species, and discarded them. All other artifacts are curated in our laboratory and will be turned in to the Institute of Archaeology.

Structures 51 and 52 were excavated almost in their entirety. Slumped, fallen, and in situ architectural stones were drawn (Figure 3.3) and photographed in place, numbered, and taken down. A level surface was then prepared, and the stones were reset using carpenter's levels, strings, and line levels. We did not use any mortar in resetting the stones, instead, they were dry laid. In the future, it may be that the Institute of Archaeology will wish to complete consolidation with mortar. After the stones were reset, we redrew (Figure 3.4) and rephotographed the entire structure.

Our descriptions of the excavations are divided rather arbitrarily between Structure 51 and Structure 52. In reality, we now know that the southern half of the platform was built first, which was later extended to the north. In our text, we sometimes refer to this northern addition as the "annex." There are no clear superstructural walls on the platform. Instead, what can be seen are what Hammond (1975) calls "forebenches." We, with less interpretation, prefer to call them "superplatforms." The distinction between Structure 51 and 52 as drawn on maps is probably the result of the misinterpretation of an old looter's trench down the centerline of the platform. Structure 51 seems to refer to features south of this trench, and Structure 52 to features to the north. Alternatively, the names could be used to identify the superplatforms at each end. We presume that, in its final form, the Structure 51/52 platform probably supported a single superstructure made of perishable materials, but we found no postholes or other features that demonstrate this assumption.

EXCAVATION OF STRUCTURE 51

The structure is a North-South oriented range structure on the northwest side of the Butterfly Plaza (see Figure 3.1). To the north of the structure lies Structure 52. Structure 49 is located to the south. Immediately to the west is a steep drop-off of the western terrace leading to the creek. Investigations of Structure 51 began with horizontal clearing excavations of the terminal architectural phase of the entire structure, including both a base platform and a masonry superplatform. Next, a vertical excavation was undertaken within the Structure 51 superplatform. This continued below the level of the Plaza VII floor to bedrock. Our excavations had three main purposes: (1) to recover diagnostic chronological markers to define the construction chronology of the structure;

(2) to reveal and understand the construction and use history of the building; and (3) to gather and analyze cultural material objects in association with the structure.

A total of twenty-six 2-m (North-South) by 2-m (East-West) units and three 2-m (North-South) by 1-m (East-West) units were arranged across the entire structure in a grid. Each unit was assigned a suboperation number and a unit letter as described above. In all, five East-West strips of units (Suboperation 3/1 to Suboperation 3/5) are arbitrarily called Structure 51. This is because the looter's trench passes through the rows of units that constitute Suboperation 3/5 and Suboperation 3/6. We eventually found the northern end of the original platform, however, in Suboperation 3/7. Units were also labeled with a letter, starting in some cases with A or, in cases where we needed to extend our grid eastward, with Z. At the western end of our grid, we ended our excavations of Structure 51 in the North-South row of units called E.

Suboperation 3/1

We placed Suboperation 3/1 along the southern edge of the structure, with F. 3/1/1 wall visible at its northern edge. Units included 3/1A, 3/1B, 3/1C, 3/1D, and 3/1E. Features exposed during the excavation include and F. 3/1/1 and F. 3/1/2.

F. 3/1/1 is the south-facing wall of the Structure 51 platform (Figure 3.5). It extends through units 3/1A, 3/1B, 3/1C, 3/1D, and 3/1E. F. 3/1/2 consists of the top 3 steps of the western stair of Plaza VII, which runs the entire North-South length of Structures 51 and 52 (Figure 3.6). The southernmost portion that we excavated of this feature was revealed in Unit 3/1E and it extends northward through units 3/2E, 3/3E, 3/4E, 3/5E, 3/6E, 3/7E, 3/8E, 3/9E, 3/10D, 3/11E, and 3/12E.

Unit 3/1A. Unit 3/1A is located at the southeast corner of the Structure 51 base platform. This unit was excavated in a single lot, Lot 3/1A/1, which represents the surface material cleared in order to reveal the slumped cut stones of F. 3/1/1, the south-facing vertical wall of Structure 51. Although we anticipated exposing the southeast corner of the Structure 51 platform, this feature was highly disturbed and no cornerstones were recovered in situ. Instead, we revealed the large fill stones of the Plaza VII fill, and beneath fill boulders eroding out of the corner of the platform. Similar damage was done to the northeast corner of the Structure 52 base platform and along the central axial transect of the Structure 51/52 platform. This pattern suggests that looters were searching for axial and corner caches in the platform. The matrix of Lot 3/1A/1 consisted of organic matter and dark black/brown soil. Cultural materials recovered from this lot include: 123 ceramic sherds, one piece of obsidian, four chert fragments, 28 whole *Pachychilus glaphyrus* (spiky jute) shells, two *P. glaphyrus* shell fragments, 46 whole *Pachychilus indiorum* (smooth jute) shells, one *P. indiorum* shell fragment, and one miscellaneous marine bivalve shell.

Unit 3/1B. Unit 3/1B is situated approximately 2-m south of the south wall of the Structure 51 base platform and just west of the southeast corner of the platform. This unit contains the easternmost portion of the south-facing wall of Structure 51 (F. 3/1/1). This unit was excavated in two lots, Lots 3/1B/1 and 3/1B/2. The first lot consists of the surface material cleared in order to expose the remains of F. 3/1/1. This material included O- and A-horizon soils composed of organic material and black/brown colored soil. We also excavated the slumped southern wall and platform fill of the Structure 51 base

platform. The wall is poorly preserved in this portion and contained only two courses of stones in their original position. The artifacts recovered in this lot include 25 ceramic sherds, four chert pieces, one *P. glaphyrus* shell, and one faunal bone.

Lot 3/1B/2 is comprised of the materials recovered in the course of clearing the pedestals under the fallen stones exposed in Lot 3/1B/1 and during leveling and reconstruction of F. 3/1/1, including five pottery sherds. Ultimately, this material is little different from the material cleared in Lot 3/1B/1.

Unit 3/1C. This unit is located along the south wall of Structure 51 at the central North-South axis of the platform. It contains the central section of F. 3/1/1, which is the most well preserved portion of the wall retaining five courses of stones in situ. This portion also provides convincing evidence that the F. 3/1/1 was originally constructed as a vertical wall rather than a stair or in the stepped perpendicular architectural style characteristic of many of the constructions in the Lubaantun site core. This unit was excavated in two lots, Lots 3/1C/1 and 3/1C/2. Lot 3/1C/1 consists of the slump and O- and A-horizon materials cleared in order to expose F. 3/1/1. Additionally, small flecks of limestone were encountered at the base of the first course of the wall indicate the possible presence of a stucco or packed sascab floor of Plaza VII that has since eroded. We recovered 27 ceramic sherds, one whole and one fragmentary *P. indiorum* shell in this lot.

Lot 3/1C/2 is analogous to Lot 3/1B/2 as it is comprised of the material from the pedestals under the fallen cut stones from F. 3/1/1. Recovered material is not very different from that removed in Lot 3/1C/1. We recovered 19 pottery sherds, one piece of chert and one whole *P. indiorum* shell from this lot.

Unit 3/1D. Just west of Unit 3/1C, Unit 3/1D is situated along the south wall of Structure 51 approximately 2-m east of the southwest corner of the platform. It contains a portion of F. 3/1/1 just east of its western extreme. This unit was excavated in two lots, Lots 3/1D/1 and 3/1D/2. The excavated material of Lot 3/1D/1 consisted of the removal of the surface organic matter and black soil matrix to reveal the remains of the south wall of the Structure 51 base platform. The portion of F. 3/1/1 exposed within this lot was poorly preserved, although two courses of stones were retained in place. This lot was excavated down to the level of the large rubble fill stones of the plaza level and yielded seven ceramics sherds and one whole *P. indiorum* shell.

The material removed from Lot 3/1D/2 is similar to that from the previous lot. It consists of the removal of the matrix beneath the fallen stones exposed in Lot 3/1D/1 during the course of leveling and reconstruction of the wall. The only artifact removed from this lot is one ceramic sherd.

Unit 3/1E. Unit 3/1E was placed over the southwest corner of Structure 51. This is the point of articulation of features F. 3/1/1 (the south wall of Structure 51) and F. 3/1/2. This second feature consists of the top three steps of the western stair of the platform terrace to the west of Structure 51 (Figure 3.6). A path from the stair runs between Structures 49 and 51 to the Butterfly Plaza. This unit was excavated in two lots, Lots 3/1E/1 and 3/1E/2. Lot 3/1E/1 consists of the material cleared in the course of exposing the westernmost extension of F. 3/1/1 and the southernmost extension of F. 3/1/2. This material was composed of an O- and A-horizon matrix of organic material and black soil mixed with small stones and the fallen cut stones of both features. No artifacts were recovered from this lot.

Lot 3/1E/2, consisted of leveling and cleaning exercises involved with resetting the stones of the south wall of the Structure 51 base platform. A single obsidian blade fragment was found in this lot.

Suboperation 3/2

Suboperation 3/2 is adjacent to and north of Suboperation 3/1, and located immediately north of the south wall of the Structure 51 base platform following an East-West axial transect. It includes feature F. 3/2/1, the eastern stair of Structure 51 south of the juncture with the eastern stair of the Structure 52 annex (F. 3/7/1) (Figure 3.7). The F. 3/2/1 stair extends through units 3/2A, 3/3A, 3/4A, 3/5A, 3/6A, and, 3/7A. North of Suboperation 3/2, we were able to determine that F. 3/2/1 originally had four steps of treads and risers, but in this suboperation, the upper two steps were removed by looters or had collapsed. Portions of F. 3/1/2 and F. 3/4/2 (Figure 3.4) are also represented within this transect. The southernmost extension of F. 3/1/2 is found in unit 3/2A and traces of F. 3/4/2, an alignment of cut stones on top of bedrock that retained the large rubble fill of Structure 51, were uncovered in Unit 3/2B.

Unit 3/2Z. Unit 3/2Z is a 1-m (East-West) by 2-m (North-South) unit located at the base of the stair of Structure 51 immediately east of the southeast corner. No features were discovered within this unit, however, fallen stones from F. 3/2/1 were encountered. This unit was excavated in two lots, Lots 3/2Z/1 and 3/2Z/2. Lot 3/2Z/1 consists of the fall material collected in the course of excavations from the surface down to the level of the bottom of the eastern stair of Structure 51 (F. 3/2/1). The purpose of excavating this lot was to determine how a prepared plaza floor of the Butterfly Plaza articulated with F. 3/2/1. Preservation here, however, was such that we could not find indications of a plaster floor. The material collected included O- and A-horizon soils and the following artifacts: 68 pottery sherds, one fragment of a human humerus bone, 17 whole *P. indiorum* shells, three *P. indiorum* shell fragments, 33 whole *P. glaphyrus* shells, one *P. glaphyrus* shell fragment, and one unidentifiable *jute* fragment.

The material collected in Lot 3/2Z/2 is little different from that removed from Lot 3/2Z/1. It consists of the material removed from the pedestals beneath the fallen stones from F. 3/2/1, but above the plaza level. This lot was terminated at the same level as 3/2Z/1 and contained five ceramic sherds, one whole *P. indiorum* shell, one *P. indiorum* shell fragment, and one whole *P. glaphyrus* shell. Overall, we are surprised at the number of *jute* shells found off the southeast corner of the structure at the plaza level. Their presence here, beneath fallen stones, implies that they were deposited some time before the structure began to collapse, probably near the end of occupation. Furthermore, the presence of discarded food implies that eating was an activity associated with Structure 51.

Unit 3/2A. Unit 3/2A is situated along the southeast corner of Structure 51 and includes the southernmost extension of F. 3/2/1, the stair on the east side of the structure. Each step is composed of 2 courses of cut stones, one riser and one tread. Due to the destruction of the southeast corner of the structure we are unable to determine whether this stair was outset. If so, it was outset by a distance of about one foot. This unit was excavated in two lots, Lots 3/2A/1 and 3/2A/2. Lot 3/2A/1 is composed of the material cleared from the eastern stair. It consists of O- and A-horizon soils removed from the

stair itself as well as the exposed fill immediately to the west of the stair within the Structure 51 platform. The cultural materials removed during the excavation of this lot include 30 ceramic sherds, one piece of chert, five whole *P. indiorum* shells, six whole *P. glaphyrus* shells, and one bivalve fragment.

Lot 3/2A/2 consisted of the cleaning and straightening of the stair. The material removed from this lot is comprised of platform fill from behind the east stair of Structure 51. Due to the slumped nature of the stair, some material may come from outside or on top of the structure. A-horizon soils were common within this fill and slump context. Recovered materials consist of a single pottery sherd, one piece of obsidian, and one whole *P. indiorum* shell.

Unit 3/2B. Unit 3/2B is on top of the platform, immediately west behind F. 3/2/1. This unit is wholly located within the Structure 51 base platform and was excavated in a single, shallow lot, Lot 3/2B/1. This lot consists of the surface material and small stone platform ballast. In this location, we did not dig through the ballast into the boulder fill of the platform itself. We encountered cut stones in a very disturbed state that appear to have comprised the southern extension of the east wall of the Structure 51 “superplatform”. This portion of the feature was likely destroyed when the southeast corner of the structure was looted. This lot proved that the east wall of the Structure 51 superplatform did extend to the southeast corner of the platform, however, there is very little trace of its southern face. The matrix is comprised of O- and A-horizon soils surrounding scattered cut stones and small fill stones that contained six ceramic sherds and six pieces of chert.

Unit 3/2D. Due to the lack of evidence for a south wall of the Structure 51 superplatform Unit 3/2C remained unexcavated. Unit 3/2, however, was excavated in one lot with goal of revealing a possible south-facing wall segment of the Structure 51 superplatform observed in south profile of Op. 3/3D/2. Nonetheless, the removal of the material from Lot 3/2D/1 confirmed that the alignment of stones visible in the south profile of Op 3/3D/2 was a layer of neatly stacked large fill stones. The material in this lot consisted of surface material and small stone ballast fill and included O- and A-horizon soils. As in Unit 3/2B, we did not excavate into the boulder fill of the platform itself, only far enough to expose the south side of the stacked fill stones. The artifacts recovered within this lot include 36 ceramic sherds, two whole *P. indiorum* shells, and one whole *P. glaphyrus* shell.

Unit 3/2E. Unit 3/2E was placed along the west side of Structure 51 immediately north of the southwest corner of Structure 51. It contains a portion of the F. 3/1/2 western stair that was exposed during excavation. This unit was excavated in two lots, Lot 3/2E/1 and 3/2E/2. The goals of Lot 3/2E/1 were to expose the west terrace stair (F. 3/1/2) and determine if the north wall of the Structure 51 superplatform (F. 3/4/1) (Figure 3.8) articulated directly with the west terrace stair or if it articulated with some sort of western wall of the Structure 51 superplatform that has since collapsed. This lot unit confirmed that the western side of Structure 51 had its base on the top stair. Unfortunately, this facing stones of the western side of Structure 51 have completely slid away. We are rather certain now that it was not a wall, but probably was, for the entire length of Structures 51 and 52 a stair that merged seamlessly with that leading down to the creek. Put another way, someone climbing up from the creek could stop at the level of the

Butterfly Plaza just south of Structure 51/52, or continue to climb the same stair to the top of the platform.

We also observed that the F. 3/1/2 stair continues northward in this unit, however, it is heavily disturbed and slumped toward the west. We encountered large rubble fill stones of the platform and concluded that many of the cut stones likely slid down the west terrace. The cultural materials recovered from this lot include: 19 ceramic sherds, one piece of chert, three whole *P. indiorum* shell, and three whole *P. glaphyrus* shells.

Lot 3/2E/2 consisted of the clearing of material in the course of resetting the stones from the three top steps of the F. 3/1/2 western stair. Two pieces of pottery and one piece of chert were recovered from this platform fill context.

Suboperation 3/3

This suboperation is north of the Suboperation 3/2 trench and more or less on the centerline of Structure 51. We exposed portions of F. 3/1/2 (in Unit 3/3E), F. 3/2/1 (in unit 3/3A), and F. 3/4/2 (in unit 3/3B) in this suboperation. Each of these features is described above and listed in Table 3.1.

Unit 3/3Z. This unit was placed over the plaza approximately 50-cm east of the east stair of Structure 51 and approximately 2.5-m north of the southeast corner of the structure. Because this area is east of Structure 51, we did not encounter any architecture, however, we did uncover a few scattered cut stones that had fallen from the eastern stair of Structure 51. This unit was excavated in 3 lots, Lots 3/3Z/1, 3/3Z/2, and 3/3Z/3.

The first lot, Lot 3/3Z/1, represents the surface material removed down to the level of the base of the eastern stair of Structure 51. This lot was excavated with the goal of determining if a prepared plaster floor of the Buttery Plaza articulated with the Structure 51 architecture, however, we did not encounter any evidence of a preserved plaster floor. The lot yielded 12 ceramics sherds, two pieces of chert, and one groundstone fragment (likely from a metate) within an O- and A-horizon matrix.

Lot 3/3Z/2 consisted of the material cleaned from beneath the fallen cut stones exposed in lot 3/3Z/1. This material is little different from 3/3Z/1 as it is composed of A-horizon soils above the level of the plaza. Ten ceramics sherds and one groundstone fragment (likely from a metate) were recovered within this lot.

Finally, Lot 3/3Z/3 is a 1.5-m (East-West) x 2-m (North-South) unit consisting of the material cleared from the plaza fill to the east of the stair down to bedrock to determine if the concentration of artifacts found in Lot 3/3B/2 (see below) extended eastward to the exterior of the structure. The western border of this unit is defined by the base of F. 3/2/1, the east stair of Structure 51, thus, a portion of this unit extends into Unit 3A. The material recovered was plaza fill composed of A-horizon soils and small stone fill ballast. This layer continued approximately 20 below the base of the bottom stair of F. 3/2/1, at which depth bedrock was exposed. We did not encounter a high concentration of artifacts, thus we believe the ceramic concentration in Lot 3/3B/2 did not extend eastward to the exterior of the structure. The cultural materials recovered from this lot included 24 pottery sherds and two pieces of chert.

Unit 3/3A. Unit 3/3A is located in the central portion of the east stair of Structure 51 approximately 2-m north of the southeast corner of the structure. It contains one of the

most well-preserved portions of F. 3/2/1 and provides evidence that this feature originally had four steps. This unit was excavated in two lots, Lots 3/3A/1 and 3/3A/2.

Lot 3/3A/1 consists of the material on the surface of the stair. We cleared the organic surface matter and A-horizon soils in order to expose all four steps. Due to the high state of preservation of this portion of the stair, all of the artifacts recovered likely came from the surface of the stair rather than from the platform fill. These artifacts include the following: 27 ceramic sherds, one piece of obsidian, six pieces of chert, and two miscellaneous groundstone fragments.

The second lot, Lot 3/3A/2, consisted of clearing the stair and removing the stair blocks during the course of dry consolidation. The material removed was composed of fallen platform fill as well as fill behind the F. 3/2/1 stair. Most of the material comes from the platform fill but because of the slumped nature of the stair, some material comes from outside or on top of the structure. No artifacts were recovered from this lot.

Unit 3/3B. Unit 3/3B is situated directly west of the east stair of Structure 51 (F. 3/2/1) and 2-m north of the south wall of Structure 51 (F. 3/1/1). It contains an alignment of cut stones placed on top of bedrock (F. 3/4/2) (Figure 3.2). This feature acted to retain the large rubble fill of Structure 51. This unit was excavated in two lots: Lots 3/3B/1 and 3/3B/2.

The first lot, Lot 3/3B/1, consists of the organic surface material and large stone platform fill cleared from within the Structure 51 platform. O- and A-horizon soils were encountered as we excavated through the platform fill of large boulders (dry fill) to a level containing a dense deposit of cultural materials (Figure 3.9). This was encountered below the level of the Butterfly Plaza, that is, within plaza fill. We found no plaster or dirt floor at the level of the plaza. This is important, and contrasts significantly with excavations inside Structure 52 (Figure 3.10). This demonstrates that the Structure 51 platform was built before the Butterfly Plaza was plastered. In other words, Structure 51 and the plaza itself were both built during the same construction episode. There is no break in the fill between the two.

To avoid collapse we did not excavate into the corners of this unit. Most of the artifacts recovered from this lot were collected from a dense layer of materials immediately under the dry platform fill and on top of buried A-horizon soils. This soil probably was the ancient surface on which the plaza was built. The artifacts found here can be considered as coming from the same deposit as those in Lot 3/3B/2. These artifacts include 47 ceramic sherds, two whole *P. indiorum* shells, one *P. indiorum* shell fragment, and five whole *P. glaphyrus* shells. Lot 3/3B/1 was terminated when it was clear that we were suddenly recovering a lot of material.

Lot 3/3B/2 consists of the excavation of the buried ground surface and below the boulder fill of the plaza and the Structure 51 platform, down to the level of the bedrock. This layer is composed of a sifted-down A-horizon above C-horizon soil that eroded from bedrock, as well as a very dense concentration of ceramics and *jute* shells. The deposit of cultural materials includes: 453 pottery sherds, eight whole *P. indiorum* shells, four *P. indiorum* shell fragments, 26 whole *P. glaphyrus* shells, and one *P. glaphyrus* shell fragment.

We cannot be completely certain how long before the plaza and Structure 51 were built that this concentration of materials was deposited, but one hypothesis is much better supported by the data. The first possibility is that sherds and other objects were discarded

a significant time before the Butterfly Plaza and Structure 51 platform were built. Nevertheless, the artifacts are well preserved and seem to be interspersed with the lowest of the boulders constituting plaza/platform fill. This suggests to us that they probably were deposited just as construction of the Butterfly Plaza and Structure 51 began. This is also supported by the fact that the artifacts were recovered on top and within the C-horizon soils, which probably have developed since the deposit was buried. Put another way, the ceramics were left on bedrock (and not a soil layer) that may have been exposed in preparation for construction.

Unit 3/3C. Unit 3/3C encompasses the top center of the Structure 51 superplatform. This unit was excavated in three lots, Lots 3/3C/1, 3/3C/2, and 3/3C/3. The first lot, Lot 3/3C/1, consists of the surface and uppermost fill stones of the Structure 51 superplatform. The material that we cleared was composed of the organic surface soils and the small stone ballast fill of the superplatform down to the level of the top of the large fill stones. We collected 17 ceramic sherds, three pieces of chert, and one *P. glaphyrus* shell fragment from this lot.

Lot 3/3C/2 consists of the clearing of the large fill stones of the Structure 51 superplatform down to the level of the dense concentration of artifacts. In other words, Lot 3/3C/2 was sealed beneath the ballast of the top of the platform and the deposit of ceramics on the buried ground surface. The artifacts recovered from this lot include: 66 pottery sherds, one unidentified fragment of bone (likely human), four whole *P. indiorum* shells, seven whole *P. glaphyrus* shells, and two *P. glaphyrus* shell fragments. These cultural materials were all collected from near the bottom of this lot and are little different from those recovered in Lot 3/3C/3. In other words, the deposit of ceramics and other materials seems to be interspersed with the stones that constitute the bottom of the plaza fill, further suggesting that the deposit was placed as construction began.

The final lot in this unit, Lot 3/3C/3, consists of the clearing the lowest most boulder fill stones of the plaza and the mixed down-sifted A and in-situ-derived C-horizon soils to the level of bedrock. To reiterate, among these stones we encountered a dense deposit of pottery and other materials within filtered A-horizon soils and a C horizon of dense, yellow ochre sand. The C horizon appears to have developed since construction as the bedrock eroded, and the artifact deposit and large stone fill were probably laid directly on exposed bedrock during the construction of the plaza and basal platform of Structure 51. In total, this lot yielded 953 ceramic sherds, three pieces of chert, 59 whole *P. indiorum* shells, eight *P. indiorum* shell fragments, 140 whole *P. glaphyrus* shells, 16 *P. glaphyrus* shell fragments, and four figurine fragments.

Unit 3/3D. This unit is on top of the Structure 51 superplatform along its East-West central axis, immediately east of the collapsed western side of the Structure 51 platform. The unit was excavated at the same time and defined using the same lot criteria as those in Unit 3/3C. Therefore, the three lots of this unit, Lots 3/3D/1, 3/3D/2, and 3/3D/3, are respectively analogous to Lots 3/3C/1, 3/3C/2, and 3/3C/3.

Lot 3/3D/1 consisted of clearing the surface material and the small ballast fill down to the level of the large boulder fill of the platform and plaza. This material was composed of a mix of organic matter, O- and A-horizon soils, and small stone fill. The artifacts recovered from this lot include: 11 pottery sherds, two pieces of chert, and one whole *P. indiorum* shell. The second lot, Lot 3/3D/2, consisted of the removal of the large fill stones of the Structure 51 platform and the plaza down to the level of the dense

concentration of artifacts sitting on top of eroded bedrock. Here, we excavated large boulder dry fill with pockets of air and some A-horizon soil that sifted down from the ballast fill layer. This lot yielded 20 ceramic sherds, one whole *P. indiorum* shell, and nine whole *P. glaphyrus* shells.

The final lot of this unit, Lot 3/3D/3, consisted of the removal of the remaining large fill stones and earth containing a dense concentration of artifacts. We terminated the lot at bedrock. These artifacts were recovered from a mix of A- and C-horizon soils, although the majority is C horizon that developed since the deposition of the sherds. The A-horizon soil we encountered probably sifted from the two fill layers above. This lot is at the southern extension of the dense concentration of sherds including known Tepeu II/III forms. This lot has less material than in Lot 3/3C/3, which is located immediately to the east. The concentration is clearly focused in Lot 3/3C/3 and perhaps Lot 3/3B/2, but drops off quickly to the north (in Units 3/4C and 3/4D) and the western portion of this unit. In this lot, the deposit contained 298 ceramic sherds, six whole *P. indiorum* shells, 51 whole *P. glaphyrus* shells, two *P. glaphyrus* shell fragments, two figurine fragments, and one crab claw fragment.

Unit 3/3E. This unit is situated at the center of the western edge of Structure 51. It contains a portion of the top three steps of the western stair running the entire length of Structures 51 and 52 (F. 3/1/2). We think that this stair continued up the western side of Structures 51 and 52 along their entire length, but no cut stones are in place. Unit 3/3E was excavated in two lots, Lots 3/3E/1 and 3/3E/2. Lot 3/3E/1 consists mainly of platform fill of large rubble stones and small stones within an O- and A-horizon matrix. A few jumbled cut stones from the west terrace stair and western side of Structure 51 (probably a continuation of the stair) remained in place. Nevertheless, it appeared that the majority of the western side of the platform slid down the steep terrace to the west of the mound. This lot contained seven pottery sherds, two whole *P. indiorum* shells, two whole *P. glaphyrus* shells, one groundstone fragment (either a mano fragment or a metate leg), and one miscellaneous marine shell.

The second lot, Lot 3/3E/2, is composed of the material removed during the final clearing and resetting of F. 3/1/2. Only six ceramic sherds were recovered within this lot.

Suboperation 3/4

Suboperation 3/4 is an East-West axial excavation through the Structure 51 superplatform fill located adjacent to and north of Suboperation 3/3. This suboperation contains the remains of five features, F. 3/1/2, F. 3/2/1, F. 3/4/1, F. 3/4/2 and F. 3/4/3 (Figure 3.7). A portion of F. 3/1/2 was exposed in F. 3/1/2 within Unit 3/4E. F. 3/2/1 was exposed in Unit 3/4A. Suboperation 3/4 also fully encompasses F. 3/4/1, the north-facing wall of the Structure 51 superplatform encountered in units 3/4B, 3/4C, 3/4D, and 3/4E. Additionally, the remains of the east wall of the Structure 51 superplatform were uncovered in this suboperation within Unit 3/4B (and 3/3B). This feature is the most well preserved portion of the wall and Unit 3/4B contains its articulation with the north wall of the superplatform (F. 3.4.1). Due to poor preservation toward its southern extent, it is unclear if this feature extended all the way to the F. 3/1/1 vertical south wall of the Structure 51 basal platform or if it terminates north of the feature. Finally, a portion of the platform fill retaining stones set directly on bedrock (F. 3/4/2) is encountered in Unit

3/4B. Both clearing and penetrating excavations were employed over 6 units (Units 3/4Z, 3/4A, 3/4B, 3/4C, 3/4D, and 3/4E) within this suboperation in order to expose the architecture and understand the construction history of Structure 51.

Unit 3/4Z. Unit 3/4Z is a 1-m (East-West) x 2-m (North-South) unit situated on the east side of Structure 51 at the base of the stair (F. 3/2/1) and over the plaza floor of Plaza VII. This unit was excavated in two lots, Lots 3/4Z/1 and 3/4Z/2, with the purpose of understanding the articulation of the plaza level with the architecture of Structure 51. Due to its location off the Structure 51 mound, the unit did not contain any architectural features. Lot 3/4Z/1 consists of the removal of the surface material composed of O- and A-horizon soils. We terminated excavation at the level of the ballast fill of the plaza subfloor. We found no indication of a prepared plaster floor, which most likely disintegrated from wet conditions and root action. The cultural material recovered from this lot includes 34 ceramic sherds and three pieces of chert.

Lot 3/4Z/2 is the final clearing of the material under the fallen cut stones from the east stair of Structure 51. This material consists of the “pedestal” material under the fallen stones, but above the level of the plaza subfloor, thus it is not much different than that from 3/4Z/1. One chert piece and 23 ceramic sherds were recovered from this lot.

Unit 3/4A. Unit 3/4A is located along the northern extension of F. 3/2/1, approximately 6-m north of its southern extreme. This unit was excavated in two lots, Lots 3/4A/1 and 3/4A/2. The first lot, Lot 3/4A/1, consists of the clearing of the surface material to expose the east stair of Structure 51. This section of F. 3/2/1 is poorly preserved due to looting activities concentrated in Suboperation 3/5. The stair is heavily slumped, therefore, some of the material removed came from the platform fill behind the east stair. This material included O- and A-horizon soils mixed with small stones. The artifacts recovered from this lot include 14 ceramic sherds and one groundstone fragment (likely from a metate).

Lot 3/4A/2 consists of the final cleaning of the stair during resetting of the stair. Like the material from Lot 3/4A/1, most material is from slumped fill and a disturbed context. Nine pottery sherds and one piece of chert are all that we recovered from this lot.

Unit 3/4B. Unit 3/4B was excavated in a single lot, Lot 3/4B/1. The unit is located along the northeast corner of the Structure 51 superplatform. The lot consisted of excavating from the surface through the small stone fill of the Structure 51 platform. The material removed from this lot is composed of surface organic material, small stone fill, and O- and A-horizon soils. This lot yielded 50 ceramic sherds, one piece of obsidian, three pieces of chert, one whole *P. glaphyrus* shell, and two figurine fragments. At the northern end of this unit, we discovered the platform fill to be disturbed by a looter’s trench located just to the north in Suboperation 3/5. This lot exposed the northeast corner of the Structure 51 superplatform including the easternmost extreme of its north-facing wall (F. 3/4/1). The east-facing wall of the superplatform (F. 3/4/3) was exposed for a distance of approximately 2.3 m in Units 3/4B and 3/3B (Figure 3.7). The east-facing wall contains four courses of stones, with well-shaped corner stones at its northeast corner. It appears to end in Unit 3/3B, but this is because it was destroyed further to the south. The wall, built, directly on large stone fill, is more or less flush with the east stair. This may have been caused by settling of the fill on which the wall is built. It is also possible that the superplatform wall once had a sixth course.

Unit 3/4C. Unit 3/4C encompasses the area located along the north-facing wall, approximately 3-m east of the western edge of Structure 51 and approximately 4-m north of the south wall of Structure 51. This north-facing wall, F. 3/4/1, is located along the very northern edge of the unit, therefore most of the unit is composed of platform fill of the Structure 51 superplatform. A large tree with many roots disturbed the fill toward the southern end of this unit. This unit was excavated in three lots, Lots 3/4C/1, 3/4C/2, and 3/4C/3, which are analogous to the lots excavated in Unit 3/3C, 3/3D and 3/4D. The first lot, Lot 3/4C/1, consists of the clearing of the surface organic material and small stone fill down to the level of the boulder fill within the Structure 51 superplatform. We also exposed the north-facing wall of this feature (F. 3/4/1) (Figure 3.8). Thirty-five pottery sherds, one piece of chert, two whole *P. glaphyrus* shells, and one groundstone fragment (possibly from a metate) were recovered from this lot.

Lot 3/4C/2 represents the removal of the large rubble fill stones within the superplatform and terminates at the level of the dense deposit of artifacts first encountered in Unit 3/3C. This is largely dry fill with a very little A-horizon soil that likely sifted down from the small fill layer. The fill consists of large, flat bedrock boulders stacked up in a manner approximating an informal wall. Most of the artifacts were drawn from the bottom of this level and should be considered as consistent with the Lot 3/4C/3 context. We recovered 146 pottery sherds, two pieces of chert, four whole *P. indiorum* shells, ten whole *P. glaphyrus* shells, and one figurine fragment within this lot.

The final lot, Lot 3/4C/3, is the removal of the dense concentration of artifacts laid above bedrock. These artifacts were recovered from dense, ochre-colored sand of the C-horizon soil eroded from the underlying bedrock. This layer is below the outside (east side) ground level because the bedrock slopes downward to the west. This midden deposit contained 349 ceramic sherds, one piece of obsidian, five whole *P. indiorum* shells, 53 whole *P. glaphyrus* shells, four figurine fragments, and one animal vertebrae.

Unit 3/4D. This unit is located along the north-facing wall of the Structure 51 superplatform, approximately 1-m east of the western edge of Structure 51. The north wall of the Structure 51 superplatform, F. 3/4/1, was encountered along the northern edge of the unit. This unit was excavated in three lots, Lots 3/4D/1, 3/4D/2, and 3/4D/3, which are analogous to the lots excavated in Units 3/3C, 3/3D, and 3/4C.

The first lot, Lot 3/4D/1, consists of the removal of the surface material and small platform fill and concludes at the level of the large rubble fill. In this lot we also exposed the face of F. 3/4/1, which consists of four courses of stones stacked vertically and facing north. The cultural materials recovered from this lot include four ceramic sherds, two pieces of chert, and one groundstone fragment (likely from a metate).

Lot 3/4D/2 involved the removal of the boulder fill, which terminated at the dense concentration of artifacts within C-horizon soils. The fill consists of large, flat, loose stones with little soil. The artifacts collected from this lot include 55 ceramic sherds, one human bone (possibly a scapula fragment), three whole *P. indiorum* shells, and three whole *P. glaphyrus* shells.

Finally, Lot 3/4D/3 consisted of the clearing of the dense deposit of artifacts within dense, yellow ochre sand C horizon lain directly atop bedrock. This deposit is below the plaza level east of Structure 51 and hence related to the construction of Plaza VII. A line of two cut stones was found at the very bottom of the unit passing south into Unit 3/3D (F. 3/4/2) (Figure 3.4). These stone likely functioned to retain the large rubble

fill and prevent it from sliding down the steep slope directly to the west. The concentrated deposit of artifacts included: 380 pottery sherds, one piece of obsidian, two whole *P. indiorum* shells, two whole *P. glaphyrus* shells, three figurine fragments, and one deer horn.

Unit 3/4E. Unit 3/4E was placed along the west side of Structure 51 and approximately 6-m north of the southwest corner of Structure 51. This corner is the articulation of feature F. 3/4/1, the north-facing wall of the Structure 51 superplatform and F. 3/1/2, the top 3 steps of the western stair running the entire North-South length of Structures 51 and 52. This unit was excavated in two lots, Lots 3/4E/1 and 3/4E/2. Lot 3/4E/1 consisted of the removal of the surface material to expose the western edge of Structure 51, the stair to the creek (F. 3/1/2), and the westernmost extension of the north-facing wall of the Structure 51 superplatform (F. 3/4/1). Feature F. 3/1/2 is very poorly preserved in this unit. Most of the cut stones likely slid down the steep west terrace. The artifacts recovered from this lot include seven ceramic sherds, four pieces of chert, and one whole *P. glaphyrus* shell.

The materials recovered from Lot 3/4E/2 were removed during the course of resetting the remains of the west stair of Structure, F. 3/1/2. This lot consists of platform fill within which just one figurine fragment was recovered.

Suboperation 3/5

Suboperation 3/5 was placed adjacent and north of Suboperation 3/4 along the East-West axial transect immediately north of the north-facing wall of the Structure 51 superplatform. We employed clearing excavations within Units 3/5Z, 3/5A, 3/5B, 3/5C, 3/5D, and 3/5E in order to expose the remaining architecture of Structure 51 including Features F. 3/1/2 and F. 3/2/1. These are present, respectively, in Units 3/5E and 3/5A. This is the last rather arbitrarily assigned suboperation of Structure 51, although our excavations revealed that the original Structure 51 basal platform extended into Suboperation 3/7 where it terminated in a north-facing stair (F. 3/7/2). On all maps of Lubaantun, the looting trench that runs through Suboperation 3/5 is marked as separating two distinct platforms, so we are using that distinction here. Nonetheless, we stress that our excavations reveal that Suboperations 3/6 and 3/7 could be included with the rest of Structure 51, because they pertain to the same construction phase.

Unit 3/5Z. The easternmost unit of Sub-Op. 3/5, Unit 3/5Z, is located at the base of the east-facing Structure 51 stair approximately 6-m north of the south-facing wall of the platform. We excavated it in a single lot, Lot 3/5Z/1. This lot consists of the surface material over the level of the plaza, which was excavated with the goal of determining if Plaza VII (east of Structure 51) was finished with a prepared plaster floor. No architectural features were uncovered within this unit. The poor preservation of the area, due to wet conditions and root action, has erased all traces of a plaster finish. We excavated down to the small ballast fill of the subfloor. The cultural materials collected include 14 ceramic sherds and one miscellaneous shell.

Unit 3/5A. Unit 3/5A is located along the northern portion of the Structure 51 platform stair (F. 3/2/1) about 6-m north of the south-facing wall of the platform. This unit includes an extremely poorly preserved portion of F. 3/2/1, the eastern stair of Structure 51. This stair was destroyed during a past looting event that probably targeted

tombs or caches thought to be located on the central axis of the Structure 51/52 platform. Nonetheless, there is no evidence remaining to indicate that the looters were successful in their quest. In fact, axial caches and tombs seem to be lacking at Lubaantun (Hammond 1975). This unit was excavated in two lots, Lots 3/5A/1 and 3/5A/2. The first of these lots, Lot 3/5A/1, involved the removal of the surface material to expose the remains of Feature 3/2/1, which is comprised of a few jumbled cut stones among many large rubble stones visible from the surface. Twelve ceramic sherds were collected from this lot.

Lot 3/5A/2 entailed the final cleaning and resetting of stones in this very disturbed section of the eastern stair of the Structure 51 basal platform. In this lot, we recovered just two pottery sherds.

Unit 3/5B. This unit encompasses the area directly north of the Structure 51 superplatform, approximately 2-m west of the east stair of the basal platform. It was excavated in a single lot, Lot 3/5B/1, which was sterile of cultural materials. This lot consists of clearing surface material and mixed small stone fill and large rubble fill of the Structure 51 basal platform. The mixed context is a result of the disturbance by looters.

Unit 3/5C. This unit is situated directly north of the north wall of the Structure 51 superplatform. It was excavated in two lots, Lots 3/5C/1 and 3/5C/2. Lot 3/5C/1 involved clearing platform fill composed of small stones and O- and A-horizon soils in order to expose the northern face of the north wall of the Structure 51 superplatform (F. 3/4/1). Upon excavation, we encountered numerous jumbled cut stones slumped from this feature as a result of root action from a tree located just to the south of the unit. We collected the following artifacts from this lot: 25 ceramic sherds, one piece of obsidian, six chert pieces (including one chert biface fragment), and one whole *P. glaphyrus* shell.

The second lot, Lot 3/5C/2, yielded material from a context more or less the same as Lot 3/5C/1. This lot was excavated with the goal of determining the base of the Structure 51 superplatform. Here, we removed disturbed platform fill in order to expose the bottommost course of F. 3/4/1. Three pieces of ceramics, two fragments of obsidian, one chert fragment, one whole *P. indiorum* shell, and three whole *P. glaphyrus* shells were collected from this lot.

Unit 3/5D. Unit 3/5D is located directly north of the Structure 51 superplatform toward its westernmost extension. The goal of this unit was to fully expose the face of Feature 3/4/1. This unit was excavated in three lots, Lots 3/5D/1, 3/5D/2, and 3/5D/3. The first lot, Lot 3/5D/1, consisted of removing the disturbed Structure 51 platform fill to the base of the bottommost course of stones of Feature 3/4/1. The fill was composed of small stones mixed with O- and A-horizons soils. The artifacts collected from this lot include 40 ceramics sherds, two pieces of obsidian, six pieces of chert, and two groundstone fragments (likely from metate artifacts).

Lot 3/5D/2 consists of the materials recovered during the course of straightening and resetting the cut stones of F. 3/4/1. The matrix was little different from the platform fill encountered in Lot 3/5D/1. A single ceramic sherd and one *P. glaphyrus* shell fragment constitute all the artifacts collected from this lot.

Excavation of the final lot, Lot 3/5D/3, involved the removal of the boulder fill of the Structure 51 basal platform terminating at the level of the topmost stair of the west terrace stair (F. 3/1/2). This lot was excavated in order to determine if there was a surface corresponding to the Plaza VII level to test the theory that the north wall of the Structure 51 superplatform marked the northern extent of the first construction phase of the

platform. The large fill stones continue to bedrock without any evidence of plaza subfloor ballast. Nor did we find any evidence of a prepared floor surface extending from the west stair along the base of the north wall of the Structure 51 superplatform. Thus, we concluded that the low saddle in Suboperation 3/5 was, indeed, a looter's trench rather than a passageway between separate platforms for Structure 51 and 52. Moreover, the lack of a floor separating the platform from the plaza allows us to conclude that the Structure 51/52 platform was built during the same construction episode as the plaza. The cultural materials recovered from this lot include 12 ceramic sherds, two pieces of chert, and one figurine fragment.

Unit 3/5E. Unit 3/5E encompasses the area immediately north of and including the northwest corner of the Structure 51 superplatform. The corner marks the point of articulation of the north-facing wall of the Structure 51 superplatform (F. 3/4/2) and the west terrace stair (F. 3/1/2). This unit was excavated in two lots, Lots 3/5E/1 and 3/5E/2. The excavation of Lot 3/5E/1 consisted of the removal of the surface organic material in order to expose the slumped west terrace stair. This portion of the western stair is well preserved, and all three of the top steps are place (we did not excavate further down the stair). We recovered only five ceramic sherds from this lot.

Our excavation of Lot 3/5E/2 entailed cleaning and leveling the three courses of the western terrace stair prior to resetting the stones. Much of the matrix is slumped fill from the Structure 51 platform. We collected two ceramic sherds and one whole *P. indiorum* shell in this lot.

STRUCTURE 52

To the north of Structure 51 is Structure 52, a North-South oriented range structure. To the east of this structure is the southwest corner of Platform 84 and to the north is a small, unnamed plaza. Immediately to the west is a steep, faced terrace wall leading to the creek. Investigations of Structure 52 began with the horizontal clearing of the terminal architectural phase of the structure, which is composed of a basal platform and a masonry superplatform. These excavations revealed that Structure 52 was a later addition constructed sometime after Structure 51 had been completed and built on top of the plaster floor of the Butterfly Plaza. Investigations continued with a penetrating excavation within the Structure 52 superplatform. The goals of these excavations were identical to those of the Structure 51 excavations: (1) to recover diagnostic chronological markers to define the construction chronology of the structure; (2) to reveal and understand the construction and use history of the building; and (3) to gather and analyze cultural material objects in association with the structure.

The grid laid out over Structure 51 was continued northward over Structure 52 creating a total of thirty-five 2-m (North-South) by 2-m (East-West) units and five 2-m (North-South) by 1-m (East-West) units arranged across the structure. Each East-West strip of units was assigned a suboperation numbers (including Suboperations 3/6 to 3/12) and each North-South strip of units was assigned a letter. From East to West, these are Z and A-E. In sum, the same grid used for Structure 51 was extended to the north.

Suboperation 3/6

Suboperation 3/6 extended from East to West and was placed just north of Suboperation 3/5, approximately 2-m north of the north-facing wall of the Structure 51 superplatform. Clearing excavations were undertaken within Units 3/6Z, 3/6A, 3/6B, 3/6C, 3/6D, and 3/6E in order to expose the terminal architecture of Structure 52. This architecture includes a portion of the west terrace stair (F. 3/1/2) in unit 3/6E and a portion of the east stair of Structure 52 (F. 3/2/1) in unit 3/6A. Excavation consisted of exposing the fill of the basal platform of Structure 51. Due to its proximity to the looters trench located in the eastern extension of Suboperation 3/5, the southern portions of this suboperation are heavily disturbed, particularly in Units 3/6A and 3/6B. Units 3/6B, 3/6C and 3/6D were not excavated because of the looting. Unit 3/6A was excavated in order to see if any of the east stair of Structure 51 was preserved.

Unit 3/6Z. Unit 3/6Z is located approximately 50-cm east of Structure 52 and 10-m south of the northeast corner of the platform annex. No architecture (except plaza floor ballast) was encountered during excavation because it is east (in front) of the structure and in Plaza VII. This unit was excavated in a single lot, Lot 3/6Z/1, which consisted of clearing the surface material and plaza fill down to bedrock. We did not encounter any evidence of a prepared plaster floor, however, we did find the small stone ballast fill of the plaza subfloor before terminating the lot at the level of bedrock, which we exposed within 15 cm of the surface level. The artifacts collected from this lot include 16 ceramic sherds, four pieces of chert and one groundstone fragment (likely from a metate).

Unit 3/6A. Unit 3/6A is located at the southeast corner of Structure 52, approximately 10-m south of the northeast corner of the structure. It contains the northern extreme of the original east stair of Structure 51 (F. 3/2/1), which terminates just to the north within Unit 3/7A. This unit was excavated in two lots, Lots 3/6A/1 and 3/6A/2. Lot 3/6A/1 involved the removal of the surface organic material to expose the east stair of Structure 51. This portion of F. 3/2/1 is disturbed due to looting activities that focused mainly on Suboperation 3/5. Excavation revealed that the base of this portion of F. 3/2/1 was built directly on top of bedrock without a layer of small stone ballast fill. We collected 21 ceramic sherds and one pieces of chert from this lot.

Excavation of Lot 3/6A/2 entailed clearing material in front of and behind the slumped stair stones prior to their resetting. Much of the material is from the platform fill behind the stair, however, due to the slumped and destroyed nature of the stair in this area, some of the material may come from the outside of the building. A single ceramic sherd and one groundstone fragment (possibly from a metate) were recovered from this lot.

Unit 3/6E. Unit 3/6E is located along the west terrace stair (F. 3/1/2) just south of its articulation with Feature 3/7/1, the original north stair of the Structure 51 basal platform. This unit was excavated in a single lot, Lot 3/6E/1, which consisted of the removal of surface material from the stair in order to expose the architecture as well as the removal of a small portion of the platform fill during the course of resetting this feature. The stair is well preserved in this area with little slump. We recovered no artifacts.

Suboperation 3/7

Suboperation 3/7 encompasses the area adjacent to and north of Suboperation 3/6, less than 1-m south of the south-facing wall of the Structure 52 superplatform. It contains Feature 3/7/2, the original north-facing stair of Structure 51, which joins with F. 3/2/1, F. 3/7/1, and F. 3/1/2 (see Figures 3.4, 3.6, and 3.7). This feature appears in Units 3/7A, 3/7B, 3/7C, 3/7D, and 3/7E. Although we arbitrarily limited Structure 51 to Suboperations 3/1 through 3/5, this feature provides strong evidence that the Structure 51 platform actually extends into Suboperation 3/7. The Feature 3/7/2 stair on the north side of the original Structure 51 platform represents a 90 degree turn in the F. 3/2/1 stair. Put another way, both the eastern and northern sides (and probably the destroyed western side, as well) consisted not of vertical walls, but of four steps leading to the summit of Structure 51. Only the south side of the platform, which provided a corridor of access between the Butterfly Plaza and the stair leading to the creek, has a vertical wall.

We exposed the northernmost extreme of the F. 3/2/1 in unit 3/7A, where it also articulates with F. 3/7/1, the eastern stair of Structure 52. This later feature was built on and against the F. 3/2/1 stair as part of the annex that constitutes the platform on which the Structure 52 superplatform was built. F. 3/7/1 stretches North-South from Suboperation 3/7 to Suboperation 3/11. Finally, we also exposed a portion of the F. 3/1/2 western stair within Unit 3/7E.

Unit 3/7Z. Unit 3/7Z is situated approximately 50-cm east of Structure 52 and about 8-m south of the northeast corner of the structure. Lot 3/7Z/1 was the only lot excavated within this unit, which consisted of the clearing of the surface material above the plaza level as well as subfloor ballast. This unit was excavated with the goals of exposing any fallen cut stones from the east stair of Structure 51 (F. 3/2/1) and of determining how Plaza VII articulated with the architecture of Structure 51. No prepared plaster floor was observed, however, we uncovered a thin layer of small stone ballast of the plaza subfloor. The lot terminated at the level of bedrock, which we encountered just 10 cm below the surface level. We recovered a single ceramic sherd and three pieces of chert during the excavation of this lot.

Unit 3/7A. Unit 3/7A is located along the east stair of Structure 51, approximately 8-m south of the northeast corner of the structure. It contains the northernmost extension of the east stair of Structure 51 (F. 3/2/1) as well as the juncture of this feature with F. 3/7/1, the eastern stair of Structure 52 annex. Additionally, this unit is the locus of the articulation of F. 3/2/1 with F. 3/7/2, the original north-facing stair of Structure 51, which together form the northeast corner of Structure 51. The unit was excavated in two lots, Lots 3/7A/1 and 3/7A/2.

The first lot, Lot 3/7A/1, consisted of clearing the surface material in order to expose the slumped remains of F. 3/2/1. The matrix was composed of O- and A-horizon soils mixed with small stones. During excavation we encountered the northernmost extension of the east stair of Structure 51 and uncovered the original northeast corner of the structure, where the east stair (F. 3/2/1) articulates with the original north stair (F. 3/7/2) of Structure 51. This feature was buried when the Structure 52 annex platform was added. Remains of preserved plaster are visible on the face of Feature 3/7/2. Together these discoveries confirm that Structure 52 was constructed after the completion of

Structure 51 and was built as a northern extension of the Structure 51 basal platform architecture. Just one whole *P. glaphyrus* shell was recovered from this lot.

Excavation of Lot 3/7A/2 consisted of removing the material cleared in the course of resetting the east stair of Structure 51. A-horizon soils, small slumped fill stones and the slumped facing stones of the eastern stair were removed during excavation. Within this lot we collected 19 ceramic sherds, two pieces of chert, one *P. indiorum* shell, seven whole *P. glaphyrus* shells, and one figurine fragment.

Unit 3/7B. Unit 3/7B is located approximately 2-m west of the east stair of Structure 51 basal platform and approximately 10-m south of the northeast corner of the Structure 52 platform. This unit contains a portion of F. 3/7/2, the north-facing original stair of Structure 51. Excavation of Lot 3/7B/1 consisted of removing the surface material, composed of O- and A-horizon soils, in order to expose the slumped south wall of the Structure 52 superplatform (F. 3/8/1). We terminated the lot at the level of the bottommost course of stones in this feature. The south superplatform wall retained three courses of stones in their place—many with traces of plaster on their faces—and the many fallen cutstones indicate that the Structure 52 superplatform was at least five courses high. Additionally, we exposed the tops of the uppermost course of stones of the northern stair of Structure 51 (F. 3/7/2). We collected a single ceramic sherd, one piece of obsidian, two whole *P. indiorum* shells, and 2 whole *P. glaphyrus* shells in the lot.

Unit 3/7C. This unit is located approximately 4-m west of the east stair of Structure 52 and approximately 10-m south of the north wall of the structure. This unit was excavated in one lot that removed the surface material, composed of O- and A-horizon soils and slumped stones, in order to expose the south face of the south wall of the Structure 52 superplatform (F. 3/8/1). We also cleared the top of the original north stair of Structure 51 (F. 3/7/2). We terminated the lot at the level of the bottom course of stones of F. 3/8/1, where we encountered a poorly preserved, but intact plaster floor on top of the annex platform. In this unit, F. 3/8/1 retained four courses of stones, which also retained preserved patches of plaster on their faces. Finally, we exposed the top of the topmost course of stones of F. 3/7/2. Within this lot, we collected two ceramic sherds and two pieces of chert, including a tanged point.

Unit 3/7D This unit is located directly south of the southwest corner of the Structure 52 superplatform. It was excavated in just one lot, Lot 3/7D/1, which consisted of removing O- and A-horizon soils in order to expose the face of the westernmost extension of the slumped south wall of the Structure 52 superplatform (F. 3/8/1) and the top of the original north stair of Structure 51 (F. 3/7/2). We also encountered an additional patch of the poorly preserved but intact plaster floor on top of the annex platform, as we had in Lot 3/7C/1. In all, a single ceramic sherd and four whole *P. glaphyrus* shells were recovered from this lot.

Unit 3/7E. Unit 3/7E is located along the west stair of the Structure 52 platform, approximately 8-m south of the northwest corner of the platform. It includes the westernmost extension of the original north stair of Structure 51 (F. 3/7/2) where it articulates with the western terrace stair beneath Structure 51 (F. 3/1/2). This unit was excavated in two lots, Lot 3/7E/1 and Lot 3/7E/2.

During the excavation of Lot 3/7E/1, we removed O- and A-horizon soils in order to expose the slumped face of F. 3/1/2 and the topmost stones of the western extension of

F. 3/7/2. The excavation of this lot exposed the point of articulation of these two features. Artifacts recovered from this lot include 13 ceramic sherds and six pieces of chert.

Excavation of Lot 3/7E/2 consisted of removing the A-horizon soils and platform fill cleared during the resetting of F. 3/1/2. We collected 37 ceramic sherds during the excavation of this lot.

Suboperation 3/8

Suboperation 3/8 is an East-West line of units located immediately north of Suboperation 3/7 and along the south-facing wall of the Structure 52 superplatform. It contains the remains of four features: (1) a 2-m stretch of the west terrace stair (F. 3/1/2) located in Unit 3/8E; (2) the south wall of the Structure 52 superplatform (F. 3/8/1) extending through Units 3/8B, 3/8C, and 3/8D (Figures 3.7 and 3.11); (3) the southeast corner of the Structure 52 superplatform, including the southern extension of the east wall of the Structure 52 superplatform (F. 3/8/2) situated in Unit 3/8B (Figure 3.7); and (4) the southern extension of F. 3/7/1, the east stair of Structure 52 located within Unit 3/8A. As part of this suboperation, we conducted clearing excavations of Units 3/8Z through 3/8E and penetrating excavations of the interior of the Structure 52 superplatform within Units 3/8B and 3/8C.

Unit 3/8Z. Unit 3/8Z is located approximately 50-cm east of the east stair of Structure 52 (F. 3/7/1) and approximately 6-m south of the northeast corner of the Structure 52 basal platform. This unit was excavated in one lot that consisted of the removal O- and A-horizon soils in order to expose the level of Plaza VII. The lot terminated at the level of bedrock, which we encountered less than 8 cm below the surface level. We did not encounter any evidence of a plaster plaza floor in this lot, and there was little trace of the subfloor ballast encountered to the east of the Structure 51/52 basal platform in Suboperations 3/1 through 3/7. The artifacts recovered from this lot include 70 ceramic sherds, ten pieces of chert, one whole *P. indiorum* shell, and one unidentified *jute* fragment.

Unit 3/8A. Unit 3/8A is located along the east stair of Structure 52 approximately 6-m south of the northeast corner of the Structure 52 basal platform. It includes a portion of F. 3/7/1, the eastern stair of Structure 52, which although in slumped condition had all four steps preserved in this unit. This unit was excavated in two lots, Lot 3/8A/1 and Lot 3/8A/2.

Excavation of Lot 3/8A/1 consisted of clearing the thin O- and A-horizon surface materials from the surface of the slumped east stair of Structure 52 (F. 3/7/1). We recovered the following artifacts from this lot: 18 ceramic sherds, four pieces of chert, one whole *P. indiorum* shell, six whole *P. glaphyrus* shells, two *P. glaphyrus* shell fragments, and one groundstone fragment (possibly a *mano* fragment).

Excavation of the second lot of this unit, Lot 3/8A/2, consisted of removing slumped and fallen platform fill (including A-horizon soil) prior to resetting F. 3/7/1. Soils and fill below the fallen stones exposed during the excavation of Lot 3/8A/1 were also cleared. Together, these contexts yielded just ten ceramic sherds.

Unit 3/8B. This unit is located at the southeast corner of the Structure 52 superplatform. It includes the corner of the superplatform formed by the articulation of F. 3/8/1, the south-facing wall of the superplatform, and F. 3/8/2—the east-facing wall of

the superplatform. Additionally, this unit includes an area of fill on the eastern exterior of the superplatform. The unit was removed in 5 lots. The first lot, Lot 3/8B/1, represents the material removed during the clearing of the terminal phase architecture and the remaining 4 lots—Lots 3/8B/2, 3/8B/3, 3/8B/4, and 3/8B/5—were removed during the course of penetrating excavations within the area bounded by the superplatform walls (see Figure 3.10).

Lot 3/8B/1 included the removal of surface O- and A-horizon soils from the eastern and southern faces of the Structure 52 superplatform. This lot is the southern analog of lot 3/9B/1. It includes all the material from the surface directly east of and including the Structure 52 superplatform. We ended this lot at the level of the first course of stones of the Structure 52 superplatform (F. 3/8/2) along the western edge of the unit, and at the top of the east stair of Structure 52 in the eastern portion of the unit. The east-facing superplatform wall of Structure 52 (F. 3/8/2) retained two courses of stones in place. Artifacts recovered in this lot include three ceramic sherds and two whole *P. glaphyrus* shells.

The first lot of our vertical excavation of this unit, Lot 3/8B/2, consisted of the removal of surface O-horizon soils and the small stone ballast mixed with A-horizon soil within the walls of the Structure 52 superplatform. The lot concluded at the base of the small stone fill that covered a layer of large stone fill. The lot is limited to the top (inside) of the Structure 52 superplatform. The small stone fill represents the ballast for the final floor of the superplatform. In this corner of the Structure 52 superplatform, the layer of small stone ballast fill is much deeper than in the other three analogous units excavated within the Structure 52 superplatform. In Lots 3/9B/2, 3/9C/2, and 3/8C/2, we encountered the large fill layer at a shallower depth. The artifacts recovered during the excavation of Lot 3/8B/2 include just four ceramic sherds.

Lot 3/8B/3 entailed the excavation of the large stone fill within the Structure 52 superplatform. This fill layer was comprised of large, amorphous fill stones in a matrix of A-horizon soils combined with either B-horizon or some C-horizon soils. This lot commenced in the large fill of the Structure 52 superplatform, but continued below the first course of the Structure 52 superplatform into the small stone ballast of the Structure 52 basal platform floor. Thus, the lot—which spans both the top of the basal platform and the superplatform fill—contains material dating to the construction of both of these platforms. We did not find any trace of a preserved plaster floor, but plaster dust was found in Suboperation 9. The cultural materials recovered from this lot include two ceramic sherds, two pieces of chert, one stone ball fragment, and one figurine fragment. The stone ball fragment appears to be a third of a large limestone drilled bead approximately 15 cm in diameter. It was uncovered between the large fill layer of the Structure 52 superplatform and the underlying Structure 52 basal platform ballast. This location may indicate that this ball was purposefully deposited on the surface of the annex before the addition of the superplatform. The figurine, however, was recovered from the underlying ballast and was deposited before the superplatform was constructed.

Lot 3/8B/4 consisted of excavating the large fill stones from the Structure 52 platform annex. We closed the lot at the level of a well-preserved plaster floor that corresponds with the Plaza VII level (Figure 3.10). This demonstrates two things. First, the Butterfly Plaza did have a plaster floor, and that it is completely deteriorated where it has been left exposed to the elements. Second, the Structure 52 platform annex, unlike

the Structure 51 platform, was built after the plaza was completed and on top of its floor. The fill with the Structure 52 platform annex was composed of very neatly stacked large fill stones with remnants of A-horizon soil. There is no evidence of the use of mortar in the fill. No artifacts were recovered within this lot.

The final lot of this unit, Lot 3/8B/5, consisted of excavating through the plaster floor of Plaza VII beneath the Structure 52 annex to bedrock. During this excavation, we exposed the small stone ballast layer of the plaza floor. Buried A- and C-horizon soils were mixed with this ballast. The only artifact recovered in this shallow context is one whole *P. indiorum* shell.

Unit 3/8/C. Unit 3/8C is located on top of the Structure 52 superplatform with its northern edge forming the East-West axis of the superplatform. The southernmost portion of the unit includes a small area off (south of) the superplatform. This unit was subject to both horizontal and vertical excavations. Lot 3/8C/1 represents the material removed to expose the terminal phase architecture while the remaining four lots—Lots 3/8C/2, 3/8C/3, 3/8C/4, and 3/8C/5—were excavated as part of our penetrating excavation program.

Lot 3/8C/1 included the clearing of the surface layer above the ballast of the Structure 52 superplatform floor. This exposed the topmost course of stones of the south wall of the Structure 52 superplatform (F. 3/8/1). The lot is comprised mostly of O-horizon and a small amount of A-horizon soil. The artifacts recovered include four ceramic sherds and one piece of chert.

Lot 3/8C/2, entailed excavating the small-stone subfloor ballast fill mixed with A-horizon soil. This lot represents the excavation of the final, uppermost fill layer within the south-central portion of the Structure 52 superplatform. It terminated just above a layer of large stone fill. The artifacts recovered within this lot include five ceramic sherds and four pieces of chert.

Excavation of Lot 3/8C/3 consisted of removing the large fill stones within the superplatform of Structure 52. Small quantities of mixed A-horizon soils and either B-horizon or C-horizon soils were removed, but excavation mostly entailed lifting out large fill stones. This lot continued through the ballast floor level of the Structure 52 basal platform itself, and thus contains materials from two discrete construction phases: the construction of the Structure 52 basal platform annex and the construction of the Structure 52 superplatform. No traces of a plaster floor separating the superplatform from the ballast of the basal platform were observed. Artifacts recovered from the lot include one whole *P. glaphyrus* shell and one large conch shell. The conch shell was recovered in the large fill above the ballast subfloor of the annex platform at the base of the superplatform. It was deposited after the annex was built and when the superplatform was added. This artifact exhibits marks consistent with being broken for food rather than being left as a whole offering or used as a trumpet.

Lot 3/8C/4 represents the clearing of the large stone fill of the Structure 52 platform annex. The boulder dry fill contains only traces of an A-horizon matrix. This lot terminates at the level of a well-preserved plaster floor corresponding to the level of Plaza VII. No artifacts were recovered from this lot.

The final lot of this unit, Lot 3/8C/5, consisted of the removal of the plaster floor corresponding to the level of Plaza VII as well as the underlying ballast subfloor. The subfloor layer is composed of a mix of small stones with A-horizon and C-horizon soils.

Directly below this thin layer we encountered bedrock. Just one ceramic sherd was recovered from this lot.

Unit 3/8D. Unit 3/8D is located along the western wall of the Structure 52 superplatform immediately northwest of its southwest corner. It was excavated in a single lot that consisted of clearing the surface of O- and A-horizon soils with the goal of exposing what remained of the west wall of the Structure 52 superplatform (F. 3/9/3). This feature is extremely poorly preserved and is only represented by a few jumbled cut stones. It is likely that this wall succumbed to gravity and slid down the steep west terrace. Three ceramic sherds were all the artifacts collected in this lot.

Unit 3/8E. Unit 3/8E is located along the west stair of the Structure 52 basal platform (F. 3/1/2) approximately 6-m south of the northwest corner of the platform. This unit was excavated in two lots. Lot 3/8E/1 consisted of clearing surface O- and A-horizon soils and slumped stones to expose the west stair of the Structure 52 platform annex, which form the steps down to the western terrace. The top step was exposed as well as a rough retaining wall within the fill of Structure 52. The artifacts recovered within this lot are three ceramic sherds and one figurine fragment.

The second lot, Lot 3/8E/2, was excavated during the final clearing for resetting the west terrace stair (F. 3/1/2). Excavation consisted of removing the small stone fill and A-horizon soils of the Structure 52 basal platform that had slumped westward. No artifacts were recovered during the clearing of this lot.

Suboperation 3/9

Suboperation 3/9 is an East-West oriented excavation located directly north of Sub-Op. 3/8. It extends from the southwest corner of Platform 84 westward toward the western terrace and includes the northern half of the Structure 52 superplatform. This suboperation contains portions of six different features including: (1) F. 3/9/1, which consists of the two steps leading north from Plaza VII to the “upper plaza,” and that join the Structure 52 platform annex to Platform 84 (uncovered in Units 3/9A and 3/9Z) (Figures 3.4 and 3.10); (2) the east stair of the Structure 52 base platform (F. 3/7/1), located in Unit 3/9A; (3) the northernmost extension of the east wall of the Structure 52 superplatform (F. 3/8/2), found in Unit 3/9B; (4) the north wall of the Structure 52 superplatform (F. 3/9/2), located in Units 3/9B, 3/9C, and 3/9D (Figure 3.12); (5) the poorly preserved remains of the west wall of the Structure 52 superplatform (F. 3/9/3), located in Unit 3/9D; and finally (6) a portion of F. 3/1/2—the west terrace stair—was uncovered in Unit 3/9E.

This suboperation, like Suboperation 3/8, was excavated both horizontally and vertically. First, clearing excavations were employed in all the Suboperation 3/9 units to expose the terminal architectural phase of the Structure 52 basal platform and superplatform. Next, penetrating excavations were placed within the superplatform (in Units 3/9B and 3/9C) to better understand the construction history of the structure.

Unit 3/9Z and 3/9A. Units 3/9Z and 3/9A are located approximately 50-cm east of the eastern wall of the Structure 52 platform annex and approximately 4-m south of the northeast corner of the platform. These units were excavated together because there was very little material outside of Unit 3/9A to be excavated and the material recovered from each square comes from the same cultural context. These features in these units include

F. 3/7/1, the east stair of the Structure 52 platform, and F. 3/9/1. This second feature is a set of two steps oriented roughly perpendicular to F. 3/7/1. It articulates with both F. 3/7/1 and the western edge of Platform 84. This feature connects Plaza VII to a small plaza between Structure 52 and Platform 84 that leads to a small upper plaza north of Structure 52. The unit was excavated in two lots, Lots 3/9A/1 (which includes material from Unit 3/9Z) and 3/9A/2.

Excavation of Lot 3/9A/1 consisted of clearing surface soils in order to expose the east stair of Structure 52 platform (F. 3/7/1) and the two steps leading to the small, northern plaza (3/9/1). This lot also contains material from Unit 3/9Z, which was excavated with the goal of exposing the eastern extent of F. 3/9/1 where it joins the west face of the Structure 84 platform. These two lots were combined because, in essence, they are the same context. We encountered both O- and A-horizon soils among fallen cut stones and the slumped architectural features. Both F. 3/9/1 and the west wall of Platform 84 were constructed directly atop bedrock. By contrast, the east stair of the Structure 52 platform located north of F. 3/9/1 was constructed on top of fill. These data lead us to believe that the Structure 52 platform annex was built at the same time or after the construction of the small, northern plaza and after the construction of Platform 84. The artifacts recovered from this lot include 11 ceramic sherds, four pieces of obsidian, one piece of chert, seven whole *P. indiorum* shells, and two whole *P. glaphyrus* shells.

The second lot, Lot 3/9A/2, consists of the material cleared from below the fallen cut stones in the course of resetting the stones from F. 3/7/1. Excavated materials include A-horizon soils and small stone fill of the Structure 52 basal platform. The artifacts recovered from the lot include 29 ceramic sherds, two whole *P. indiorum* shell, two whole *P. glaphyrus* shells, and one whole sandstone *mano* broken into 2 fragments.

Unit 3/9B. Unit 3/9B is located at the northeast corner of the Structure 52 superplatform. During excavation of this unit, we removed soils and stones from within the bounds of the Structure 52 superplatform walls. The unit includes the articulation of the northern extent of the east wall of the superplatform (F. 3/8/2) with its north wall (F. 3/9/2). The unit was excavated in 6 lots—Lots 3/9B/1 to 3/9B/6—that ended at bedrock. The first of these lots was excavated as part of our clearing excavation strategy to reveal the final stage architecture. Lots 3/9B/2, 3/9B/3, 3/9B/4, and 3/9B/5 were penetrating excavations aimed at collecting information about the construction history of the structure (Figure 3.10). Finally, Lot 3/9B/6 represents material removed during the course of resetting the northeast corner of the Structure 52 superplatform.

During excavation of Lot 3/9B/1, we cleared O- and A-horizon soils from the surface of Unit 3/9B with the goal of exposing the slumped eastern and northern faces of the Structure 52 superplatform. We exposed the east wall of the superplatform (F. 3/8/2) down to the bottom of its first course. This feature still retained four courses of stones in place. We also partially exposed the north wall (F. 3/9/2) and the northeast corner of the Structure 52 superplatform, which contains five courses in place at its highest point. The architecture is well preserved and is of the stepped perpendicular style with the bottom two courses of stones flush with each other and the next row of two stones set back by approximately 10 cm. We recovered six ceramic sherds during the course of the clearing of this lot.

The second lot, Lot 3/9B/2 was our first penetrating excavation in this unit. It was approximately 1 m by 1 m in area because it is located within the walls of the

Structure 52 superplatform. Excavation entailed the removal of the small stone ballast of the Structure 52 superplatform subfloor. We closed the lot at the base of the ballast subfloor layer just above the level of the large stone fill of the superplatform. During excavation we encountered black A-horizon soils mixed with small fill stones, however, no artifacts were recovered in this lot.

Lot 3/9B/3 also was approximately 1-m by 1-m in area and is located within the Structure 52 superplatform walls. Excavation entailed removing the large stone fill of the Structure 52 superplatform above the original Structure 52 annex platform ballast subfloor. This lot started in the large stone fill of the superplatform, however, it mistakenly continued through the underlying ballast floor of the annex platform. A mix of A- and C-horizon soils was encountered with the large fill stones, however, most of the excavated mass consisted of large, crude stone dry fill. No artifacts were recovered during the excavation of this lot. At the base of this material we observed plaster dust that is likely the remnants of a prepared plaster floor covering the top of the Structure 52 platform before the addition of the Structure 52 superplatform. Therefore, the Structure 52 superplatform was constructed after the construction of the Structure 52 basal platform annex. This construction history is unlike that of the Structure 51 superplatform, which was built in a single episode along with the Structure 51 basal platform.

Excavation of Lot 3/9B/4 consisted of removing the large stone fill of the Structure 52 platform annex. Trace quantities of mixed A- and C-horizon soils were removed and screened. This lot concluded at the level of a well preserved plaster floor, which corresponds to the Plaza VII surface. This lot was sterile of cultural materials.

The final penetrating excavation, Lot 3/9B/5, entailed digging through the plaster floor and the underlying plaza fill. This fill consisted of small stone ballast mixed with A- and C-horizon soils, within which we recovered three ceramic sherds and one whole *P. indiorum* shell. Bedrock was encountered directly beneath the small stone fill.

Finally, excavation of Lot 3/9B/6 consisted of removing A- and O-horizon soils mixed with small stone ballast during the resetting of the east and north walls of the Structure 52 superplatform. We recovered three ceramic sherds in this lot.

Unit 3/9C. Unit 3/9C is located along the center of the north wall of the Structure 52 superplatform (F. 3/9/2) and extends southward into the fill of the superplatform. This unit was excavated in five lots—Lots 3/9C/1, 3/9C/2, 3/9C/3, 3/9C/4, and 3/9C/5. The first of these lots was a horizontal clearing excavation lot targeted at exposing the terminal architecture of the Structure 52 superplatform. By contrast, the remaining lots were removed during penetrating excavations aimed at understanding the construction history of Structure 52.

Excavation of the first lot, Lot 3/9C/1, consisted of clearing the surface to expose the face of the north wall of the Structure 52 superplatform (F. 3/9/2) (Figure 3.12). Like the east wall of the superplatform, Feature 3/9/2 was constructed according to the stepped perpendicular architectural style typical of many structures at Lubaantun. Although slumped, the wall was relatively well preserved with four courses of stones retained in their original positions. In this lot we encountered O- and A-horizon soils and recovered three ceramic sherds and one groundstone fragment (possibly from a *metate*).

Lot 3/9C/2 represents the excavation of the uppermost fill (subfloor ballast) of the Structure 52 superplatform and is the northern analog of Lot 3/8C/2. In this unit, the ballast layer was quite thin (approximately 10-20 cm deep) with a few deeper pockets. It

consists of an A-horizon soil matrix containing small stones. The fill was virtually sterile, containing only just ceramic sherd. Seven pieces of unworked chert were included probably as part of the ballast. We terminated the lot at the level of the large fill layer of the Structure 52 superplatform.

Excavation of Lot 3/9C/3 consisted of removing the large stone fill of the Structure 52 superplatform. Although this lot started in the basal layer of the superplatform, it mistakenly continued through the ballast floor layer of the Structure 52 platform annex. That is, it was dug through the large stones of the superplatform and intruded into the ballast subfloor of the underlying annex platform. Traces amounts of A-horizon soil were present around the boulder fill stones. The lot was virtually sterile: only one piece of unworked chert was recovered.

During excavation of Lot 3/9C/4, we removed the very neatly stacked large fill stones of the Structure 52 platform annex. Only small amounts of A-horizon soils were excavated as the fill was removed. We terminated the lot at the level of a well-preserved plaster floor. The floor corresponds to the Plaza VII floor east of Structure 52, as well as the floor at the base of F. 3/11/1, the set of 3 steps underneath the north wall of the Structure 52 basal platform. F. 3/11/1 led north to the small upper plaza (Figure 3.4). No artifacts were recovered in this lot.

The final lot, Lot 3/9C/5, represents the removal of the plaster floor corresponding to Plaza VII in order to excavate the underlying ballast fill. The ballast was composed of small stones mixed within an A- and C-horizon soil matrix. Bedrock was encountered directly beneath this small stone fill layer. We recovered three ceramic sherds from this shallow lot.

Unit 3/9D. This unit is located immediately southwest of the northwest corner of the Structure 52 superplatform. We excavated it in a single lot, Lot 3/9D/1. This lot represents the clearing of the surface O- and A-horizon soils and small stones in order to expose remains of the west wall of the Structure 52 superplatform (F. 3/9/3). Nonetheless, this wall was not preserved here, and we instead encountered large fill stones eroding out of the superplatform. The west wall of the superplatform likely slid down the steep west terrace. No artifacts were recovered in this lot.

Unit 3/9E. Unit 3/9E is located along the western edge of the Structure 52 basal platform approximately 4-m south of its northwest corner. It contains a portion of feature F. 3/1/2, the west terrace stair of the Structure 51/52 basal platform, and was excavated in two lots: Lots 3/9E/1 and 3/9E/2.

Excavation of Lot 3/9E/1 entailed clearing surface material to expose the west terrace stair of the Structure 51/52 platform (F. 3/1/2). This material consisted of an O- and A-horizon matrix containing small stones that slumped from the fill of the west edge of the superplatform. The excavation of this lot revealed a crude wall within the fill of the Structure 52 platform. This wall was likely designed to retain the weight of the platform fill and to prevent it from sliding down the steep west terrace. One sherd was found in this lot.

Lot 3/9E/2 consisted of the final clearing of soil and fill during the resetting of the western stair (F. 3/1/2). This material was composed of an A-horizon matrix and small fill stones. No artifacts were recovered.

Suboperation 3/10

Suboperation 3/10 is an East-West oriented excavation located just north of the north wall of the Structure 52 superplatform. Two features were encountered during excavation of platform fill: (1) F. 3/7/1, the east stair of Structure 52, was exposed in Unit 3/10A and a portion of F. 3/1/2; and (2) the west terrace stair of the platform was uncovered in Unit 3/10E.

Unit 3/10A. This unit is located to the east of the Structure 52 platform and to the west of the western edge of Platform 84. It includes an un-backfilled test pit excavated by Hammond during his 1970 investigations and left to collapse. Our excavation was conducted as a single lot, Lot 3/10A/1, representing the surface clearing down through fall, slump, and backdirt to reveal the final stage architecture. We exposed the top two steps of F. 3/7/1 down to the level of the “upper plaza”. We also exposed the west-facing wall of Platform 84 (located just to the east of Structure 52). The artifacts recovered in this lot include 16 ceramic sherds, six pieces of chert, and one groundstone fragment.

Unit 3/10B. Unit 3/10B is located immediately north of the north wall of the Structure 52 superplatform near its northeast corner. It was excavated in a single lot, Lot 3/10B/1, which consisted of removing surface material composed of O- and A-horizon soils and small stones. No features were encountered in this unit, however, the material cleared as this lot gave us room to expose the north wall of the Structure 52 superplatform (F. 3/9/2) in Unit 3/9B. The lot concluded at the level of the top of the Structure 52 annex platform just above the small stone ballast of the platform subfloor. The artifacts recovered from this lot include eight ceramic sherds, one piece of chert, and two whole *P. glaphyrus* shells.

Unit 3/10C. Unit 3/10C is located immediately to the north of the center of the north wall of the Structure 52 superplatform. This unit was excavated in a single lot, 3/10C/1. Excavation consisted of clearing to expose the north wall of the Structure 52 superplatform down to its base and the top of the Structure 52 annex platform. Excavated material consisted of slumped small stone fill within an O- and A-horizon matrix. The only artifact recovered from this unit is a piece of chert.

Unit 3/10D. This unit is situated immediately north of the north wall of the Structure 52 superplatform and approximately 2-m east of the west terrace stair. It was excavated in a single lot, Lot 3/10D/1, which consisted of cleaning the surface in order to expose the face of the north wall of the Structure 52 superplatform. The lot terminated at the top of the Structure 52 basal platform, which is composed of small stone subfloor ballast. Excavated materials include of O- and A-horizon soils mixed with small stones. No artifacts were found in the lot.

Unit 3/10E. Unit 3/10E is located along the top three steps above the western terrace (F. 3/1/2) at the west side of the Structure 52 platform. This unit was excavated in two lots, Lots 3/10E/1 and 3/10E/2. The first lot consisted of clearing the surface in order to expose the remaining architecture of the western edge of the Structure 52 platform and the stair leading down to the creek (F. 3/1/2). Excavated material consisted of O- and A-horizon soils mixed with small stones. A North-South oriented wall of at least three courses of slumped cut stones was observed in the eastern edge of the unit. One ceramic sherd and three pieces of chert were recovered from this lot.

The second lot, Lot 3/10E/2, was excavated during the course of resetting the west terrace stair (F. 3/1/2). Excavated materials consist of A-horizon soils mixed with small stones eroded out of the Structure 52 platform fill. No artifacts were collected in this lot.

Suboperation 3/11

Suboperation 3/11 is an East-West excavation located directly south of the north wall of the Structure 52 platform annex (F. 3/12/1). This suboperation contains four features: (1) the northernmost extension of the east stair (F. 3/7/1) is visible in Unit 3/11A; (2) the northernmost extension of the west terrace stair (3/1/2) was uncovered in unit 3/11/E; (3) F. 3/11/1, a stair containing three steps climbing north from the level of Plaza VII to the “little plaza” north of Structure 52, was exposed during penetrating excavations (Figure 3.4); and (4) F. 3/11/2, a short south-facing platform wall roughly perpendicular to F. 3/1/2 (Figures 3.4 and 3.13) was exposed in Unit 3/11F. This feature was exposed only in Unit 3/11D, however, it probably extends all the way to Platform 84. This stair was buried during the construction of the Structure 52 basal platform and represents an earlier construction phase.

Unit 3/11A. Unit 3/11A is located between the Structure 52 platform and Platform 84, near the northeastern extension of the Structure 52 platform. It was excavated in a single lot, Lot 3/11A/1, within slump, fall, and backdirt contexts. Excavation consisted of removing the surface material in order to expose the level of the upper little plaza. We exposed the remaining east stair of the Structure 52 platform (F. 3/7/1), however we did not find the cornerstone representing the northeast corner of the Structure 52 platform annex. It is likely that this corner was disturbed by a looter who was targeting corner caches in a manner similar to the disturbance encountered in Unit 3/1A. The remaining east stair is composed of three courses of stones. We also exposed the slumping west stair of Platform 84, just to the east of Structure 52. This unit included the backdirt from one of Hammond’s test pit from his 1970 excavations. We recovered 39 ceramic sherds, five whole *P. indiorum* shells, and three whole *P. glaphyrus* shells within this lot.

Unit 3/11B. Unit 3/11B is located 2-m north of the north wall of the Structure 52 superplatform approximately 2-m west of Platform 84. This unit was excavated in one lot, Lot 3/11B/1, which consisted of cleaning the surface. The original goal of this excavation was to expose the north wall of the Structure 52 platform annex, however, during the course of the excavations we determined that the remains of this feature (F. 3/12/1) were outside the margins of the unit. We then changed our excavation strategy for the unit and terminated the lot at the level of the top of the Structure 52 basal platform. The lot contained O- and A-horizon soils mixed with small stones. Just five ceramic sherds were collected from this lot.

Unit 3/11C. Unit 3/11C is located approximately 2-m north of the north wall of the Structure 52 superplatform and approximately 4-m west of Platform 84. It was excavated in a single lot, Lot 3/11C/1, which consisted of cleaning the surface of the platform fill of the Structure 52 basal platform. This lot concluded at the level of the base of the north wall of the Structure 52 superplatform, which corresponds to the top of the

Structure 52 basal platform. The material removed was a mix of O- and A-horizon soils with small stones. Within this unit we recovered one ceramic sherd and 2 chert artifacts.

Unit 3/11D. Unit 3/11D is located 2-m north of the Structure 52 superplatform and approximately 6-m west of Platform 84. Although the unit measures 2 m by 2 m, the material cleared in its only lot, Lot 3/11D/1, was removed from a 1-m (North-South) by 2-m (East-West) zone within the unit. This zone is located along the northern edge of the unit, mirroring lot 3/12D/1. The lot commenced with the removal of the surface O- and A-horizon soils in order to expose the fallen slumped stones of the north wall of the Structure 52 platform annex. The purpose of this lot was to ascertain the height of the north wall of the Structure 52 platform annex (F. 3/12/1) and to determine if this architectural feature took the form of a stair or a vertical wall. Instead of finding the north wall of the Structure 52 platform, which lies just north of the northern margin of the unit, we exposed a buried south-facing stair (F. 3/11/1). This feature is a three-step, south-facing (and northwards rising) stair running East-West. It leads to the upper “little” plaza to the north of Structure 52. At its base we found a well-preserved plaster floor that corresponds to the level of Plaza VII. We speculate that this feature likely articulates with Platform 84 in its eastern extreme and the west terrace in its western end. Nevertheless, excavations were not expanded to test this hypothesis. It is clear that this stair is part of an earlier construction phase that was buried in the course of constructing the Structure 52 platform annex. One ceramic sherd and one piece of chert were recovered during the clearing of this lot.

Unit 3/11E. The final unit in this suboperation, Unit 3/11E, is located along the northern extreme of the western terrace stair (F. 3/1/2), just south of its articulation with the north wall of the Structure 52 basal platform. The unit was excavated in two lots, Lot 3/11E/1 and 3/11E/2. The first of these lots consisted of the removal of the surface material in order to expose the west terrace stair (F. 3/1/2). The stair is well preserved here and we exposed three slumped steps. We removed O- and A-horizon soils that developed on the surface and probably slumped from the Structure 52 platform fill. We recovered one ceramic sherd, one piece of chert, and one whole *P. glaphyrus* shell in the course of excavating the lot.

Lot 3/11E/2 represents the material excavated during the course of resetting the west stair above the west terrace (F. 3/1/2). The material removed was composed mainly of platform fill, that is, a mix of A-horizon soil and small fill stones. No artifacts were recovered.

Suboperation 3/12

Suboperation 3/12 straddles the north wall of the Structure 52 platform annex and continues to the north. The north wall, F. 3/12/1, consists of four courses of stones set vertically (Figure 3.12). It was encountered in Units 3/12B, 3/12C, 3/12D, and 3/12D, but is missing in Unit 3/12A. It is presumed that this suboperation also contained the articulation of the northernmost extension of the east stair (F. 3/7/1) with F. 3/12/1, although this corner is also missing in Unit 3/12A. The corner formed by the west terrace stair (F. 3/1/2) and F. 3/12/1 was exposed in Unit 3/12E.

Unit 3/12A. Unit 3/12A is situated at the northeast corner of the Structure 52 basal platform. It is clear that this unit was the site corner of the north wall (F. 3/12/1)

and the east stair (F. 3/7/1) of the platform. Nonetheless, excavations did not reveal any remnants of this corner. We speculate that this corner, like the southeast corner of Structure 51 and much of the eastern portion of Sub-Op. 3/5, was heavily disturbed by looting activities. This unit was excavated in a single lot, Lot 3/12A/1, which commenced at the surface and terminated at the level of the “upper” plaza level. The material removed consisted of a mix of O- and A-horizon material with small fill stones, which likely slumped from the platform fill of Structure 52. No cultural materials were recovered during the excavation of this lot.

Unit 3/12B. Unit 3/12B is located along the north wall of the Structure 52 platform (F. 3/12/1), approximately 2-m east of the northeast corner of the platform. The unit was excavated in two lots, Lots 3/12B/1 and 3/12B/2. The first lot consisted of the excavation of the surface material and slumped fill from the surface in order to expose the fallen cut stones of the north wall of the Structure 52 platform annex (F. 3/12/1). The matrix encountered during excavation was a mix of O- and A-horizon soils with small stones. This lot contains two ceramic sherds, one piece of obsidian, and three pieces of chert.

Lot 3/12B/2 consisted of the final clearing of material during the course of consolidating F. 3/12/1, the north wall of the Structure 52 platform annex. This wall was reset as a vertical wall composed of four courses of stones. The only cultural materials recovered are seven ceramic sherds.

Unit 3/12C. Unit 3/12C is located along the central portion of the north wall of the Structure 52 platform (F. 3/12/1), approximately 4-m west of Platform 84. This is a 1-m (North-South) by 2-m (East-West) unit that was excavated in two lots, Lots 3/12C/1 and 3/12C/2. Excavation of Lot 3/12C/1 consisted of clearing the north wall of the Structure 52 platform annex. This feature was uncovered in a poorly preserved state with only one course of stones in place and another course fallen to the north. The material removed during the excavation of this lot was a mixture of O- and A-horizon soils mixed and small fill stones that likely slumped from the platform fill of Structure 52. This lot contained one ceramic sherd.

Excavation of the second lot of this unit, Lot 3/12C/2, consisted of clearing and leveling during the course of resetting the north wall of the Structure 52 platform (F. 3/12/1). This wall was consolidated as a vertical wall composed of four courses of stones. The matrix was little different from the previous lot, with a slumped platform fill context composed of A-horizon soil mixed with small stones. Three ceramic sherds were recovered.

Unit 3/12D. Unit 3/12D is located along the north wall of the Structure 52 platform, approximately 6-m west of Platform 84. It contains a portion of F. 3/12/1 toward its western edge. This unit was excavated in two lots, Lots 3/12D/1 and 3/12D/2. Excavation of the first lot consisted of clearing the surface in order to expose the remains of Feature 3/12/1. This feature was poorly preserved with many of the facing stones fallen in a jumbled state. It was encountered as a badly slumped row of north-facing stones running East-West through the unit. The material removed was a matrix of O- and A-horizon soils containing small fill stones from the platform fill of Structure 52. One ceramic sherd was recovered from this lot.

The excavation of Lot 3/12D/2 entailed cleaning and leveling during the course of resetting the north wall of the Structure 52 basal platform (F. 3/12/1). This wall was

consolidated as a vertical wall composed of four courses of stones. The material removed was a mix of A-horizon soil and small stones that is little different from the matrix encountered in the previous lot. No cultural materials were recovered.

Unit 3/12E. This unit is situated approximately 8-m west of Platform 84 at the westernmost extension of the north wall of the Structure 52 basal platform. It contains the northwest corner of Structure 52, where the northern extension of the west terrace stair (F. 3/1/2) and the western end of the north wall of the Structure 52 basal platform (F. 3/12/1) meet. This unit was excavated in two lots, Lots 3/12E/1 and 3/12E/2.

Excavation of Lot 3/12E/1 consisted of clearing the surface in order to expose the northwest corner of the Structure 52 platform annex. The material removed consisted of a mix of O- and A-horizon soils and small fill stones slumped from the Structure 52 platform. F. 3/12/1 was encountered as an alignment of fallen facing stones. One ceramic sherd was recovered in this lot.

The final lot of the excavation, Lot 3/12E/2, consisted of clearing and leveling excavations in preparation for resetting the northwest corner of the Structure 52 platform annex. The two features that meet at this corner are the north wall of the platform (F. 3/12/1) and the west stair (F. 3/1/2). Material removed during excavation includes fill slumped from the platform. This fill consists of A-horizon soils mixed with small stones. No artifacts were recovered in this lot.

CONCLUSIONS

The 2009 field season of the Toledo Regional Interaction Project at Lubaantun addressed two specific archaeological research goals. First, we performed both clearing and penetrating excavations in two elite residential structures of the site core—Structures 51 and 52. These are the first domestic structures to be excavated at Lubaantun. Second, we recovered a sample of material culture from the site, which will contribute to a regionally comparable collection. This data will form the basis of interpretations about the relations between Lubaantun and its southern Belize neighbors, and about the broader political and economic structure of the Southern Belize Region.

Although systematic analyses of the artifacts recovered during the 2009 field season have yet to be conducted, a few preliminary and tentative interpretations can be made with regard to the function and construction history of Structures 51 and 52, as well as concerning the overall chronology of the site. First, clearing excavations suggest that the platforms probably supported residences where elite members of society lived and ate, but did not do much cooking and did not engage in certain ritual activities. Second, our penetrating excavations within the Structure 51 and 52 superplatforms and in Unit 3/12D provide strong evidence that these structures were built in multiple construction phases. Finally, the artifact assemblage, including both ceramic and lithic chronological markers, has allowed us to refine the chronology of Lubaantun. Hammond (1975) determined Lubaantun to be a Tepeu-sphere site with Tepeu II and Tepeu III/Boca ceramics. This implies that the occupation at Lubaantun could have begun as early as A.D. 700, and may have endured until as late as A.D. 890 (Hammond 1975:66). Nonetheless, he chose not to distinguish between different phases within this time period. Our preliminary analysis has identified two phases of Terminal Classic occupation at Lubaantun that followed an earlier Late Classic occupation demonstrated by Hammond.

Structures 51 and 52 likely supported perishable superstructures that functioned as elite residences. Structure 51 is approximately 1 m high and Structure 52 rises approximately 2 m above the plaza level. Their location in the site core and the large labor investment implied by cut-stone masonry reflect the high status of their inhabitants. The domestic use of these structures is suggested by the presence of serving and storage vessels. No incense burners or other ritual pottery was found on or at the base of the mounds. *Jute* shells from local river snails, which formed a part of the ancient diet of the residents of Lubaantun, were common on and at the base of the mounds. A large number of shells appear to have been tossed off the southeast corner of Structure 51. Additionally, no incense burners or other specialized religious artifacts were recovered during the course of our excavations. This indicates that the structures did not serve a strictly ritual function.

Our investigations also reveal that Structures 51 and 52 were constructed in multiple phases. The Structure 51 platform and superplatform were part of the same construction phase in which Plaza VII was built. We know this because there is no floor or even change in fill between Structure 51 and the plaza. Moreover, the Structure 51 superplatform was built directly on and within this same plaza/platform fill. The Structure 52 platform (really a north annex of the Structure 51 platform) was added during a second construction phase. We know this because the plaza floor is well preserved beneath the Structure 52 platform and because the southern end of that platform covers up and is built on top of the northern end of the Structure 51 platform (F. 3/7/2). Moreover, the north end of the Structure 52 platform covers and rests on top of a stair (F. 3/11/1) leading up from Plaza VII to a small, unnamed terrace north of the structure. The superplatform of Structure 52 was added during a third construction phase. We know this because our penetrating excavations revealed clear changes in fill where the superplatform rests on top of the Structure 52 annex, and we even found traces of a plaster floor on top of the annex and beneath the superplatform.

Most of the artifacts recovered during the 2009 field season come from a dense deposit discovered during penetrating excavations through the interior of Structure 51 and into the plaza fill. This deposit was left directly on bedrock, probably at the time the plaza and Structure 51 were built, that is, at the beginning of our construction sequence. Of special chronological interest are: (1) figurine fragments; (2) obsidian blade fragments; and (3) pottery sherds, including examples of cream-slipped polychromes. We observed subtle differences in both the frequency and style of specific sorts of lithic and ceramic artifacts found inside and outside of Structures 51 and 52. These differences allow us to distinguish between an early and a late phase of Terminal Classic occupation at Lubaantun.

Hammond (1975) reports that figurines were generally abundant in his 1970 excavations at Lubaantun. Our excavations, however, recovered relatively few fragments, found entirely in lots from the interior of the structures. The lack of figurines on the exterior of Structures 51 and 52 indicates that either figurines were not used in this area of the site core, or that figurine use declined over the course of the Terminal Classic occupation at Lubaantun. For the moment, we think the latter may be the case.

Obsidian artifacts are quite rare at Lubaantun as compared to Pusilha, where Braswell (2008) reports over 4000 pieces. Our excavations of Structures 51 and 52 yielded just 21 obsidian blade fragments. The majority of the obsidian blades recovered

from excavations in both the interior and exterior of the structure are visually sourced to the El Chayal, Guatemala, source. Nonetheless, a few pieces of Ucareo and Zaragoza source obsidian were recovered from the exterior of Structures 51 and 52, but *not* from their interiors. According to Braswell, the appearance in the southeastern Maya area of obsidian from these Mexican sources occurs during the late Terminal Classic period, especially after A.D. 900. The presence of material from these two sources on and near the surface suggests that Structures 51 and 52 were in use during the tenth century, slightly later than the time proposed by Hammond (1975) for occupation of the site.

Lastly, the ceramic assemblage provides the most compelling evidence for an early and a late phase of the Terminal Classic period occupation at Lubaantun. Most of the observed differences in pottery between the interior and exterior of the structures have to do with frequency and style rather than presence/absence. First, we recovered fewer Puluacax Unslipped sherds in lots from the exterior of the Structure 51/52 platform than on the interior, and very few cream-slipped polychromes were found outside or on top of the platforms. This may be a preservation issue, however, more likely there was a drop-off in the production or consumption of both polychromes and utilitarian Puluacax wares from the early Terminal Classic to the late Terminal Classic at Lubaantun. Many of the polychrome sherds from the large interior deposit are from flaring-walled dishes, a mode that dates to some time in the Terminal Classic. This implies that the deposit and our construction episodes date to a time after the Late Classic. Finally, unit-stamped Remate Red jar sherds display a possible shift in stylistic preferences during the Terminal Classic period. Stamped Remate Red sherds recovered from the interior of the platform tend to show geometric shapes, like the dot-and-S designs, while those recovered from the exterior of the structures exhibit higher frequencies of stylized images of birds and monkeys. In sum, these differences in lithic procurement strategies and ceramic modes suggest to us that Plaza VII and Structure 51 were probably built near the beginning of the Terminal Classic period, about A.D. 780-830. The structures continued to be used during later times when neither figurines nor polychromes were common, and when Mexican obsidian was imported to the site. This is most likely the period A.D. 830-900/1000.

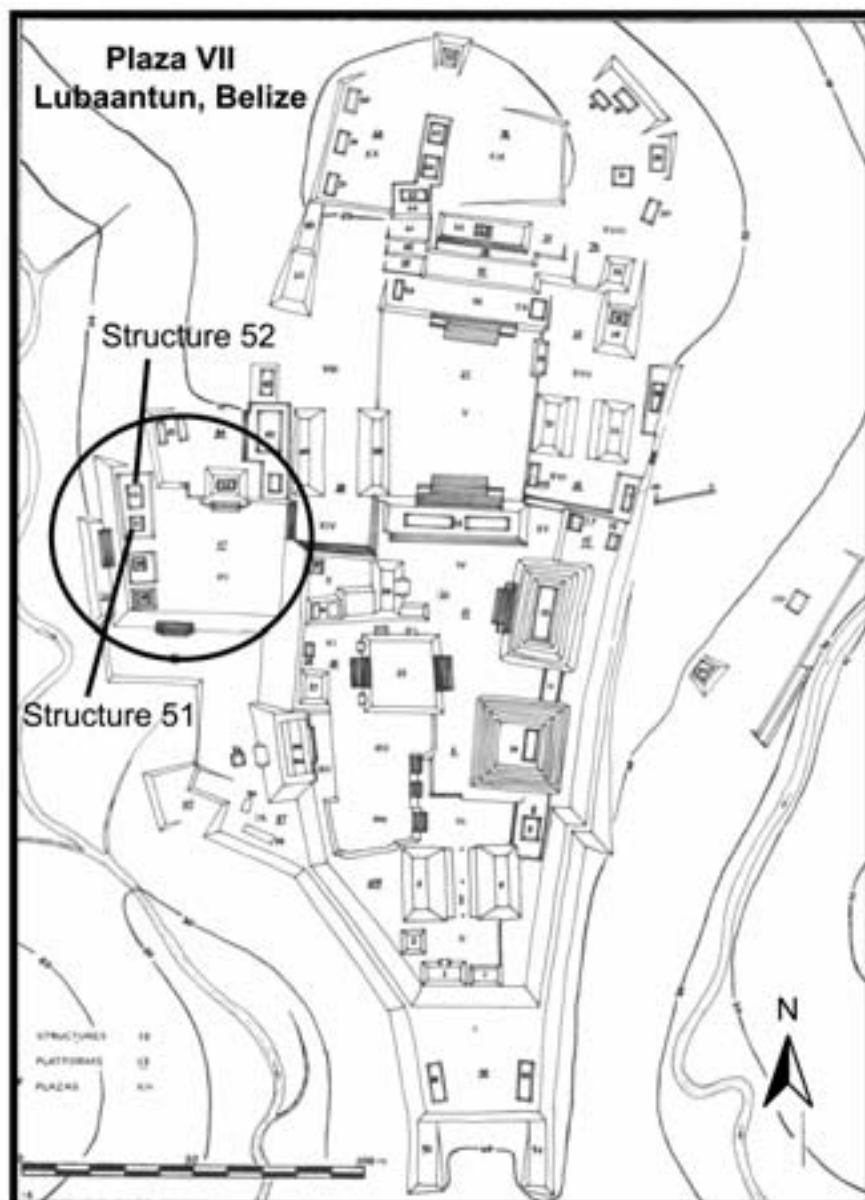


Figure 3.1. Map of Lubaantun highlighting the locations of Plaza VII (the Butterfly Plaza) and Structures 51 and 52 (modified from Hammond 1975).

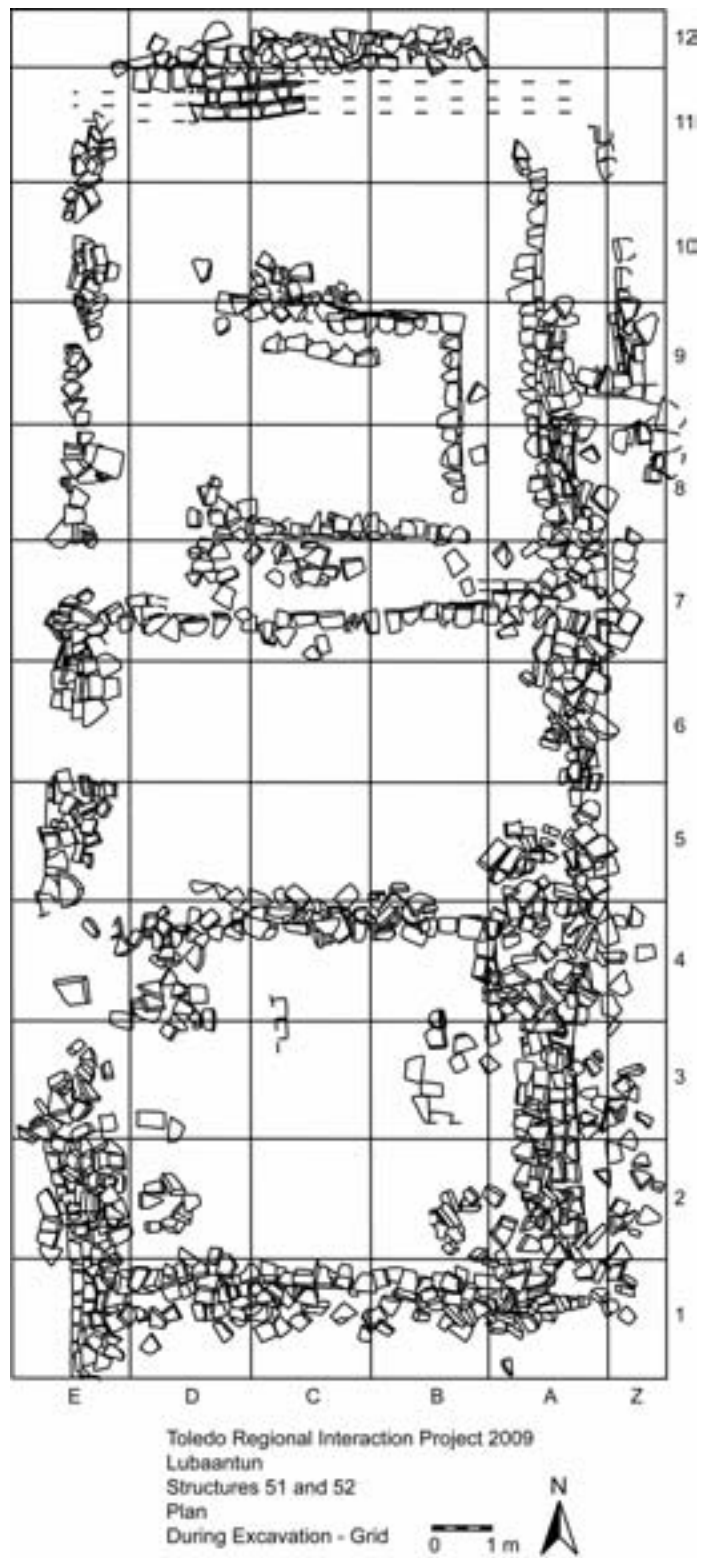


Figure 3.2. Plan view of Structures 51 and 52 indicating the grid locations of our Suboperations and Units.

Toledo Regional Interaction Project 2009
Lubaantun
Structures 51 and 52
Plan View - During Excavation

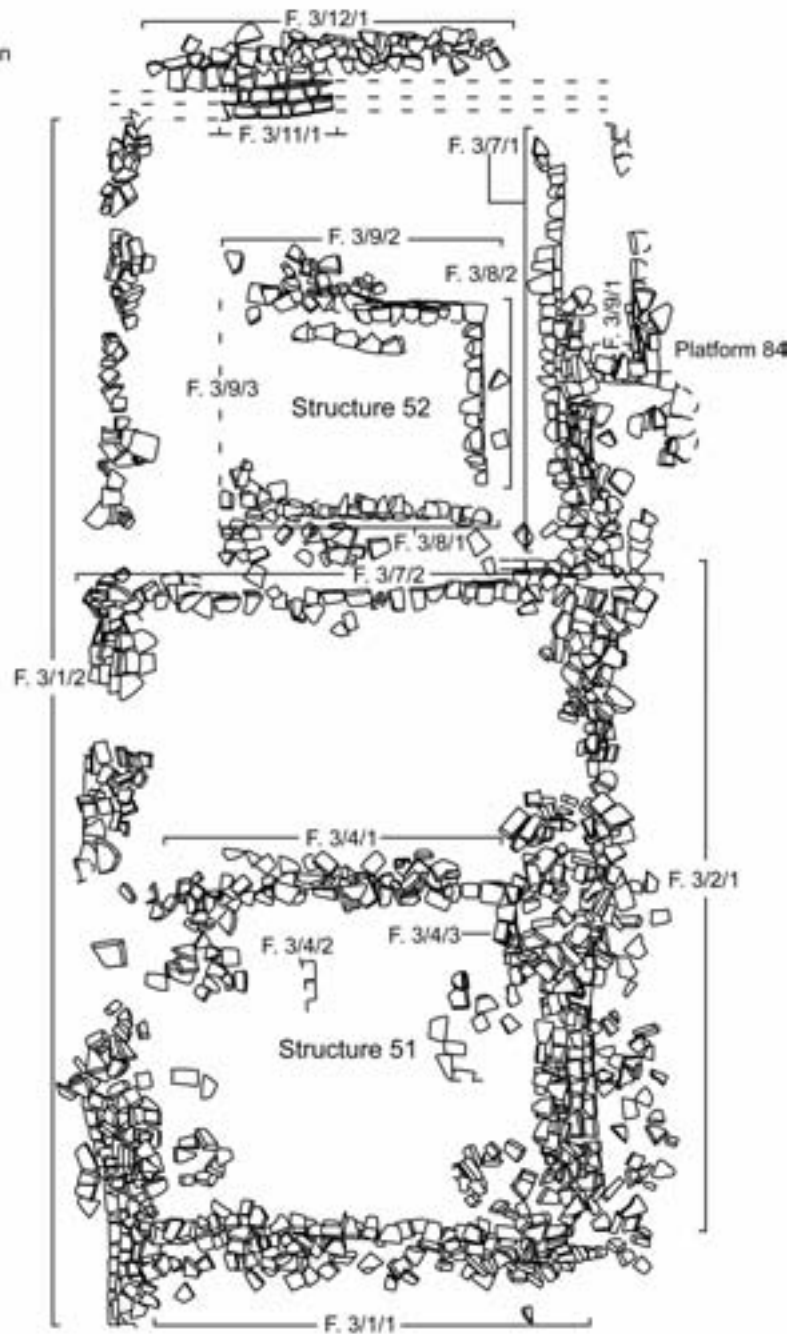
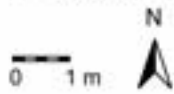


Figure 3.3. Plan view of Structures 51 and 52 during excavation with all features indicated.

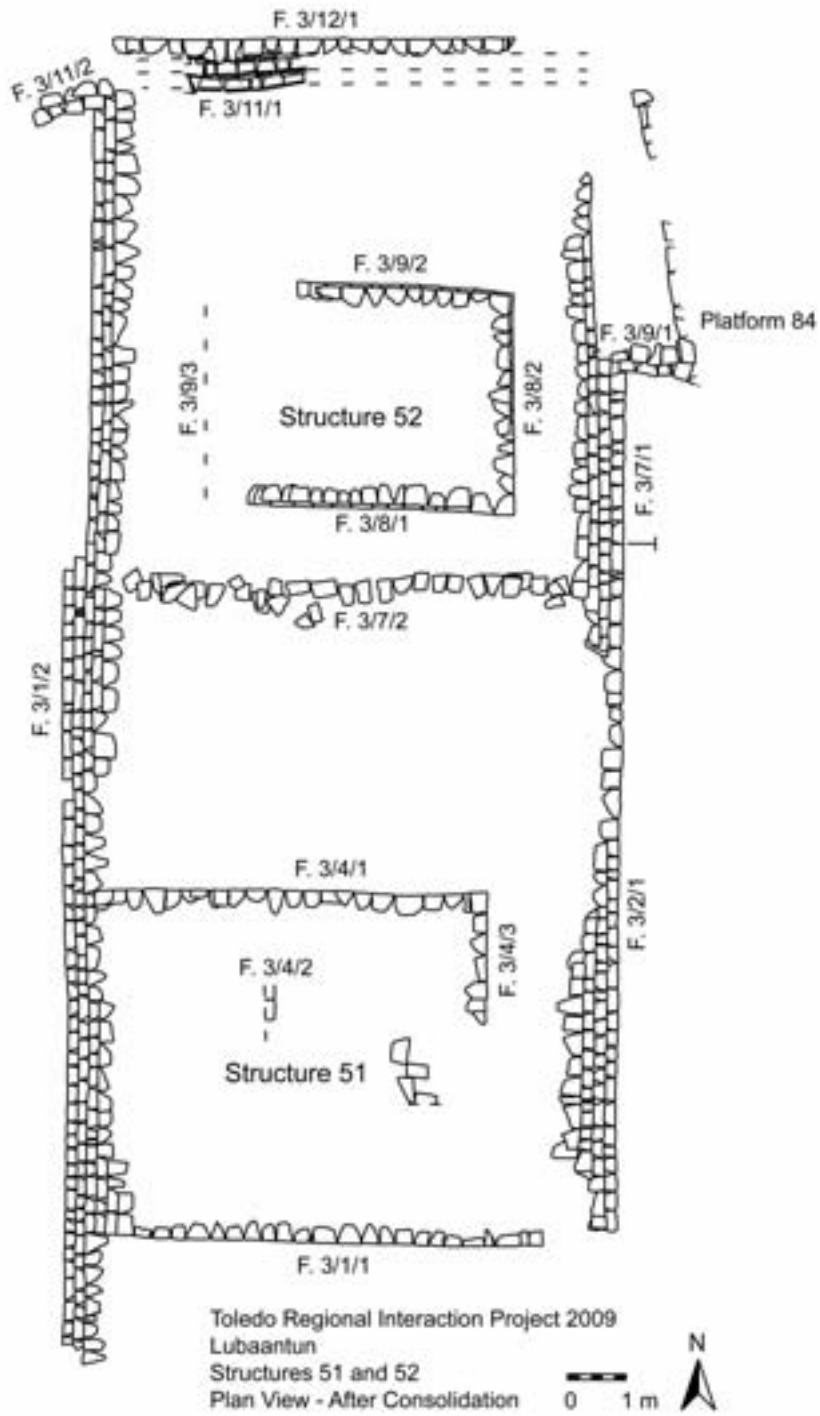


Figure 3.4. Plan view of Structures 51 and 52 after consolidation.

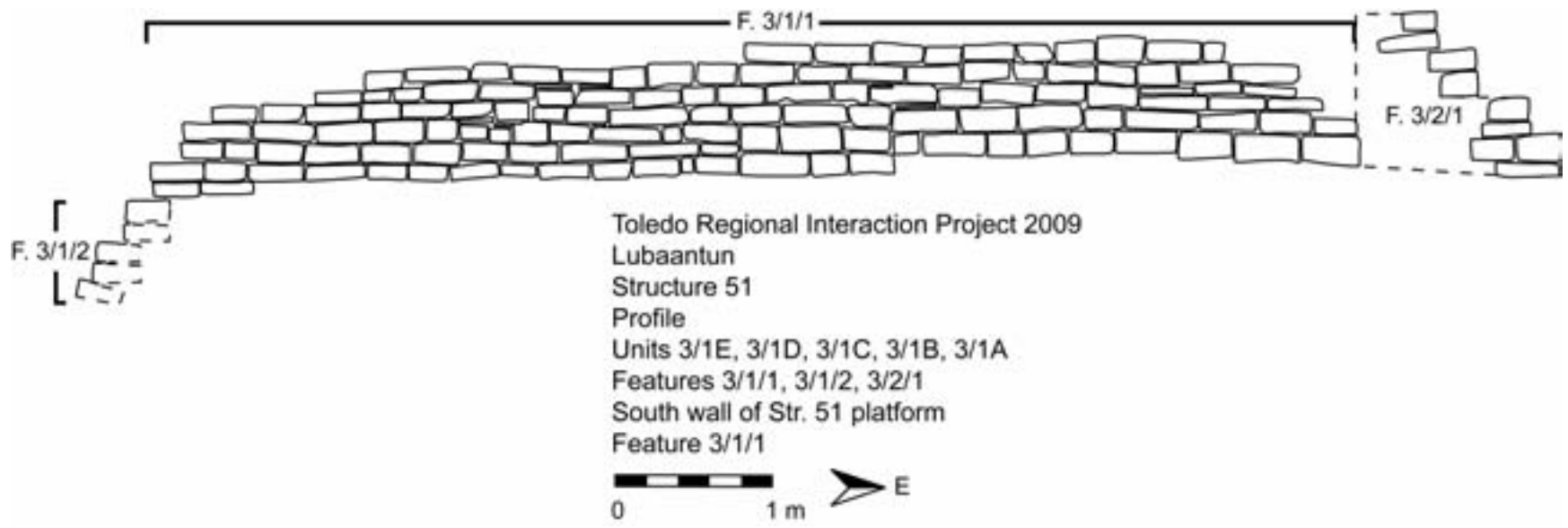
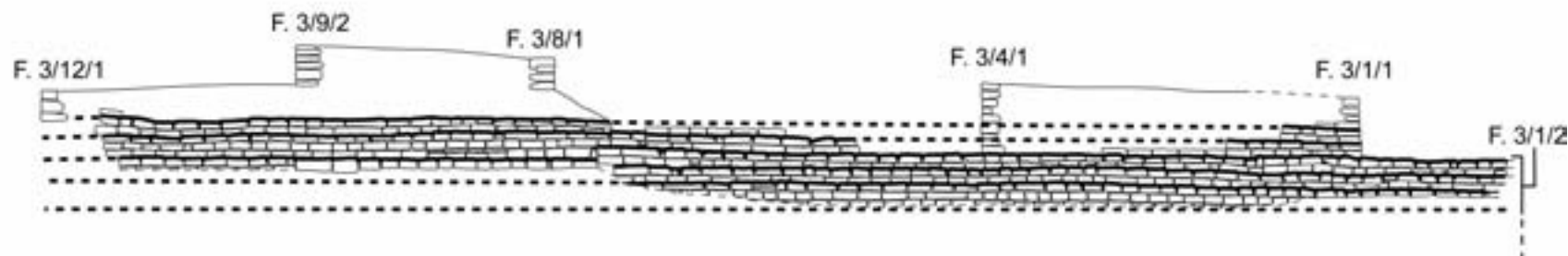


Figure 3.5 Profile of the south wall of the Structure 51 basal platform (F. 3/1/1).



Toledo Regional Interaction Project 2009
 Lubaantun
 Structure 51 and Structure 52
 Profile
 Units 3/1E, 3/2E, 3/3E, 3/4E, 3/5E, 3/6E, 3/7E
 3/8E, 3/9E, 3/10E, 3/11E, 3/12E
 West Stair
 Features 3/1/1, 3/1/2, 3/4/1, 3/8/1, 3/9/2, 3/12/1

0 1 m N

Figure 3.6. Profile of the west stair of Structures 51 and 52.

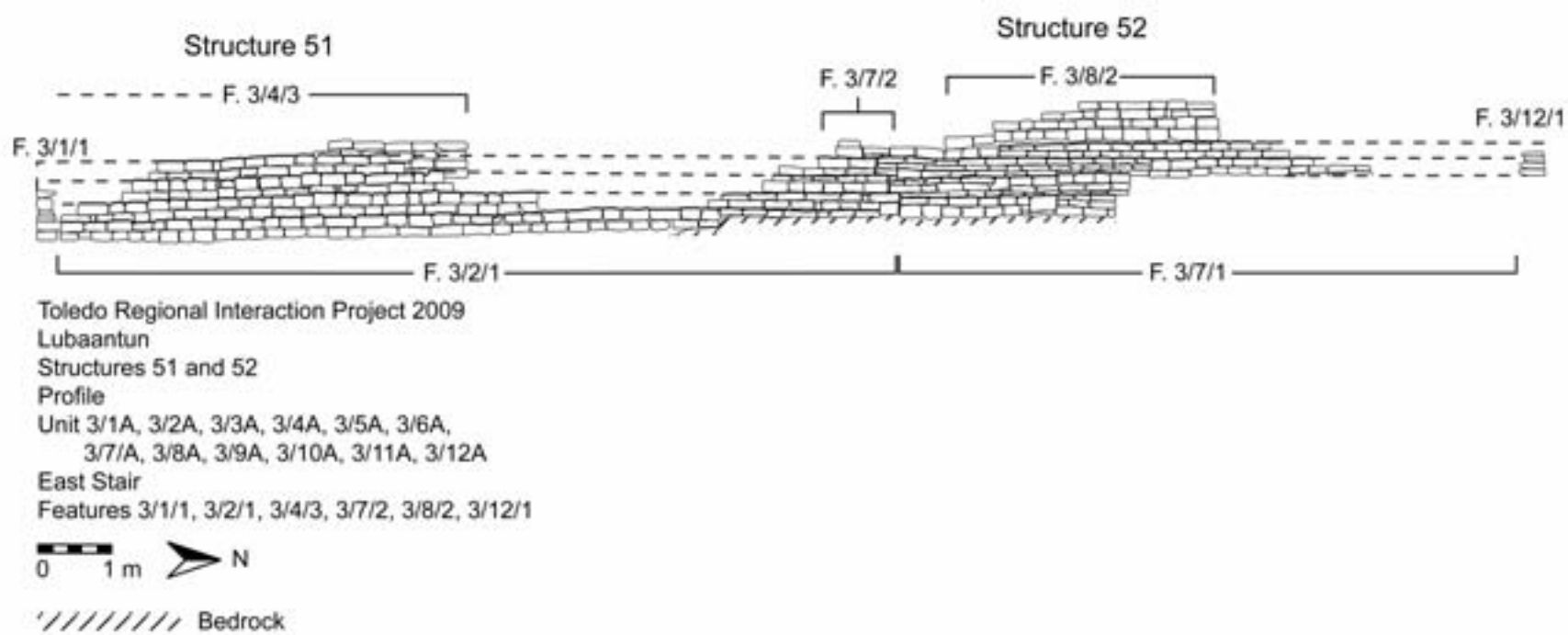


Figure 3.7. Profile of the east stair of Structures 51 and 52.

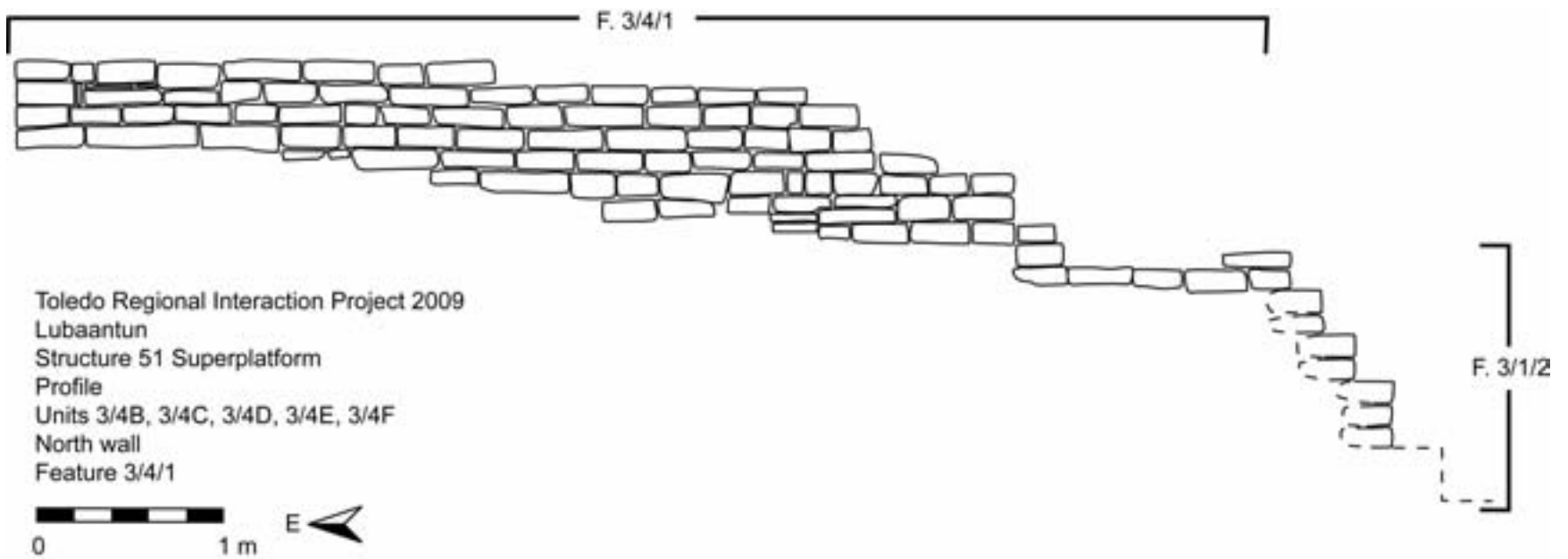


Figure 3.8. Profile of the north wall of the Structure 51 superplatform.

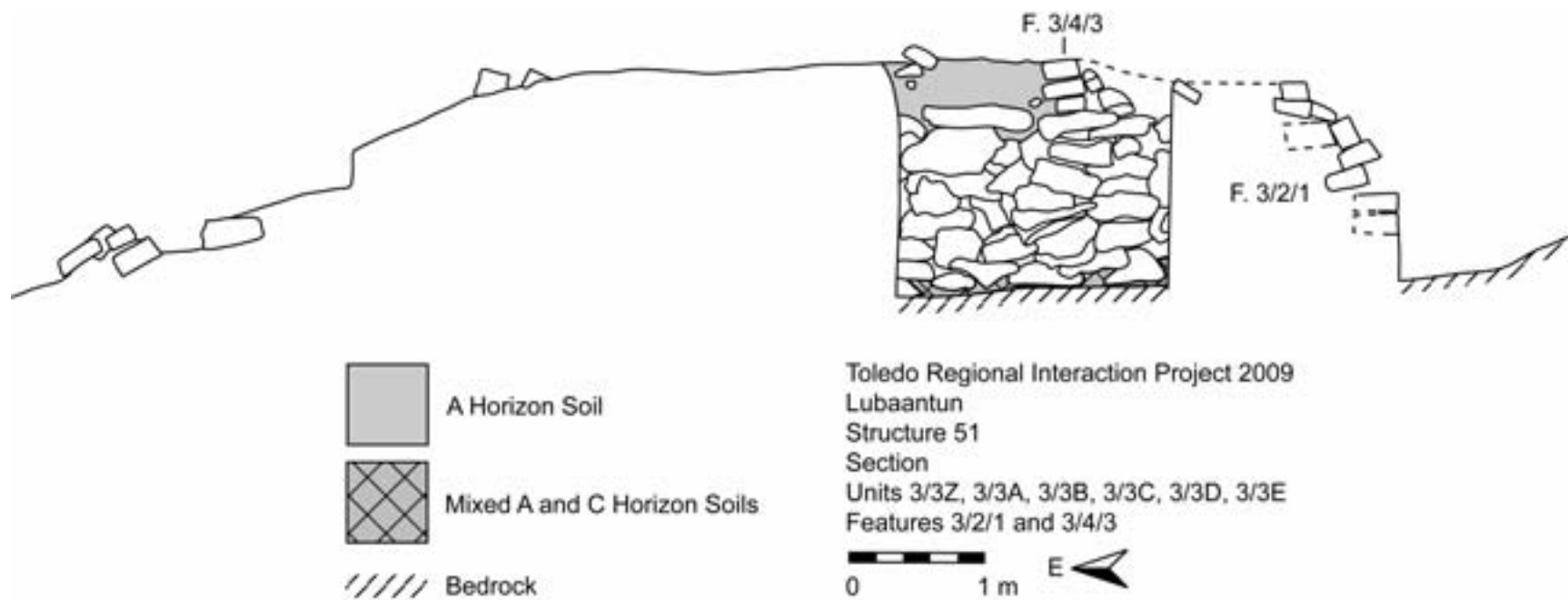


Figure 3.9. Section view through Suboperation 3 of Structure 51.

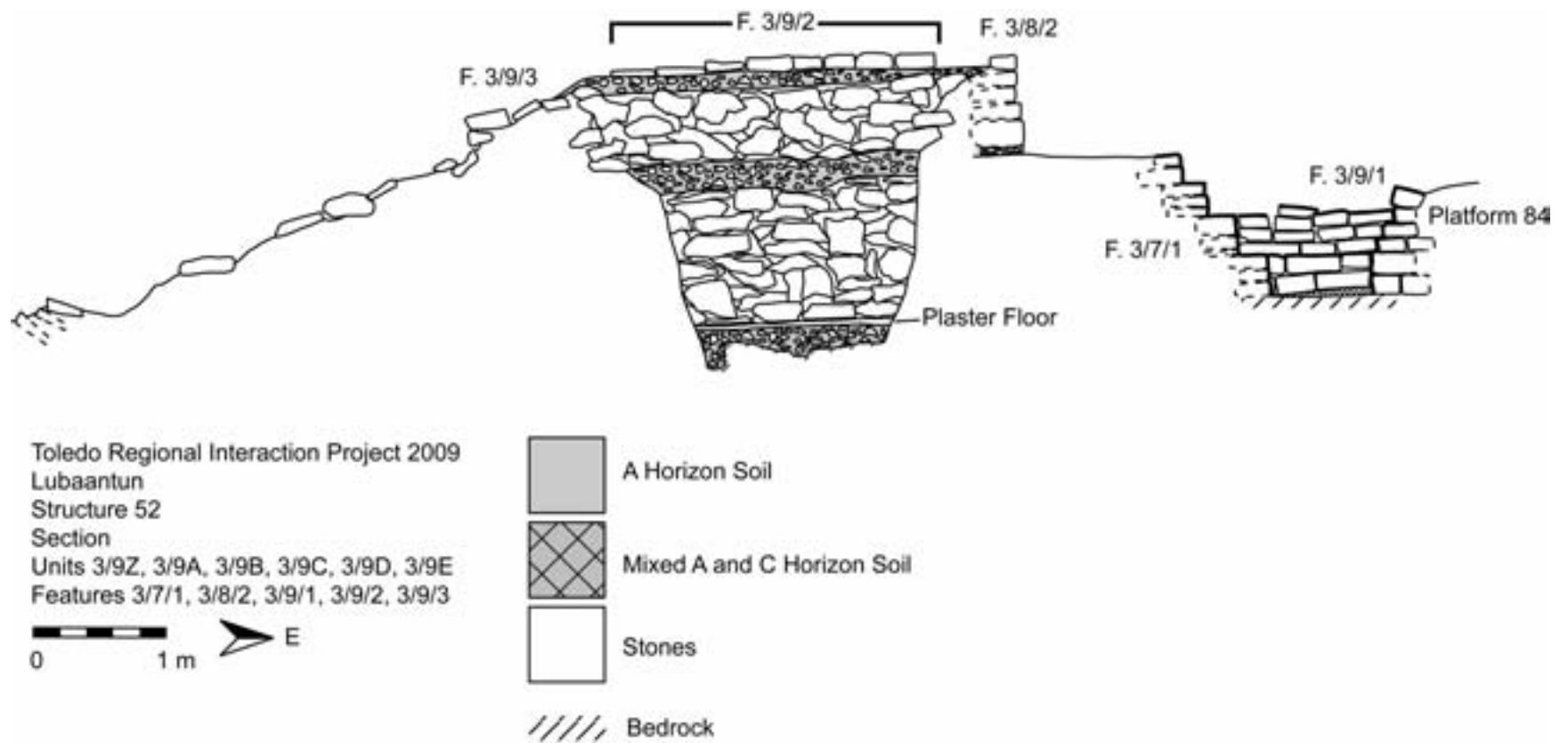
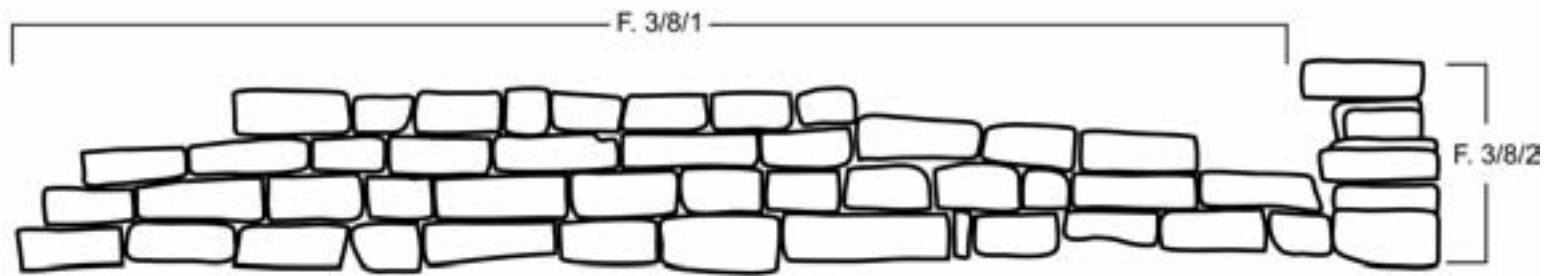


Figure 3.10. Section view through Suboperation 9 of Structure 52.



Toledo Regional Interaction Project 2009
Lubaantun
Structure 52 Superplatform
Profile
Units 3/8B, 3/8C, 3/8D
South Wall
Feature 3/8/1 and 3/8/2



Figure 3.11. Profile of the south wall of the Structure 52 superplatform.

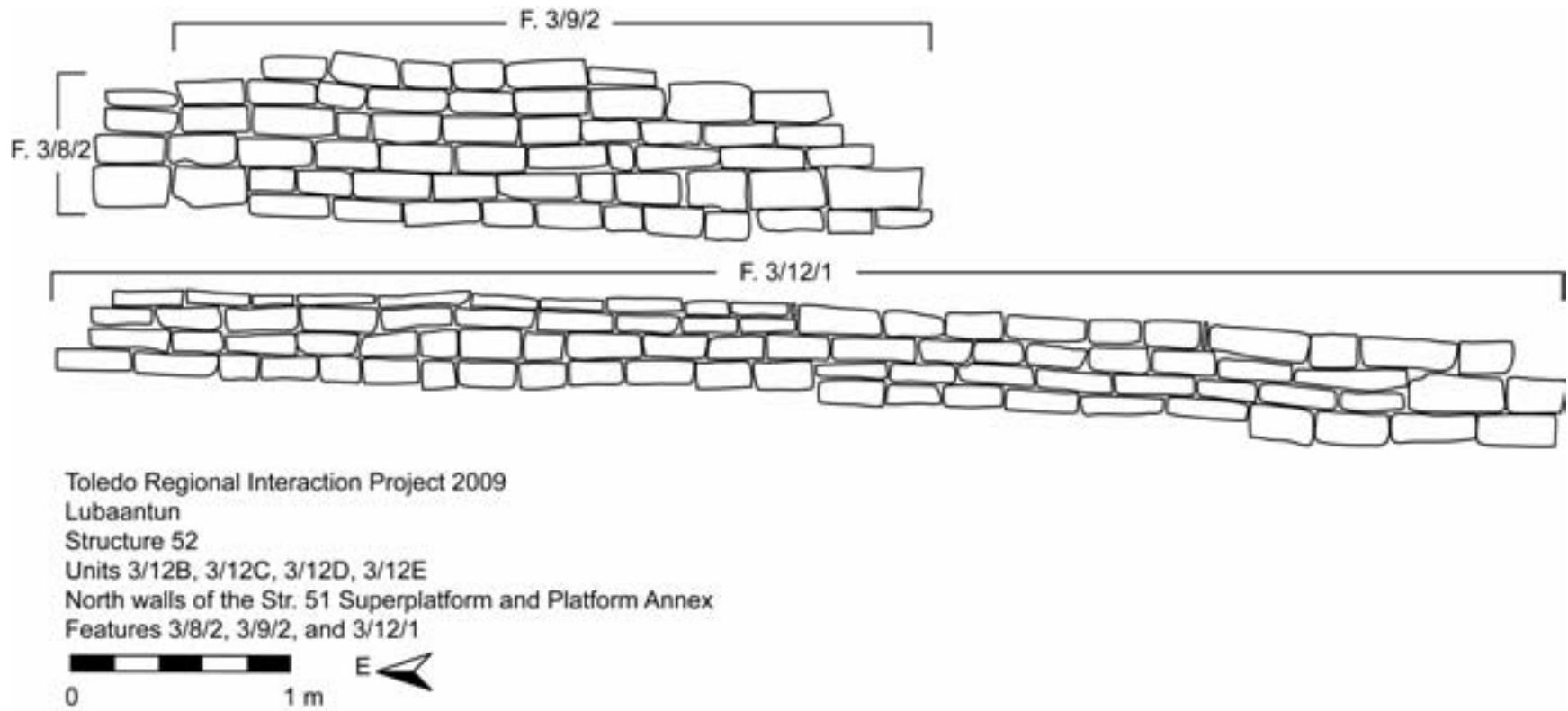


Figure 3.12. Profile of the north wall of the Structure 52 basal platform and Structure 52 superplatform.

Table 3.1. List of features.

Feature Number	Description	Location (SubOp)
F. 3/1/1	South-facing wall of Structure 51	3/1A, 3/1B, 3/1C, 3/1D, and 3/1E
F. 3/1/2	Top 3 steps of the western stair running the entire north-south length of Op. 3 Str. 51 and Str. 52	3/1E, 3/2E, 3/3E, 3/4E, 3/5E, 3/6E, 3/7E, 3/8E, 3/9E, 3/10E, 3/11E, and 3/12E
F. 3/2/1	Eastern stair of Str. 51 until the juncture with the eastern stair of Str. 52 “annex” (F. 3/7/1)	3/2A, 3/3A, 3/4A, 3/5A, 3/6A, and 3/7A
F. 3/4/1	North-facing wall of Str. 51 superplatform	3/4B, 3/4C, 3/4D, and 3/4E
F. 3/4/2	An alignment of cut stones on top of bedrock that acted to retain the large rubble fill of Structure 51	3/3B (north end only), 3/4B, and 3/2B (traces only)
F. 3/4/3	East wall of Str. 51 superplatform	3/4B
F. 3/7/1	Eastern stair of Str. 52, which follows northward from SubOp. 3/7 through SubOp. 3/11	3/7A, 3/8A, 3/9A, 3/10A, 3/11A (missing), and 3/12A (missing)
F. 3/7/2	North-facing stair/wall of Str. 51, which joins with F. 3/2/1 and F. 3/7/1 and F. 3/1/2	3/7A, 3/7B, 3/7C, 3/7D, and 3/7E
F. 3/8/1	South wall of Str. 52 superplatform	3/8B, 3/8C, and 3/8D
F. 3/8/2	East wall of Str. 52 superplatform	3/8B and 3/9B
F. 3/9/1	Two steps leading north from Plaza VII to the “little plaza”, joins the Str. 52 annex to Platform 84	3/9A and 3/9Z
F. 3/9/2	North wall of Str. 52 superplatform	3/9B, 3/9C, and 3/9D
F. 3/9/3	West wall of Str. 52 superplatform	3/9D and 3/8D
F. 3/11/1	Three-step stair leading to the North “little plaza” (Probably articulates with Platform 84 at its eastern extreme)	3/11D (and presumably 3/11A, 3/11B, 3/11C, 3/11D, and 3/11E)
F. 3/11/2	South-facing platform wall	3/11F
F. 3/12/1	North wall of Str. 52 “annex” platform (consists of three courses)	3/12A (missing), 3/12B, 3/12C, 3/12D, and 3/12E

Table 3.2. Obsidian artifacts.

Lot	Count
3/0/0	1
3/1A/1	1
3/1E/2	1
3/2A/3	1
3/3A/1	1
3/4B/1	1
3/4C/3	1
3/4D/3	1
3/5B/1	2
3/5C/1	1
3/5C/2	2
3/5D/1	2
3/7B/1	1
3/9A/1	4
3/12B/1	1
TOTAL	21

Table 3.3. Human remains.

Lot	Package Count	Description
3/2Z/1	1	Medial fragment of humerus
3/4D/2	1	Possible fragment of scapula
3/3C/2	1	Unidentifiable fragment - may be faunal - possible polishing

Table 3.4. Non-*Jute* faunal remains.

Lot	Count	Description
3/1B/1	1	Bird bone?
3/3B/1	1	Crab claw
3/3D/3	1	Crab claw frag
3/4C/3	1	Animal vertebrae?
3/4D/3	1	Deer horn

Table 3.5. Ceramic sherd counts.

Sub-Op 3/1		Sub-Op 3/2		Sub-Op 3/3		Sub-Op 3/4		Sub-Op 3/5		Sub-Op 3/6	
<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>
3/1A/1	123	3/2A/1	30	3/3A/1	27	3/4A/1	14	3/5A/1	12	3/6A/1	21
3/1B/1	25	3/2A/3	1	3/3B/1	47	3/4A/3	9	3/5A/2	2	3/6A/2	1
3/1B/2	5	3/2B/1	6	3/3B/2	453	3/4B/1	50	3/5B/1	58	3/6Z/1	16
3/1C/1	27	3/2D/1	36	3/3C/1	17	3/4C/1	35	3/5C/1	25		
3/1C/2	19	3/2E/1	19	3/3C/2	66	3/4C/2	146	3/5C/2	3		
3/1D/1	7	3/2E/2	2	3/3C/3	953	3/4C/3	349	3/5D/1	40		
3/1D/2	1	3/2Z/1	68	3/3D/1	11	3/4D/1	4	3/5D/2	1		
		3/2Z/2	5	3/3D/2	20	3/4D/2	55	3/5D/2	12		
				3/3D/3	298	3/4D/3	380	3/5E/1	5		
				3/3E/1	7	3/4E/1	7	3/5E/2	2		
				3/3E/2	6	3/4Z/1	34	3/5Z/1	14		
				3/3Z/1	12	3/4Z/2	23				
				3/3Z/2	10						
				3/3Z/3	24						
Sub-Op 3/7		Sub-Op 3/8		Sub-Op 3/9		Sub-Op 3/10		Sub-Op 3/11		Sub-Op 3/12	
<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>	<i>Lot</i>	<i>n</i>
3/7A/2	19	3/8A/1	18	3/9A/1	11	3/10A/1	16	3/11A/1	39	3/12B/1	2
3/7B/1	1	3/8A/2	10	3/9A/2	29	3/10B/1	8	3/11B/1	5	3/12B/2	7
3/7C/1	2	3/8B/1	3	3/9B/1	6	3/10E/1	1	3/11C/1	1	3/12C/1	1
3/7D/1	1	3/8B/2	4	3/9B/5	3			3/11D/1	1	3/12C/2	3
3/7E/1	13	3/8B/3	2	3/9B/6	3			3/11E/1	1	3/12D/1	1
3/7E/2	37	3/8C/1	4	3/9C/1	3					3/12E/1	1
3/7Z/1	1	3/8C/2	5	3/9C/2	1						
		3/8C/5	1	3/9C/5	3						
		3/8D/1	3	3/9E/1	1						
		3/8E/1	3								
		3/8Z/1	70								
TOTAL: 3987											

Table 3.6. Chert artifacts.

Sub-Op 3/1		Sub-Op 3/2		Sub-Op 3/3		Sub-Op 3/4		Sub-Op 3/5		Sub-Op 3/6	
<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>
3/1A/1	4	3/2A/1	1	3/3A/1	6	3/4A/3	1	3/5B/1	3	3/6A/1	1
3/1B/1	4	3/2B/1	6	3/3C/1	3	3/4B/1	3	3/5C/1	6	3/6Z/1	4
3/1C/2	1	3/2E/1	1	3/3C/3	3	3/4C/1	1	3/5C/2	1		
		3/2E/2	1	3/3Z/1	2	3/4C/2	2	3/5D/1	6		
				3/3Z/3	2	3/4D/1	2	3/5D/1	2		
						3/4E/1	4	3/5D/2	2		
						3/4Z/1	3				
						3/4Z/2	1				
Sub-Op 3/7		Sub-Op 3/8		Sub-Op 3/9		Sub-Op 3/10		Sub-Op 3/11		Sub-Op 3/12	
<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>	<i>Lot</i>	<i>Count</i>
3/7A/2	2	3/8A/1	4	3/9A/1	1	3/10A/1	6	3/11C/1	2	3/12B/1	3
3/7C/1	2	3/8B/3	2	3/9C/2	7	3/10B/1	1	3/11D/1	1		
3/7E/1	6	3/8C/1	1	3/9C/3	1	3/10C/1	1	3/11E/1	1		
3/7Z/1	3	3/8C/2	4			3/10E/1	3				
		3/8Z/1	10								
TOTAL: 137											

Table 3.7. Figurines.

Lot	Count	Description
3/3B/1	1	head frag @ -2.14 below D ₂
3/3C/3	4	frags
3/3D/3	2	frags from same figurine
3/4B/1	2	fragments
3/4C/2	1	figurine frag
3/4C/3	4	frags
3/4D/3	3	frags
3/4E/2	1	figurine frag
3/5D/2	1	fragment
3/7A/2	1	fragment
3/8B/3	1	fragment
3/8E/1	1	fragment
Total	22	

Table 3.8. *Pachychilus (Jute)* shells.

Lot	<i>P. glaphyrus</i> (Spiky) Whole	<i>P. glaphyrus</i> Fragment	<i>P. indiorum</i> (Smooth) Whole	<i>P. indiorum</i> Fragment	Unidentifiable
3/1A/1	28	2	46	1	-
3/1B/1	1	-	-	-	-
3/1C/1	-	-	1	1	-
3/1C/2	-	-	3	-	-
3/1D/1	-	-	1	-	-
3/2A/1	5	-	6	-	-
3/2A/3	1	-	-	-	-
3/2D/1	2	-	1	-	-
3/2E/1	3	-	3	-	-
3/2Z/1	17	3	33	1	1
3/2Z/2	1	1	1	-	-
3/3B/1	2	1	5	-	-
3/3B/2	8	4	26	1	-
3/3C/1	-	-	1	-	-
3/3C/2	4	-	7	2	-
3/3C/3	59	8	140	16	-
3/3D/1	1	-	-	-	-
3/3D/2	1	-	9	-	-
3/3D/3	6	-	51	2	-
3/3E/1	-	-	2	-	-
3/4B/1	-	-	1	-	-
3/4C/1	-	-	2	-	-
3/4C/2	4	-	10	-	-
3/4C/3	5	-	53	2	-
3/4D/2	3	-	3	-	-
3/4D/3	2	-	2	-	-
3/4E/1	-	-	1	-	-
3/5B/1	1	-	3	-	-
3/5C/1	-	-	1	-	-
3/5C/2	1	-	3	-	-
3/5D/2	-	-	-	1	-
3/5E/2	1	-	-	-	-
3/6A/1	-	-	1	-	-
3/7A/1	-	-	1	-	-
3/7A/2	1	-	7	-	-
3/7B/1	2	-	2	-	-
3/7D/1	-	-	4	-	-
3/8A/1	1	-	6	2	-
3/8B/1	-	-	2	-	-

3/8B/5	1	-	-	-	-
3/8C/3	-	-	1	-	-
3/8Z/1	-	1	-	-	1
3/9A/1	7	-	2	-	-
3/9A/2	2	-	2	-	-
3/9B/5	1	-	-	-	-
3/10B/1	-	-	2	-	-
3/11A/1	5	-	3	-	-
3/11E/1	-	-	1	-	-
TOTAL	176	20	449	29	2

Table 3.9. Polished and ground stone artifacts.

Lot	Type	Count	Description
3/1B/1	misc. stone	1	polished and carved
3/3A/1	groundstone	2	palette fragments?
3/3B/1	groundstone	1	mano fragment?
3/3E/1	groundstone	1	metate leg fragment or mano fragment?
3/3Z/1	groundstone	1	metate fragment
3/3Z/2	groundstone	1	metate fragment
3/4A/1	groundstone	1	metate fragment
3/4C/1	groundstone	1	metate fragment
3/4D/1	groundstone	1	metate fragment
3/5D/1	groundstone	2	metate fragment
3/6A/2	groundstone	1	metate fragment
3/6Z/1	groundstone	1	metate fragment
3/8A/1	groundstone	1	mano fragment
3/9C/1	groundstone	1	metate fragment
3/9A/2	groundstone	2	mano fragments (they fit together)
3/10A/1	groundstone	1	palette fragment?
Total: 19			

Table 3.10. Marine shell artifacts

Lot	Count	Description
3/1A/1	1	bivalve frag
3/2A/1	1	bivalve frag
3/3E/1	1	misc. marine shell
3/8C/3	1	large conch
Total: 4		

4. IDENTIFYING THE LOCAL AND THE FOREIGN: STRONTIUM ISOTOPE AND TRACE ELEMENT ANALYSIS OF COMPANION BURIALS FROM PUSILHÁ, TOLEDO DISTRICT, BELIZE

INTRODUCTION

During the later half of the 20th century, the scholarly perception of the ancient Maya as a society of peaceful theocracies gradually gave way to a more realistic picture of aggressive city-states engaged in practices of warfare, slavery, and human sacrifice. Maya nobles were reinterpreted from their original role as priestly astronomers to practical rulers who struggled to legitimate and maintain their power and authority. Indeed, the Maya elite employed a variety of strategies to reinforce their place within the establish hierarchy. They commissioned stelae that depicted themselves towering over captured enemies (Marcus 1974); they possessed esoteric ritual knowledge that allowed them to communicate with the otherworld (e.g. Schele and Miller 1986:175); they spoke and read an elite language that created social distance from the commoners (Houston et al. 2000); and they instigated the construction of monumental pyramids, temples, and palaces. Additionally, the Maya elite used human remains in ritual and mortuary contexts as powerful symbols of their right to rule.

Frequently encountered in archaeological investigations, multiple burials from single-interment episodes, or “companion burials” often consist of a principal figure with one to several, often disarticulated or incomplete, secondary individuals. This mortuary practice, in contrast to multiple-episode internments –which likely represent family crypts- has variously been interpreted as representing either the interment of sacrificial victims to accompany the principal figure or as a funerary practice involving the curation of revered ancestor remains. Distinguishing between these two practices has proven problematic elsewhere in Mesoamerica (e.g. Christensen and Winter 1997; Nelson et al. 1992) and also in the mortuary contexts from complex societies outside of Mesoamerican (e.g. Tung and Knudson 2008). Overcorrecting for the erroneous notion of a peaceful Maya, scholars may have subsequently attributed human sacrifice to a wide variety of observed mortuary practices, including dismemberment, missing skeletal elements, interment in ritual areas, and secondary burials (Welsh 1988). Yet, as McAnany (1995:60) notes, the remains of revered ancestors were often part of a protracted series of rituals that often led to an incomplete skeleton at its final resting place. This paper addresses the issue of Maya rulership and legitimation by attempting to contribute to the ongoing debate concerning the nature of companion burials and their relationship to their principal figures.

The Late to Terminal Classic Maya site of Pusilhá, located in southern Belize, presents an ideal opportunity to investigate companion burial practices and the methods of elite legitimation. Recent excavations by the Pusilhá Archaeological Project (PUSAP) uncovered the remains of 22 individuals, including three multiple burials, in the ceremonial core of the site. This chapter reports our investigation of a sample of these individuals by strontium isotope and trace-element analysis in order to determine the childhood location of the sampled individuals. If the results reveal differing signals

between the principal and companion figures, then the hypothesis that the companions were captured warriors is supported though not proven, as will be discussed below. If no discernable difference is observed between the individuals, then the companion remains may either belong to revered and curated ancestors, or alternatively, to local, perhaps low status, sacrificial victims ritually offered to the principal figure. Additionally, this chapter will contribute to the understanding of the political history of Pusilhá by identifying possible migrants and their regions of origin.

ANCESTORS AND SACRIFICIAL VICTIMS

Both the use of ancestor remains and the display of sacrificial victims would have been potent symbols of the authority of principal figures. Because ancestor veneration was already a pervasive and fundamental concept to the ancient Maya commoners as early as the Preclassic period (McAnany 1995), the manipulation and display of deceased ancestor remains would have served as powerful symbols for the elite rulers who appropriated the practice. For the elite Maya, justification for rule was an unbroken chain of succession between themselves and the real or mythical rulers of the past. Marcus (1992b:262) states that the Maya and other Mesoamerican elites

used their divine ancestors as rationalization for the right to rule, as justification for a whole series of privileges not shared by commoners, and as explanation for skills...that were in fact taught in special school for young nobles.

Thus, through the framework of ancestor veneration, the reign of the living was approved, aided, and sanctified by a connection to the dead. Archaeological, iconographic, epigraphic, and ethnohistorical sources provide examples of this practice. Writing in the 16th century, Fray Diego de Landa describes a funerary event in which the bones of an ancestor remained in the realm of the living.

Among the ancient lords of the house of the Cocombs they cut off the heads after death, boiled them so as to remove the flesh; then they sawed away the back part of the skull, leaving the front with the cheeks and the teeth, supplying in these half sections of the head the removed flesh by a sort of bitumen, and gave them almost the perfection of what they had been in life. These they kept together with the images, and the ashes, all in the oratorios of their houses among their idols, with great reverence and affection. (de Landa 1978:57)

Including ancestor bones in funerary rituals would have symbolized the rightful authority of the deceased and, perhaps more importantly, the rightful succession of his or her offspring.

The inclusion of sacrificial victims in funerary contexts, likewise, served as a tactic to legitimate the authority of the Maya elite. Colonial documents and bioarchaeological studies indicate that sacrificial victims were often local low-status Maya, such as criminals, the sick, or children (de Landa 1978:48; Tiesler 2007).

Alternatively, they may have resulted from the capture and sacrifice of enemy warriors (Schele and Miller 1986; Tiesler and Cucina 2007). Again, archaeological, iconographic, epigraphic and ethnohistorical data from the Maya region support the actuality of these practices. When the sacrificial victims were local individuals, they may have been dispatched as an offering to the gods or to the principal figure, symbolizing the connection the Maya elite had with the otherworld and their power over the body. Schele and Miller (1986:220) saw the capture and sacrifice of enemy warriors as important not only for building prestige, but also as a fundamental requirement for the office of rulership. Including the remains of sacrificed individuals within the burial would have been a demonstration of power and right to rule.

Although companion burials may have stemmed from very different sources, distinguishing between the two in archaeological contexts often proves difficult, especially in the Maya lowlands where the heat and humidity frequently result in poor bone preservation (Tiesler and Cucina 2007). If cultural markers of violence, such as heart extraction, are obscured due to the lack of preservation, indirect methods for inferring the nature of companion burials are required. Various scholars have attempted to use indirect indicators, such as burial context, nutrition indices, demographic profiles, and health markers to address this issue (Fowler Jr 1984; McAnany et al. 1999; Pitcavage 2008; Tiesler 2007; Welsh 1988). Below, I contribute to the ongoing debate concerning the nature of companion burials through an isotopic and chemical investigation of skeletal remains from Pusilhá, Belize.

PUSILHÁ

Located in the Toledo District of southern Belize, the Maya city of Pusilhá dates to the Late and Terminal Classic periods (600-850 AD) (Figure 4.1). The city was capital of the regional *Un* (Avocado) polity, situated at the confluence of the Pusilhá and Poité rivers in the southern Maya lowlands (Braswell and Gibbs 2006). Population estimates for the 6 km² site suggest a density of 1,100 persons/km², or a total of 6,600 inhabitants, making Pusilhá the most populated Late and Terminal Classic site in the southern Belize region (Volta 2007:39). While the majority of Pusilhá's residential structures lie within the valley between the rivers, the royal palace and elite residences are located on the southern banks of the Pusilhá and are connected to the rest of the site by a unique triple-span stone bridge. Although Pusilhá never boasted monumental architecture on the scale of the largest lowland Maya cities, its most prominent architectural feature, the Gateway Hill Acropolis (Figure 4.2), contained a series of terraces and ceremonial architecture built atop an impressively modified natural hill. In total, the acropolis reached a height of 79m, making it taller than the Pyramid of the Sun at Teotihuacan (Braswell et al. 2005; Braswell and Gibbs 2006).

Pusilhá was rediscovered in 1927 by British archaeologists during the British Museum's Expedition to British Honduras and, over the course of four field seasons, it became one of the first systematically excavated sites in Belize (Gruning 1930; Joyce 1929; Joyce et al. 1927; Joyce et al. 1928). These early explorations produced the first ceramic sequence for the region and dated the site to the Late Classic period through their analyses of recovered stelae, hieroglyphs, and ceramics (Joyce et al. 1928). Despite the early interest in Pusilhá, subsequent archaeological research has been sporadic due to its

remote location and difficulty of access. Decades after the British expeditions, Hammond (1975) investigated two caves at Pusilhá as an extension of his larger excavations at Lubaantun. In 1979 and 1980, Levantlhal excavated several test pits, located previously unknown architectural groups, and produced a pace-and-compass map of the site (Levantlhal 1990). The work of Hammond and Levantlhal proved beneficial in that it recognized southern Belize as its own archaeological region or “realm” within the Maya world (Hammond 1975; Levantlhal 1990). During the late 1980s and early 1990s, further exploration of Pusilhá was conducted by Gary Walters who documented several additional architectural groups in a series of unpublished reports (Walters and Weller 1992).

Most recently, extensive research resumed under the banner of the Pusilhá Archaeological Project (PUSAP), directed by Geoffrey Braswell. Interdisciplinary work from 2001 through 2007 consisted of several components, including systematic mapping of the site, test pitting and excavations of major architectural features, architectural consolidation, epigraphic and iconographic analysis, and osteological and artifact analysis (Bill et al. 2005; Braswell et al. 2005; Braswell 2001; Braswell and Gibbs 2006; Nickels 2008; Pitcavage 2008; Volta 2007). A primary goal of the PUSAP was to test models of secondary state formation and to understand the political history of Pusilhá in relation to nearby states such as Copan and Tikal. The findings of Braswell and colleagues suggest that Pusilhá, contrary to previous models, was never politically affiliated with its larger neighbors and that secondary state formation in southern Belize may have developed differently than predicted by the dynamic model of state formation by Marcus (1992a) or by the “superstate” model by Martin and Grube (1995).

Pusilhá Skeletal Remains

Although no formal cemetery was discovered during excavations by the PUSAP, 22 burials were uncovered in 17 different funerary contexts (Figure 4.2; Braswell et al. 2005; Braswell and Gibbs 2006; for detailed discussion of each burial see Pitcavage 2008). Because of the labor investment in most of these tombs, the nature of their artifact assemblages, and their location within *plazuela* group structures, most burials are assumed to represent high-status individuals. Yet, three burials, Bu 3/1, Bu 3/2, and Bu 8/3, were multiple interments consisting of a primary individual and one or two companions. Recent analysis of Pusilhá dental paleopathology by Pitcavage (2008) suggests that the companion burials lived different lifestyles than the principal individuals and that the companions may have been sacrificial victims. Because maize is a socially valuable yet cariogenic food, individuals of higher status were expected to exhibit a higher rate of caries and dental calculus. Despite the somewhat limited skeletal sample of Pusilhá, Pitcavage (2008) observed a significant difference between the primary and companion individuals, with the primaries exhibiting both higher average rates of caries and higher calculus scores than their companion figures. This indicates a general division in health and status within the multiple burials and suggests that the companion figures were ritually sacrificed individuals disposed of as a means to demonstrate the power and authority of the Maya elite. The present project builds upon the work of Pitcavage and presents data concerning the geographic origins of the companion burials in relation to their primary figures.

PRINCIPLES OF STRONTIUM ISOTOPES AND CHEMICAL ANALYSES

The radiogenic isotope ratios of strontium in combination with trace-element analysis are becoming an integral part of archaeological investigations, especially in Mesoamerica and the Andes (e.g., Burton et al. 2003; Knudson and Price 2007; Price et al. 2008). The chemical and isotopic ratios in bones and teeth reflect dietary, climatological, and geographic information relevant to the life history of the individual under study (Katzenberg and Harrison 1997; Schoeninger and Moore 1992). Over the past two decades, these analyses have proven extremely useful in Maya bioarchaeology. Strontium isotope ratio analysis and trace-element analysis of strontium and barium are here applied to a sample of the skeletal remains from Pusilhá to investigate the relationship between the principal and companion burials and to identify any possible immigrants within the sampled population.

Strontium Isotope Analysis

Strontium isotope ratios in an ecosystem are a factor of the local geology and these ratios are incorporated into the skeletal tissue of organisms that consume local flora and fauna. Regional strontium isotope values vary depending on the age and nature of the geological sediments. Strontium-87 (^{87}Sr) is the end-product of the decay of rubidium-87 (^{87}Rb), a process by which the radioactive ^{87}Rb transforms into ^{87}Sr over time. ^{86}Sr is a stable isotope and the ratio of $^{87}\text{Sr}/^{86}\text{Sr}$ is a function of the age of geological deposits. Generally, rocks older than 100 mya that originally had high Rb/Sr ratios are expected to have $^{87}\text{Sr}/^{86}\text{Sr}$ values > 0.710 . More recent rocks ($< 1-10$ mya) with low original Rb/Sr ratios are expected to have $^{87}\text{Sr}/^{86}\text{Sr}$ values < 0.704 (Bentley 2006; Faure and Powell 1972). Since the variation of $^{87}\text{Sr}/^{86}\text{Sr}$ values is a function of both time and the original abundance of ^{87}Rb in the bedrock, isotope values can be quite variable between regions.

Strontium is released from rocks through weathering and enters the biological cycle by being incorporated in plant material. Plants growing in a given area will exhibit similar $^{87}\text{Sr}/^{86}\text{Sr}$ values to the local geology, and due to the small mass difference between ^{87}Sr and ^{86}Sr , strontium does not fractionate as it is metabolized by plants and animals and transported through trophic levels. Like calcium, strontium is a member of the alkaline earth metals and has two valence electrons. Because of their similar atomic radii, strontium occasionally substitutes for calcium during bone and enamel formation (Elias et al. 1982; Schroeder et al. 1972). Organisms that consume local plants will exhibit the local $^{87}\text{Sr}/^{86}\text{Sr}$ values in their skeletal tissue and in a stable local ecosystem, plants, herbivores, and predators will all exhibit the same ratios of $^{87}\text{Sr}/^{86}\text{Sr}$. Therefore, the strontium isotope composition of the foods in a given region will be reflected in the skeletal tissue of living organisms. Because bone remodels through time, an individual's skeleton will eventually come to exhibit the same $^{87}\text{Sr}/^{86}\text{Sr}$ value of a new region after a residential relocation. Enamel, on the other hand, forms during childhood and undergoes no subsequent remodeling. Even if an individual relocated to an isotopically different region, their enamel would retain the $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of the area during original mineralization. Comparing $^{87}\text{Sr}/^{86}\text{Sr}$ ratios between different individuals, or between individuals and the local geology, or even between one individual's bone and enamel

provides the opportunity to observe past migrations and residential mobilities (Bentley 2006; Price et al. 1994).

Because $^{87}\text{Sr}/^{86}\text{Sr}$ values can vary greatly within an individual rock or sediment deposition and because these variations may be transferred to plant material, sampling rocks, soil, or plants may provide unrepresentative baseline signals. Instead, Price et al. (2002) suggest using local animal tissues as proxies for the expected variation in $^{87}\text{Sr}/^{86}\text{Sr}$ within a given region. Small mammal species consume foods within a finite area and integrate the range of local values within their bones. The integration effect reduces the potential intra-site variability and has proven to provide accurate local baseline values (Knudson and Price 2007; Price et al. 2000). When small mammal species are not available for baseline sampling, the human values may be used. Archaeological human populations will generally consume similar foods grown in similar locations through time and thus averaging the $^{87}\text{Sr}/^{86}\text{Sr}$ values from a population of humans may also provide reliable baseline data. Price et al. (2002) propose finding the mean $^{87}\text{Sr}/^{86}\text{Sr}$ value from either small mammals or from a local human sample and setting a limit of two standard deviations as the expected variation for an archaeological site. According to this line of reasoning, any individuals who exhibit $^{87}\text{Sr}/^{86}\text{Sr}$ values above or below two standard deviations from the mean should represent immigrants to the site.

An additional factor to consider in establishing local baseline values is the source of strontium for the sampled fauna or humans. As maize was the staple food of the Classic Maya (e.g. White 1999), much of the Sr uptake most likely came from alkaline processing of maize in order to dissolve the outer shell, or pericarp, from the kernels (Wright 2005). Lime processing raises the Ca and Sr content by 10-20 fold and, theoretically, will bias the $^{87}\text{Sr}/^{86}\text{Sr}$ value towards that of the lime used in processing (Burton and Wright 1995). If a settlement imported their lime, the $^{87}\text{Sr}/^{86}\text{Sr}$ values of sampled skeletal elements may represent a false local average. As Pusilhá is situated near, and perhaps partially within, a geological region composed primarily of carbonate breccia (Purdy et al. 2003), it is not likely that the Classic Period residents would have imported limestone from great distances.

A second variable source of strontium to consider is the intake of sea salt. The modern $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of seawater has a relatively high value of 0.7092, which is also reflected in the values of salt. Wright (2005:562-563) suggests that the importation of sea salt to Tikal may explain the elevated $^{87}\text{Sr}/^{86}\text{Sr}$ values in her human samples over the local geology. If the residents of Pusilhá imported large enough quantities of salt from the coast, their $^{87}\text{Sr}/^{86}\text{Sr}$ values may be affected. Similarly, if seafood, such as small fish, was consumed whole, including the calcium rich bones, the $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in human bone and enamel might be raised towards the value of seawater. However, experimental studies demonstrating this phenomenon are lacking.

Trace-Element Analysis

Unlike the isotope analysis, which measures the ratios of two isotopes of strontium, trace-elemental analyses are useful in determining the concentration of a particular element. Concentrations of strontium and barium in bioapatite were originally used primarily for paleodietary analysis. Based on the principle of biopurification of calcium (Elias et al. 1982; Schroeder et al. 1972), strontium to calcium ratios (Sr/Ca)

were expected to represent the amount of plant and meat contributions to the diet of an individual (e.g., Schoeninger 1979; Toots and Voorhies 1965). Although strontium substitutes for calcium in bone and enamel, it does not pass through the alimentary canal wall as efficiently as calcium. This process led researchers to predict that organisms with higher trophic positions would exhibit smaller concentrations of strontium than organisms of lower trophic positions. In controlled ecosystem analyses, carnivores had lower Sr/Ca values than herbivores, and herbivores had lower values than plants (Elias et al. 1982). These analyses were widely used to determine the degree of meat consumption among human populations and between social classes.

Similarly, barium is also subject to biopurification and Ba/Sr ratios have also been used to gauge the relative contribution of marine foods to the diet of individual organisms (e.g., Ezzo et al. 1995). Although concentrations of barium and strontium appear to be distributed somewhat evenly in terrestrial environments (Ba/Sr=1), barium levels are much less abundant in seawater relative to strontium (Ba/Sr < 0.001). Consequently, marine organisms exhibit significantly depleted levels of barium in their inorganic tissues, and marine mammals may be easily distinguished from terrestrial mammals by concentrations of barium in their bone and enamel (Burton and Price 1990; Wessen et al. 1977). These findings suggested that humans exhibiting relatively low ratios of barium to strontium consumed significant amounts of marine food (Burton and Price 1990).

Although experimental studies have demonstrated that Sr/Ca and Ba/Ca of bone and enamel do indeed track dietary Sr/Ca and Ba/Ca, recent research has exposed several problems with strontium and barium as paleodiet indicators (Burton and Price 2000). Principal among these objections is the realization that strontium and barium inputs in bioapatite are biased towards food sources that contain high amounts of calcium. Since plants contain much more calcium than does meat, the use of strontium to test degree of meat consumption may not be valid. Significant differences in Sr concentrations are indeed observed between pure carnivores and pure herbivores, but omnivorous organisms produce unreliable results as “the dietary Sr/Ca ratio for mixed diets is not linearly related to the plant/meat ratio or even particularly sensitive to it” (Burton and Price 2000:163). Although Sr and Ba in human skeletal tissue do come from dietary sources, they most likely reflect calcium rich botanical inputs, which draw their strontium from the local geology.

An additional problem with using Sr/Ca and Ba/Ca concentrations as paleodiet indicators is the fact that the natural variation in strontium and barium abundances can differ significantly between regions independently of the types of foods consumed. The geological differences between areas can result in variability in strontium and barium abundances that exceeds the variation expected from individual dietary differences (Burton et al. 2003). Although problematic for dietary research, the regional differences in Sr and Ba concentrations allow Sr/Ca and Ba/Ca to be used as an additional tool for tracking human mobility patterns (Burton et al. 2003; Knudson and Price 2007). Since Sr and Ba are incorporated into skeletal tissue in proportion to their local abundances, their concentrations in human remains will reflect the profile of the local geology. By comparing the local abundances of strontium and barium to the abundances in human bone and teeth, or by comparing the abundances between individuals, patterns of migration and mobility may be discerned.

GEOLOGICAL VARIATION AND IMPLICATIONS FOR DEFINING LOCAL AND FOREIGN

Since both strontium isotope and trace element values in human bone vary depending on the geology of a region, here I provide a brief summary of the geological variation of southern Belize and discuss its relevance to the problem of defining “local” and “foreign” individuals within the mortuary population at Pusilhá.

The Toledo District and Pusilhá fall within the larger geological area of the Southern Maya Lowlands, a wide region generally characterized by flat-lying limestone that traverses sections of southern Mexico, Guatemala, and southern Belize. By analyzing rock, water, soil, and plant samples from across the Maya world, Hodell et al. (2004) produced a $^{87}\text{Sr}/^{86}\text{Sr}$ distribution map with the intent of providing baseline data for future migration studies. Their results demonstrate a general trend of relatively higher $^{87}\text{Sr}/^{86}\text{Sr}$ ratios in the carbonates of the Northern Lowlands (0.7089 ± 0.0007 ; $n=16$; 2σ) giving way to the lower values of the Southern Lowlands, which have a $^{87}\text{Sr}/^{86}\text{Sr}$ range of 0.7071 - 0.7082 ($n=86$) and exhibit an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7077 ± 0.0005 (2σ) (Hodell et al. 2004). Within Belize, this trend is interrupted by the Maya Mountains, which have very positive $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.7133 ± 0.0017 ; $n=3$; 2σ) due to their advanced age. South of Belize, the Volcanic Highlands and Pacific Coast exhibit much higher $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.70415 ± 0.00023 ; $n=34$; 2σ). Another distinct region, the Metamorphic Province, exhibits widely variable $^{87}\text{Sr}/^{86}\text{Sr}$ ratios (0.7074 ± 0.0057 ; $n=50$) and is located southeast of the Southern Lowlands. Although useful for observing macro geological differences within the Maya world, more precision is needed to address specific questions of human migration.

Pusilhá lies within an especially heterogeneous portion of the Southern Lowlands. The city itself is situated mostly within a narrow strip of the Toledo Formation, a patchy geologic region that spans southern Belize and into Guatemala. This formation dates to the Paleocene and Eocene epochs and is characterized by siliciclastic sediments, siltstone and sandstone beds, and hemipelagic clays (Purdy et al. 2003; Tunich-Nah 2007). However, an older geological zone known as La Cumbre Formation borders Pusilhá, and outskirts of the city may lie on its soils. This formation, a Campanian to early Paleocene carbonate breccia almost completely surrounds Pusilhá and is itself nestled within the Toledo Formation (Purdy et al. 2003). Additionally, patches of recent Quaternary limestone and Late Carboniferous Permian formations lie within walking distance from Pusilhá, adding to the mottled nature southern Belize geology (Meerman and Clabaugh 2009; Tunich-Nah 2007). As no fine-scaled isotopic or trace-element mapping has been conducted throughout these regions, we must assume that variation of $^{87}\text{Sr}/^{86}\text{Sr}$ ratios and trace-element concentrations exists within the Pusilhá kingdom and that individuals living in its disperse corners may exhibit differing values.

The geologic heterogeneity within the Pusilhá kingdom has implications for which individuals may be defined as “local” or “foreign.” Local individuals may be viewed from two levels. On one hand, local could describe someone who lived within the larger sphere of the Pusilhá kingdom, which spanned at least two distinct geological formations and, before approximately 750 A.D., might have extended as far north as to include the territories of Lubaantun and Nim li Punit (Geoff Braswell personal communication 2009). Although residents of the kingdom may have identified

themselves as part of the Pusilhá sphere, they could have consumed food grown on soils isotopically and chemically distinct from food grown near the city center. In this situation, an ally or ancestor could be erroneously interpreted as a foreigner or an enemy due to differing isotope or chemical values of their bones or teeth. On the other hand, a stricter definition of local could describe an individual raised within the limits of the Pusilhá settlement. This more constricted definition of local has the advantage of narrowing the potential range of isotopic and chemical variation but runs the risk of labeling an individual as foreign who was in fact closely affiliated with Pusilhá. For the present study, I adopt the tighter definition of local – i.e. individuals who spent their childhood within the limits of the city of Pusilhá proper. Consequently, nonlocal individuals cannot be determined to be captured enemy warriors simply because they spent their childhood in an isotopically or chemically distinct region because, as discussed above, the kingdom of Pusilhá extended over geologically diverse regions and individuals who identified themselves as belonging to the Pusilhá system may appear as foreigners. This tighter definition, since it reduces the possible areas of agriculture to those near the city, allows a more comfortable usage of the method proposed by Price et al. (2002) for identifying nonlocal individuals as those who exhibit values more than two standard deviations from the population mean.

Since the Pusilhá kingdom probably never extended outside of the Southern Lowlands, the definition of foreign, at its broadest, includes any individual with a strontium isotope ratio that falls outside of this regional range, as defined by Hodell et al. (2004). For the present study, individuals who exhibit Sr isotope and trace-element values more than two standard deviations from the mean will also be considered nonlocal, though they will not necessarily be assumed to be captured enemy warriors. Sampled individuals that do exceed the local two-sigma range but fall within the $^{87}\text{Sr}/^{86}\text{Sr}$ range of the Southern Lowlands will be discussed and possible origins will be hypothesized, but this will be done with the above-described caveats in mind.

MATERIALS

Sixteen of the 22 burials recovered from excavations by the Pusilhá Archaeological Project (PSAP) were sampled for the present study. Three sets of principal individuals and their companion burials were included to test their relationship to each other. Because enamel has been shown to preserve a biogenic signal far longer than bone (Kohn et al. 1999; Lee-Thorp and Sponheimer 2003), perhaps as far back as the Triassic (Botha et al. 2005), only teeth samples were selected for the present study. Enamel has much larger hydroxyapatite crystals than bone, resulting in less surface area available for diagenetic exchange to occur. Also in comparison to bone, enamel contains very little organic material (approximately 2%) making it much more resistant to post-depositional contamination (Hillson 1996). The selected teeth represent similar developmental stages in the lives of the sampled individuals. The crown of the second molar mineralizes between ages 3 and 7 (Hillson 1996). Since this tooth was represented in greater frequency than the other molars and is not likely to contain a weaning signal, it was preferentially selected for analysis. Other teeth used in this study were permanent first molars, the crowns of which begin mineralizing *in utero*, permanent third molars, which mineralize between ages 7 through 12, and a permanent canine, which begins to

mineralize at approximately 4 months and finishes at around 6 years (Hillson 1996:123). Deciduous molars were selected from the two sub-adults of the sample. Hence, all enamel specimens represent the isotopic and trace element signal, and therefore geographical location, of the sampled individuals during their childhood years.

METHODS

All teeth samples were mechanically cleaned in Margaret Schoeninger's Paleodiet Laboratory at the University of California, San Diego. The enamel surface of each tooth was ablated with a Dremel rotating saw equipped with a carbide burr in order to remove dirt and surface enamel. A section of enamel spanning the crown to cervix (~30-40 mg) was removed using a Dremel diamond cutting wheel. Removing a vertical segment of enamel ensures that the sample will represent an average isotope ratio and trace element concentration signal from the duration of the crown's formation and will not bias the analysis towards any particular temporal episode. Because studies have conclusively demonstrated that dentin is much more prone to diagenesis than enamel (Budd et al. 2000), all dentin adhering to the enamel wedge was removed by further drilling with a carbide burr. Remaining enamel pieces were powdered in an agate mortar and pestle and separated into mini-centrifuge tubes for strontium and trace elemental analyses.

Although proven to be very resistant to contamination, enamel is not completely immune from diagenetic processes. Enamel is composed of approximately 96% calcium phosphate hydroxyapatite [$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$] by weight, with water and organic matter comprising the remaining 4% (Hillson 1996:218). Elements such as fluorine, uranium, and the rare earth elements (REE) can readily substitute for OH and Ca in hydroxyapatite and are thousands of times greater in fossil enamel than in modern enamel (Kohn et al. 1999; Trueman and Tuross 2002). Similarly, Sr and Ba from the burial environment may substitute for Ca in the calcium phosphate of teeth. If this substitution occurs during diagenesis, isotopic and trace element analyses may produce erroneous data; Sr and Ba concentrations may increase and $^{87}\text{Sr}/^{86}\text{Sr}$ values in enamel may shift to resemble the ratios of the local burial environment, obscuring any evidence of residential mobility.

In order to test for diagenetic contamination, all samples were analyzed for concentrations of U and the REE. These elements are the most appropriate for detecting post-depositional contamination of bioapatite because, like Sr, they substitute for Ca in hydroxyapatite, are readily analyzed, and occur in extremely low abundances in modern teeth (Kohn et al. 1999:2744). Approximately 4 to 6 mg of powdered enamel were dissolved in 4 M nitric acid (HNO_3). This was subsequently heated on a hotplate until all acid had evaporated, leaving only a white precipitate. All samples were then diluted by a factor of 4,500 in 2% HNO_3 that contained 1 ppb indium for machine tuning. Concentrations were obtained by a Finnegan Element II inductively coupled plasma-mass spectrometer (ICP-MS) at the Scripps Institute of Oceanography Unified Laboratory Facility.

Sample processing for strontium isotope analysis took place in the Isotope Geology Clean Laboratory at Scripps Institute of Oceanography, University of California, San Diego under the direction of professor Paterno Castillo, Christopher MacIsaac, and myself. Between 4 and 6 mg of powdered enamel were placed in pre-cleaned Teflon vials and dissolved in 4 M nitric acid (HNO_3). These vials were then uncapped and the sample

solution was dried down under heat until only a white precipitate remained. This precipitate was subsequently dissolved in 100 μL of 0.75 M hydrochloric acid (HCl) at room temperature. Strontium was separated in glass cation-exchange columns using 1,000 μL of AG-50W X8 resin (200-400 mesh). The columns were first conditioned with 1.8N HCl and then the dissolved samples were loaded in the solution of 0.75 M HCl. Strontium was eluted with 1.8 M HCl, loaded onto Re filaments, and the ratios of $^{87}\text{Sr}/^{86}\text{Sr}$ were obtained through thermal ionization mass spectrometry (TIMS). Recent analyses of carbonate standard NBS-987 produced an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.710259 \pm 0.000016 (2σ), which is well within the range of previously published values (Platzner 1985).

To obtain elemental concentrations of strontium, barium, and calcium, the powdered enamel samples were analyzed at the Scripps Institute of Oceanography Unified Laboratory Facility by inductively coupled plasma-optical emission spectroscopy (ICP-OES), model Optima 3000DV. Between 4 and 6 mg of powdered enamel were dissolved 4 M HCl. An aliquot of sample solution was then placed in a pre-cleaned centrifuge tube, diluted in 1% HNO_3 , and analyzed on the ICP-OES. Results are presented in parts per million (ppm).

RESULTS

Diagenesis

Results from the ICP-MS indicate that concentrations of uranium and the rare earth elements are extremely low and are well within the range of biogenic enamel (Kohn et al. 1999). The average ratio of $\text{U}/\text{Ca} = 8.4 \times 10^{-8} \pm 1.0 \times 10^{-7}$ ($n=15$, 1σ) with an average U concentration of 0.03 ppm. These values indicate no post-mortem uptake of U and thus suggest that the strontium isotope and trace element data represent the ratios and concentrations consumed in vivo. The rare earth element lanthanum, like uranium, readily substitutes for Ca in the apatite lattice of post-mortem bone and its presence in enamel in concentrations less than 1 ppm suggest that the bone or enamel contain biogenic values (Trueman and Tuross 2002). The enamel samples from Pusilhá exhibit an average La/Ca ratio of $2.9 \times 10^{-7} \pm 5.7 \times 10^{-7}$ ($n=15$, 1σ) with an average concentration of 0.11 ppm. Neither the U nor the REE results provide any evidence of post-mortem chemical changes in the apatite lattice and all subsequent data are expected to represent biogenic values.

Strontium Isotope Results

The teeth samples from Pusilhá display a strontium isotope range of $^{87}\text{Sr}/^{86}\text{Sr} = 0.7061 - 0.7086$ with an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7078 ± 0.0007 ($n=15$, 1σ) (Figure 4.3; Table 4.1). The individual from Bu 5/1 was analyzed and a $^{87}\text{Sr}/^{86}\text{Sr}$ value was produced ($^{87}\text{Sr}/^{86}\text{Sr} = 0.7079$), but the sample appeared dirty on the filament and will not be included in the following discussion, although the produced ratio falls very close to the mean. Because no small mammals from Pusilhá were analyzed to provide a background $^{87}\text{Sr}/^{86}\text{Sr}$ signal, the sampled humans provide the local baseline in comparison with the published data from the region (Hodell et al. 2004).

To detect any nonlocal individuals within the sample population, the mean value \pm two standard deviations was established as the local signature for Pusilhá. The resulting $^{87}\text{Sr}/^{86}\text{Sr}$ range is 0.7064 - 0.7091. Within these parameters, one individual clearly stands out as nonlocal. The adult female from Burial 4/1 exhibits a $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7061, the lowest ratio of the sample set. Her partially-articulated remains were found on the surface of the Terminal Classic plaza and were associated with a smashed red-ware vessel. The intact cranium was discovered beneath a capstone while scattered arm bones were found several meters away, suggesting that they were disturbed by animal activity. Additionally, as will be discussed below, the trace element data further support her nonlocal status. However, the exact temporal provenience of this individual is unknown and her death may represent a period long after the abandonment of Pusilhá.

Due to the small sample size and obviously nonlocal status of Burial 4/1, we recalculate the site mean and range with her $^{87}\text{Sr}/^{86}\text{Sr}$ value excluded in order to establish a tighter local baseline signature. With Burial 4/1 removed, the mean $^{87}\text{Sr}/^{86}\text{Sr}$ enamel value becomes 0.7079 ± 0.0005 ($n=14$, 1σ) and the two sigma range becomes 0.7068 - 0.7089 (Figure 4.3). Assigning an average baseline $^{87}\text{Sr}/^{86}\text{Sr}$ value of approximately 0.7079 for Pusilhá is supported by isotopic results from the enamel of Burial 8/4. This adult male was interred in by far the most elaborate tomb uncovered at Pusilhá and has been tentatively identified as the Terminal Classic *ajaw*, Ruler G (Braswell et al. 2005:80-81). Although his paternal grandfather was a noble from an unidentified site and his father was not an *ajaw* of Pusilhá, Ruler G was the son of a local female ruler and should therefore represent the local $^{87}\text{Sr}/^{86}\text{Sr}$ value (Braswell et al. 2004). The present study finds that this individual has a $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7078, which is very similar to the group average and well within the regional range produced by Hodell et al. (2004).

The “trimmed” range reveals one to two more individuals who appear nonlocal isotopically, both of whom were recovered from within Structure 3, a 2-m high north-south orientated platform mound in the Gateway Hill Acropolis. This multiple burial consisted of one primary individual, a young adult male, and two unsexed companion individuals who are represented by only their dentition and a few fragments of bone. The remains of the sampled companion were discovered within a flat red-ware dish located near the pelvis of the principal individual while the remains of the second, unsampled, companion were found near the head of the principal figure. Although the companion ($^{87}\text{Sr}/^{86}\text{Sr} = 0.7067$) falls outside of the Pusilhá range, the principal figure ($^{87}\text{Sr}/^{86}\text{Sr} = 0.70685$) falls at the low end but within the range by 0.0001. Nevertheless, this individual will be considered nonlocal for three reasons. First, his association, both isotopically and contextually, with the nonlocal companion suggests that he was affiliated with this foreign individual. Secondly, this individual, along with his companion figure and Bu 4/1, falls, not only far from the Pusilhá mean, but outside of the broad $^{87}\text{Sr}/^{86}\text{Sr}$ range provided by Hodell et al. (2004) for the Southern Lowlands. Finally, because of the small sample size, the two sigma range for Pusilhá should not be considered a hard line, but rather a suggestive tool for interpreting the isotopic evidence. If the individual from Bu 4/1 and the two individuals from Bu 3/1 are excluded, 92% (11 out of 12) of all other sampled individuals fall tightly within one standard deviation of the mean. Although the principal figure from Bu 3/1 is slightly within two standard deviations, he appears isotopically different from nearly all other individuals (Figure 4.6). Taken together, these lines of evidence suggest that both the principal and the sampled companion figure in Bu

3/1 are nonlocal individuals who spent their childhood in a geologically distinct region and migrated to Pusilhá sometime before their death. Possible locations for these individuals will be discussed in more detail below.

Importantly, the $^{87}\text{Sr}/^{86}\text{Sr}$ data from all three sets of principal-companion burials exhibit no significant differences between the primary and secondary individuals, although the possibility remains that the sampled individuals came from different sites with isotopically similar geology. Nevertheless, the current $^{87}\text{Sr}/^{86}\text{Sr}$ data provide no evidence that the companion figures were sacrificed enemies from foreign locations.

Even when the three nonlocal individuals are excluded, the range for the rest of the Pusilhá population is somewhat large. This may in part be due to differential consumption of salt or marine foods, which would raise the enamel $^{87}\text{Sr}/^{86}\text{Sr}$ ratios toward 0.7092 in individuals who consumed more of these products. Also, as discussed above, the local geology of the Toledo District is quite heterogeneous (Meerman and Clabaugh 2009) and if individuals were consuming crops grown in different micro-locations, variations in the $^{87}\text{Sr}/^{86}\text{Sr}$ signal would be expected.

Trace Element Results

The trace element results produced from analysis by ICP-OES provide a second line a data to the Sr isotope results and allow for a finer-resolution examination of residential mobility at Pusilhá. The Sr and Ba trace element concentrations are normalized with Ca concentrations and, because Sr/Ca and Ba/Ca exhibit logarithmic rather than normal distributions, values are here expressed in $\text{Log}_{10}(\text{Sr}/\text{Ca})$ and $\text{Log}_{10}(\text{Ba}/\text{Ca})$ form to enable quantitative comparative analyses (Burton et al. 2003). The average $\text{Log}(\text{Sr}/\text{Ca})$ value for the Pusilhá enamel is -3.91 ± 0.25 ($n=16$, 1σ) while the mean $\text{Log}(\text{Ba}/\text{Ca})$ value is -4.8 ± 0.19 ($n=16$, 1σ ; Figures 4 & 5, Table 4.1).

The raw ppm Sr data from all teeth appear very low at first glance (mean= 57.4 ppm). All individuals exhibit low Sr concentrations with the exception of Burial 4/1 (Sr = 259.8 ppm), the above discussed adult female who had a nonlocal Sr isotope ratio (Figure 4.4). This individual exhibits a $\text{Log}(\text{Sr}/\text{Ca})$ value of -3.19, giving her the most positive value of the sample set (Figure 4.5). Furthermore, this sample has the only $\text{Log}(\text{Sr}/\text{Ca})$ value that falls more than two standard deviations from the population mean, further supporting her status as a nonlocal individual. The $\text{Log}(\text{Ba}/\text{Ca})$ value for Bu 4/1 is -4.69, which is not significantly different from the mean. Apparently this individual spent her childhood years in a different region where differences in the local geology or stark differences in diet resulted in a much higher concentration of Sr in her enamel apatite.

The only $\text{Log}(\text{Ba}/\text{Ca})$ value that falls more than two standard deviations from the mean comes from Bu 5/1 (Figure 4.5). This individual is a subadult, aged 4-5 by dental development (Pitcavage 2008), and is here represented by a deciduous molar. Interestingly, this child had jade inlays set into its deciduous incisors, a unique feature in the Maya world. Although Bu 5/1 exhibits the most positive $\text{Log}(\text{Ba}/\text{Ca})$ value (-4.36) of the sample set, his or her $\text{Log}(\text{Sr}/\text{Ca})$ value (-3.82) falls close to the average. Since the deciduous first molar begins forming in utero and is complete shortly after birth, the $\text{Log}(\text{Ba}/\text{Ca})$ value partially reflects the fetal source of barium, which is partially a factor of the maternal Ba intake and might also be altered by fetal biological processes. Unfortunately, the $^{87}\text{Sr}/^{86}\text{Sr}$ data produced for this individual are not reliable due to a

“dirty” filament (though the produced value is close to the sample mean). At this time, no conclusions may be made regarding geographic origin.

Although the trace element data are not being used for paleodietary analysis in this paper, it is interesting to note that within the multiple-interment burials, all three principal figures exhibit lower $\text{Log}(\text{Sr}/\text{Ca})$ values than their respective companions. This suggests that the principal figures may have consumed foods with less calcium than their companions. Yet these differences are very small and not on an order large enough to suggest differing trophic levels.

DISCUSSION

Companion Burials

The isotopic and trace element data produced from the Pusilhá enamel provide valuable information on the nature of elite rulership and on the political affiliations of Pusilhá. By comparing the data from the principal and companion figures we can suggest the methods by which the elite Maya maintained their right to rule. The data presented here do not support the theory that the companion figures were nonlocal individuals who were captured and sacrificed as a display of the elites' authority. The strontium isotope data find no significant differences between the principal and companion figures, as would be expected if they were *nonlocal* sacrificial victims (Figure 4.6). Additionally, the trace element data of the companions do not significantly differ from the principal figures, further supporting their local origin.

At this point, the second question to ask is whether the companion skeletal remains belonged to revered ancestors/family members or to *local* sacrificial victims. When the dental health analysis by Pitcavage (2008) is considered alongside the isotopic and chemical data, a complex picture emerges. Pitcavage's results demonstrate that average differences do exist between the general health, and consequently status, of the principal and companion remains from Bu 3/1 and Bu 3/2, with the principals exhibiting higher average percentages of caries and higher average calculus scores than their respective companions.

Nevertheless, if the nonlocal status of the principal figure from Burial 3/1 is accepted, then the data suggest that he was buried at Pusilhá along with at least one other individual from his original location. In this situation, the identity of the companion is confused by its ambiguous dental health. The companion figure exhibits caries on 25% of his or her teeth, which is a higher percentage than the principal figure from Bu 3/2 and higher than the high-status average for Pusilhá (22%, $n=15$). Additionally, his or her calculus score is not substantially less than the average score for principal individuals (0.92 vs. 1.16) and no linear enamel hypoplasia was observed, indicating no periods of severe stress during the period of enamel development (Pitcavage 2008). Moreover, the second companion figure had jade inlays set into its incisors, a general marker of status. When singled out and compared to the rest of the population, the sampled companion figure appears more high-status than low status. Based on the current data, the companion heads interred within Bu 3/1 are tentatively interpreted here as belonging to revered ancestors. The companion heads may represent either the remains of individuals who migrated to Pusilhá during their life or individuals who perished in their original location

and whose remains were brought to Pusilhá by the principal figure at some point during the Late Classic Period.

The dental data from Burial 3/2, on the other hand, does indicate clear differences in diet, health, and consequently status, between the principal and companion figure. The most likely explanation for the companion from Bu 3/2 is that he was a lower status local individual sacrificed by the elite of Pusilhá, a practice documented in the ethnohistorical and archaeological literature (de Landa 1978; Tiesler 2007).

The third multiple burial analyzed in the present study, Burial 8/3, similarly to Bu 3/1 and Bu 3/2 exhibits no appreciable difference in strontium isotope or trace element data between the principal individual and the secondary interment. However, unlike Bu 3/1 and Bu 3/2, the companion figure, an old adult female, based on percentage of caries and dental calculus scores, was interpreted to have had greater access to maize than the principal figure (Pitcavage 2008), which is consistent with the general notion that women tend to consume more carbohydrates than men due to their association with maize-processing activities. Also unlike Bu 3/1 and Bu 3/2, which were single depositional events, Bu 8/3 appears to have been opened and sealed on multiple occasions. This companion figure, flexed and located to the north of the principal individual, has been interpreted to be the wife of the principal figure and the mother of the subadult. Because of her older age, she presumably died later in life than the male (Pitcavage 2008). The isotope and trace element data confirm the fact that both individuals spent their childhood lives at Pusilhá, where they were both later buried.

In sum, the isotopic and elemental data, in combination with Pitcavage's (2008) relative health study, suggest a complicated picture of mortuary practices at Pusilhá. The three multiple burials may represent three very different types of interments. Burial 3/1 appears to contain the remains of at least two *foreigners* with roughly similar health and social status. In this situation, the relationship of the primary to secondary individuals may represent the curation of the remains of revered ancestors. Burial 3/2 appears to contain a principal elite figure and the remains of a local sacrificial victim who was of lower social status. Finally, Burial 8/3 contains the remains of what may be a family unit. A local adult male interred with a local adult female and the scattered remains of a sub-adult most likely represents a family vault.

Geographic Origins

Due largely to abuse by archaeologists who, among other faults, equated changes in ceramic styles with migratory events, migration theory largely fell out of fashion in archaeology during the 1960s and 1970s (cf. Cameron 1995; Chapman and Hamerow 1997). More recently, migration as a viable concept of study and as a potential source for social change has seen a resurgence in the past two decades and new models and methods for investigating human mobility have been the focus of a number of scholars (e.g. Anthony 1990; Montgomery et al. 2005; Price et al. 2000; Smith 1984). In reference to the sea-change in migration studies, Beekman and Christensen (2003:134), note that recently

archaeologists have recognized that migrations are excellent occasions for the study of ethnicity, culture contact, restructuring of power relations, crisis decision making, and the adjustments necessary to accommodate new people into an existing social situation, all important theoretical issues.

With the reemergence of mobility studies in anthropological archaeology, scholars have turned away from notions of migration as merely a mechanistic response to push and pull factors and now view residential mobility as a social strategy -- one option among several to negotiate complex problems such as climate change or political turmoil (Anthony 1997). Additionally, this theoretical framework allows for an understanding of the movement of people as a part of internal social and political processes and not merely as responses to external inputs to the system. For example, individuals within the Classic Maya world migrated as part of political processes of forming strategic alliances through marriage, which would send local men or women to live in distant communities (Marcus 1973).

Ascertaining the geographic origins of nonlocal individuals from Pusilhá may provide important information concerning the political and economic history of the site. However, baseline sampling for strontium isotopes and trace elements across Mesoamerica has yet to reach a level of precision necessary to determine which specific settlements nonlocal individuals may have originated from. The discussion below, then, considers *possible* childhood locations for the individuals identified as foreigners at Pusilhá. As discussed above, three individuals exhibit $^{87}\text{Sr}/^{86}\text{Sr}$ or trace element values that suggest they spent their childhood years in a different geological region. While both strontium isotope and trace element data are useful in identifying individuals as nonlocal, much more baseline work has been done on $^{87}\text{Sr}/^{86}\text{Sr}$ ratios than trace element distribution in Mesoamerica and, consequently, the following discussion will rely primarily on the isotope rather than trace element data.

Since Pusilhá and Lubaantun, another Late Classic Maya site of southern Belize, share a nearly identical ceramic assemblage (Bill et al. 2005) and similar architectural styles, the settlement, located a short 31 km from Pusilhá, makes an attractive option as the source of nonlocal individuals of the current study. Unfortunately, a recent strontium isotope investigation of faunal enamel samples from Lubaantun produced an average ratio of 0.7076 ± 0.0002 ($n=4$; 1σ) (Thornton 2008:23-24), which is indistinguishable from the human $^{87}\text{Sr}/^{86}\text{Sr}$ ratios from the Pusilhá sample. If an individual who spent their childhood years at Lubaantun was buried at Pusilhá, strontium isotope analysis would not be able to detect them. The three individuals identified as nonlocal in the Pusilhá collection must have come from elsewhere.

All three nonlocal individuals from the Pusilhá sample, Bu 4/1 and the principal and companion burials from Bu 3/1, exhibit $^{87}\text{Sr}/^{86}\text{Sr}$ values that fall below the expected range for the Southern Lowlands as defined by Hodell et al. (2004). Burial 4/1, the partially disarticulated adult female discovered on the surface of the Terminal Classic plaza, has a $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7061, the lowest ratio of the sample set, and a $\text{Log}(\text{Sr}/\text{Ca})$ value of -3.19, the most positive value of the set. The principal figure and sampled companion from Burial 3/1 exhibit $^{87}\text{Sr}/^{86}\text{Sr}$ values of 0.7069 and 0.7067, respectively (Figure 4.6). The values of all three individuals fit within the range of the Metamorphic

Province, which Hodell et al. (2004) define as 0.7055 – 0.7071 (n=50). This geologically diverse area of ultrabasic and metamorphic rocks along the Motagua River Valley includes the Maya site of Copan, Honduras.

Several papers have discussed the isotopic data from Copan (Buikstra et al. 2004; Price et al. 2008:174; Price et al. 2007) and have established a baseline value from both human and faunal skeletal remains. The human bone $^{87}\text{Sr}/^{86}\text{Sr}$ average is 0.7064 ± 0.0002 while the fauna have a slightly higher average of 0.7068 ± 0.0003 . Interestingly, human enamel samples from Copan are slightly higher than the bone ratios, with an average value of 0.7069 (Buikstra et al. 2004). Although the lower end of Copan's values are close to the observed value of Bu 4/1, her Sr isotope ratio still falls below the reported range for humans at Copan (Figure 4.8). The nearest archaeological zone to exhibit a similar $^{87}\text{Sr}/^{86}\text{Sr}$ value to Bu 4/1 is El Chayal ($^{87}\text{Sr}/^{86}\text{Sr} = 0.7061$), an obsidian source located in the highlands of Guatemala (Figure 4.7). Interestingly, much of the obsidian from Pusilhá comes from this location. The individual from Burial 4/1 most likely spent her childhood years somewhere within the Metamorphic Province, although more baseline work is needed.

Although Bu 4/1 most likely did not come from Copan, the two individuals from Bu 3/1 exhibit $^{87}\text{Sr}/^{86}\text{Sr}$ values that fall within the published human range for Copan (Figure 4.8). Several lines of evidence seem to link Pusilhá to the larger Honduran center. Copan and Pusilhá share an artistic tradition of carving zoomorphic altars in the round, both sites reference a mysterious “Foliated Ajaw” figure, and Pusilhá and Quiriguá have very similar emblem glyphs (Braswell et al. 2005:62). Joyce Marcus (2003:95; 2004:371) has proposed that Pusilhá was conquered by Copan and incorporated into the expansionist state, later claiming independence during the fragmentation of the state. However, neither site mentions the other in the entire body of their hieroglyphic inscriptions. Moreover, recent excavations by PUSAP found that the ceramic evidence points to a variety of influences, especially from the southwestern Peten and only very minimally (only three non-Mayan sherds) from western Honduras (Braswell and Gibbs 2006; Braswell et al. 2004). Instead of being ruled by Copan, Braswell et al. (2004; 2005) suggest that Pusilhá remained largely independent throughout the course of its political history and probably shared more culturally with the Peten than with Copan.

Nevertheless, the two individuals from Burial 3/1 exhibit isotopic ratios very similar to the published $^{87}\text{Sr}/^{86}\text{Sr}$ averages for Copan, where tooth enamel samples average 0.7069 (Buikstra et al. 2004:210; Price et al. 2008:170). When all of the published $^{87}\text{Sr}/^{86}\text{Sr}$ values of individuals described as ‘local’ to Copan are grouped together, they exhibit an average $^{87}\text{Sr}/^{86}\text{Sr}$ value of 0.7067 ± 0.0003 (n=15, 1σ) (Buikstra et al. 2004:208), which is nearly identical to the observed values of both individuals from Pusilhá's Burial 3/1 (Figure 4.8). Moreover, Copan is geographically the closest sampled Maya site with a $^{87}\text{Sr}/^{86}\text{Sr}$ average less than 0.7070, making it, or a yet unsampled nearby site, possible candidates for the origin of the individuals from Burial 3/1. Although suggestive, the results cannot determine with any degree of certainty that the individuals from Bu 3/1 came from Copan. More lines of data will be needed to further explore this potential connection.

CONCLUSION

Companion burials in the Maya world have variously been interpreted as belonging to captured enemy warriors, local sacrificial victims, or the remains of revered ancestors (McAnany et al. 1999; Tiesler 2007; Welsh 1988). Due to the frequent poor preservation of bone in the Maya lowlands, various scholars have employed indirect methods, such as relative health, status, burial context, and demographic profiles, to investigate the nature of companion burials. The present project used isotopic and trace-element analyses as methods of exploring this question at Pusilhá, a Late and Terminal Classic Maya site in southern Belize.

Results from this study indicate that no significant isotopic or trace elemental differences exist between the sampled principal and companion figures, providing no support to the hypothesis that companions were captured enemies from different settlements. Nevertheless, the two sampled individuals from Burial 3/1, the principal figure and a companion cranium, *both* exhibit a nonlocal strontium isotope signature that most closely resemble the average $^{87}\text{Sr}/^{86}\text{Sr}$ values from within the Metamorphic Province, including the Maya site of Copan. The companion head from this burial may represent either the remains of an individual who migrated to Pusilhá during his or her life or an individual who perished earlier and whose remains were brought to Pusilhá by the principal figure. Although Pitcavage (2008) tentatively suggests that the companion figure was a lower status sacrificial victim, I propose that it may represent the remains of a curated ancestor.

Though not a multiple burial, Bu 4/1 exhibits the clearest evidence for a foreign origin. Her remains were left on the surface of the Terminal Classic plaza and, although possibly associated with the abandonment of Pusilhá, the temporal provenience is unsecure and her death may have post-dated the Terminal Classic Period. Although her observed $^{87}\text{Sr}/^{86}\text{Sr}$ ratio matches the ratio from the El Chayal obsidian source, the lack of temporal control for Bu 4/1 does not allow any conclusions to be made regarding her presence at Pusilhá.

The multiple interments at Pusilhá reflect a variety of mortuary practices. As discussed by Carr (1995), in addition to social ranking, a wide variety of factors, such as ideology, religion, economic circumstances, and world views, affect mortuary practices. A more nuanced understanding of Maya companion burials provides valuable information on the nature of Maya rulership and legitimation. Human sacrifice and ancestor veneration, though both methods of social control, serve as very different symbols for the same end. Distinguishing between the two and observing the patterns of their occurrence increases our understanding of elite Maya rulership. As demonstrated in this paper, the inclusion of human sacrifices in mortuary contexts was not the norm for the elite Maya, but one possibility out of several. Here, the evidence suggests the presence of three different mortuary practices in three different contexts and implies, instead of a singular method of elite legitimation through the manipulation of human remains, a general symbolic importance of the dead to the ancient Maya.

Significantly different from our modern Western view of the dead, the ancient Maya conceived an ongoing and active relationship with the deceased. In regards to this view of the afterlife and the connection of the living to it, McAnany et al. (1999:129) stated that the ancient Maya would “often blur the boundary between life and death” and

that this boundary was “viewed as a permeable membrane rather than an unbreachable chasm.” Human bones were not merely reminders of those once living, but symbols of their ongoing presence. The manipulation of human remains was a general, powerful symbol for the Maya and for centuries the dead, whether ancestor or enemy, aided the living in practices of social control and political maneuvering.

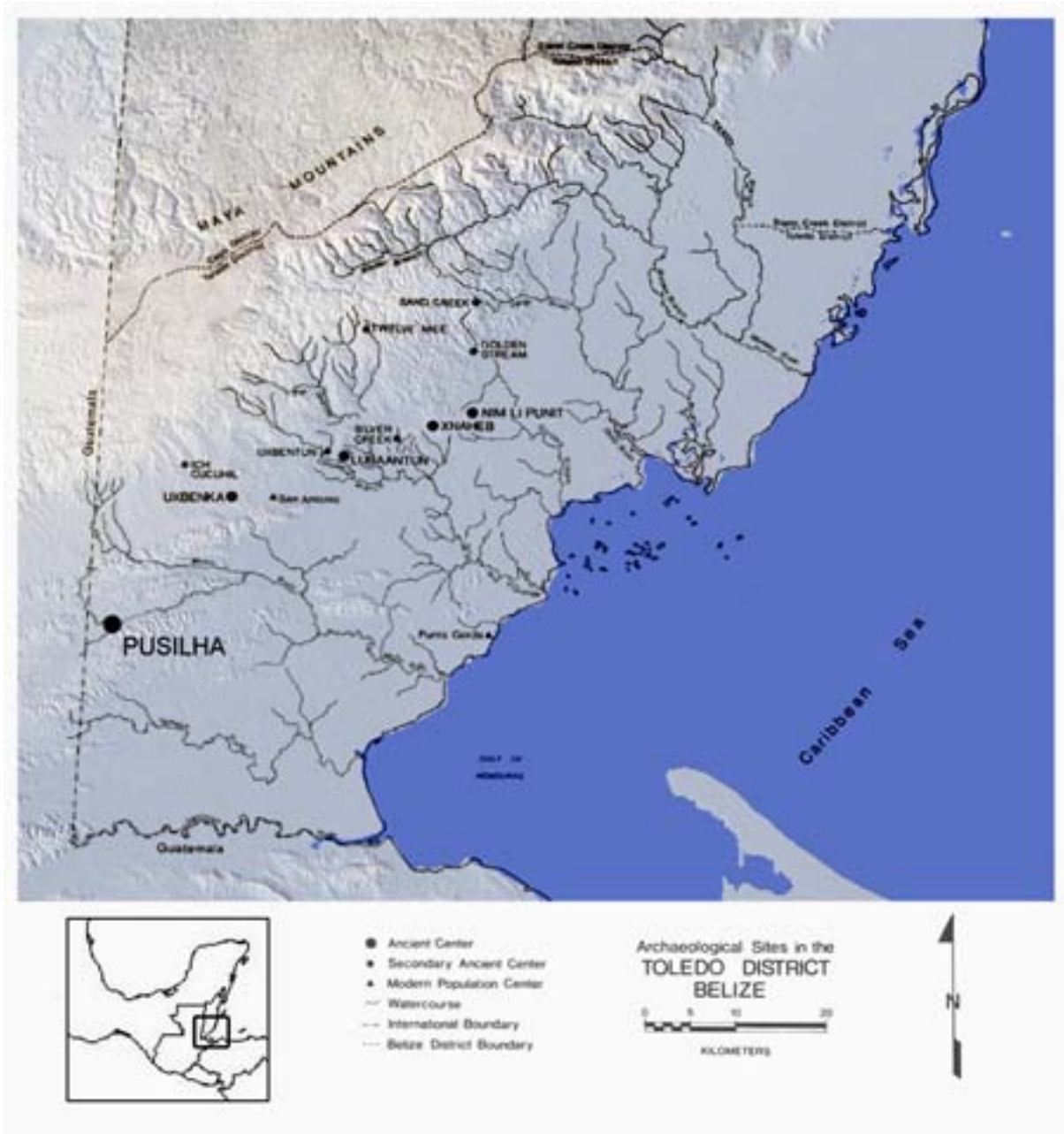


Figure 4.1. Southern Belize region, showing the location of Pusilhá and other Maya sites (Volta 2007:Figure1).

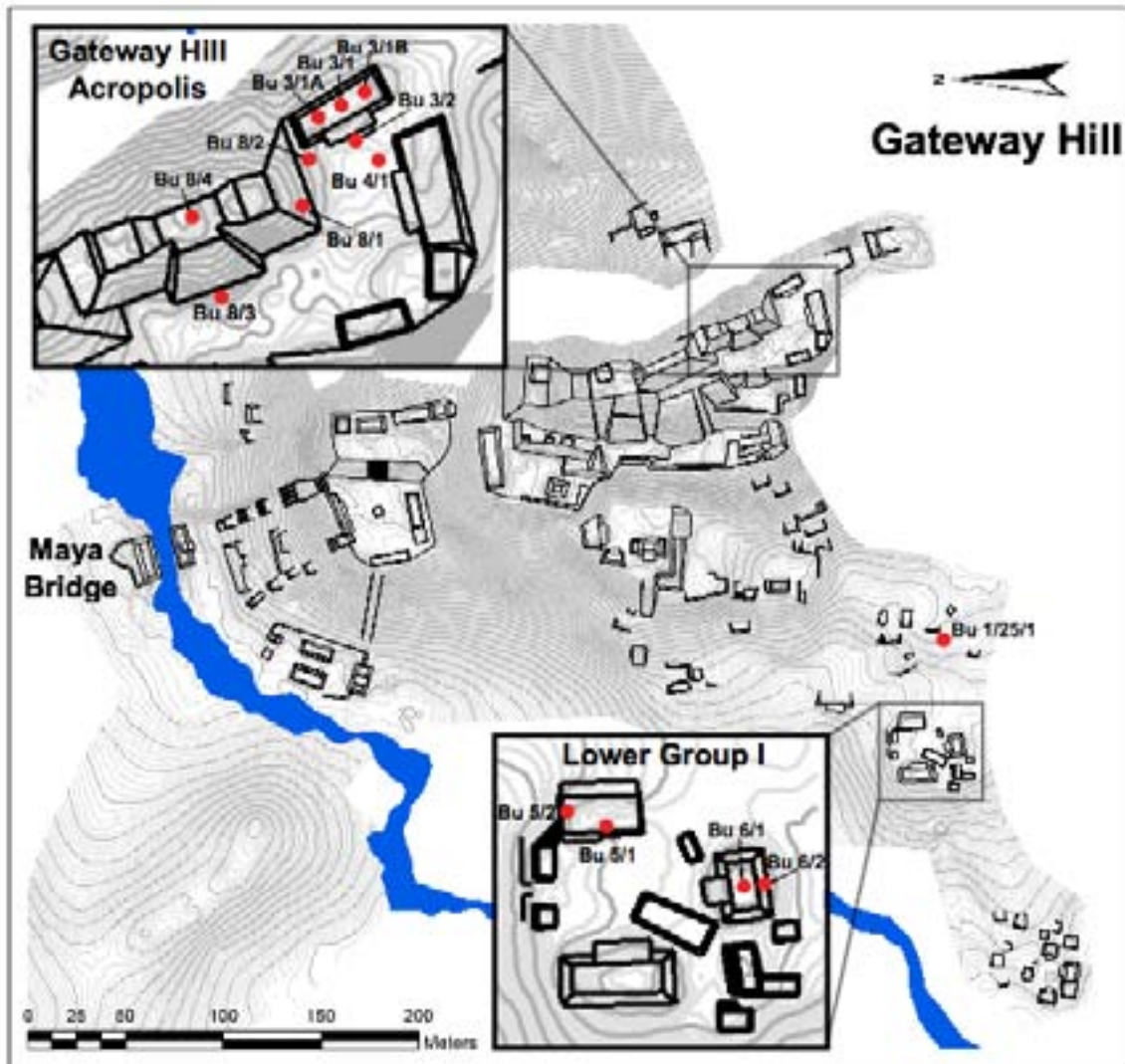


Figure 4.2. Locations of burials on Gateway Hill (modified from Volta 2007:Figure10 and Pitcavage 2008:Figure 3).

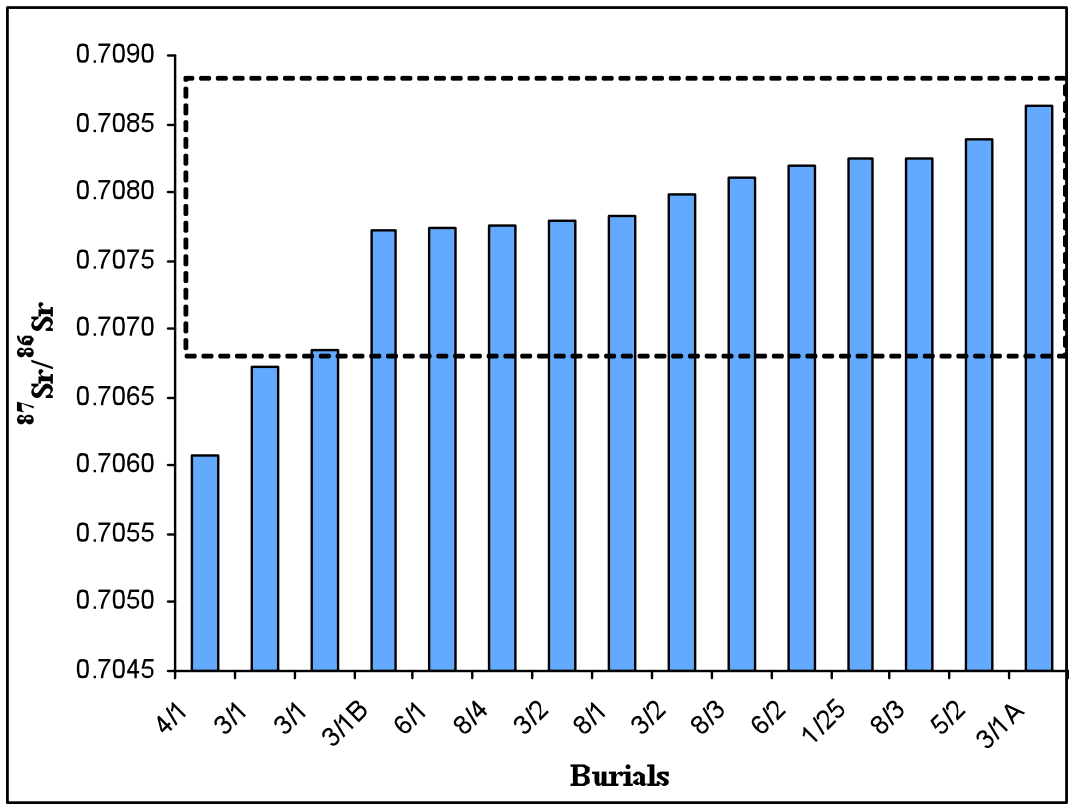


Figure 4.3. Graph of strontium isotope ratios by burial number. Dashed box represents two sigma baseline range for Pusilhá once the $^{87}\text{Sr}/^{86}\text{Sr}$ value of Burial is 4/1 excluded.

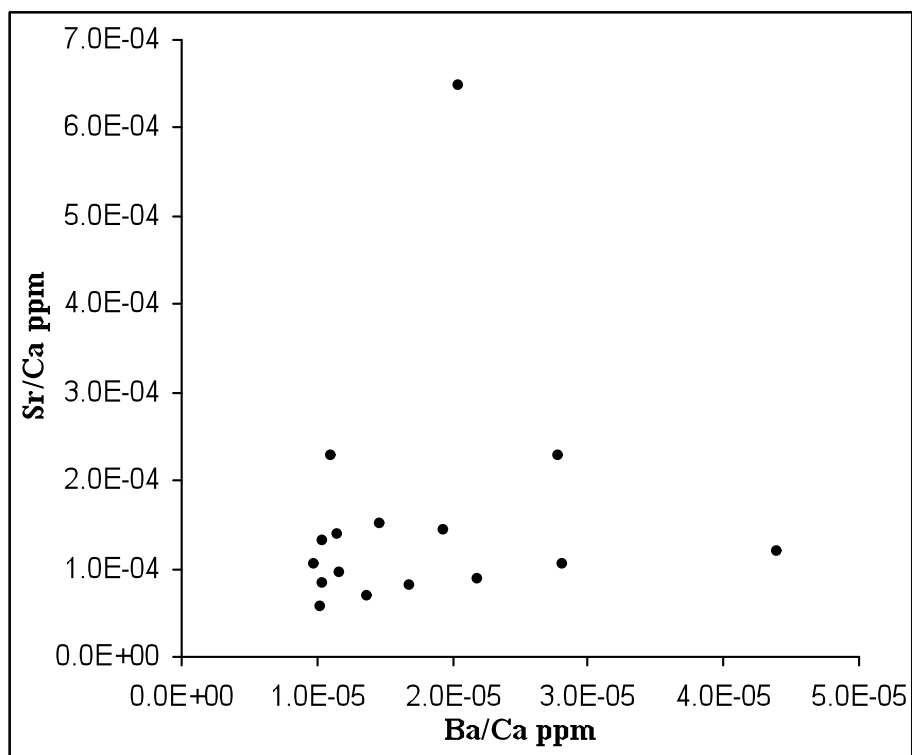


Figure 4.4. Scatterplot of raw Sr and Ba concentration values normalized over Ca.

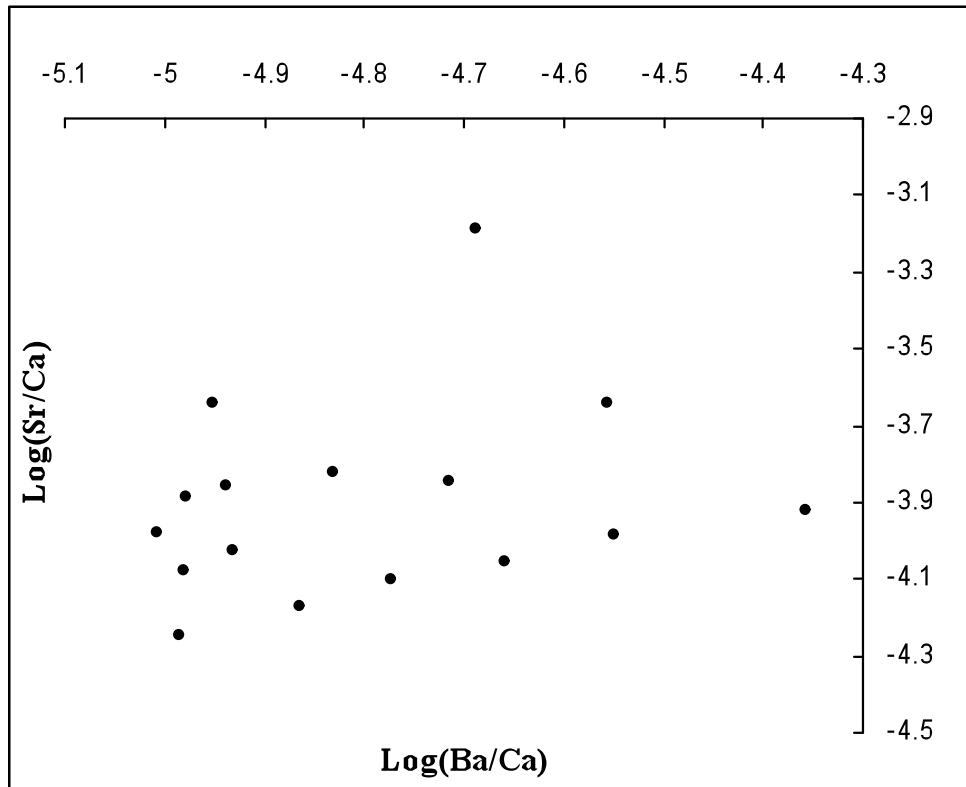


Figure 4.5. Scatterplot of Log(Sr/Ca) vs. Log(Ba/Ca) values

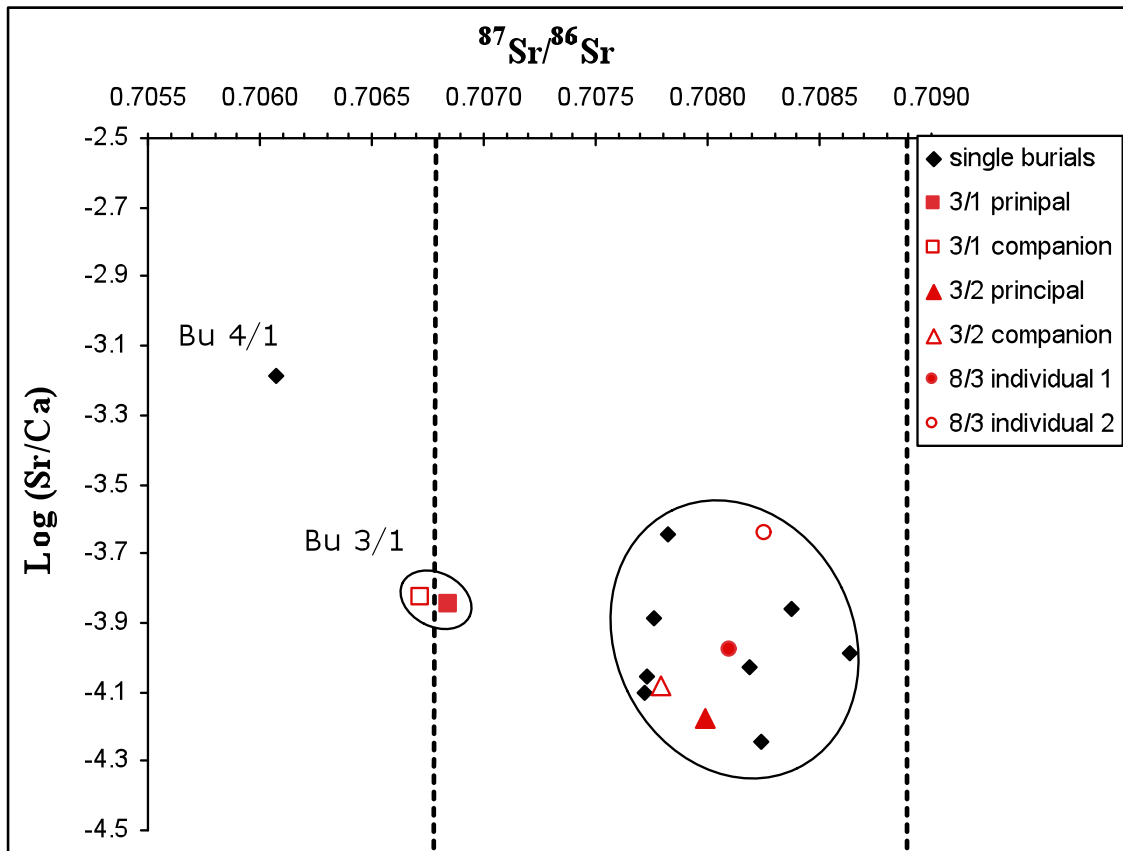


Figure 4.6. Scatterplot of $^{87}\text{Sr}/^{86}\text{Sr}$ ratios vs. $\text{Log}(\text{Sr}/\text{Ca})$ concentration values.



Figure 4.7. Map of $^{87}\text{Sr}/^{86}\text{Sr}$ ratios from across the Maya world. Adapted from Price et al. 2008:170.

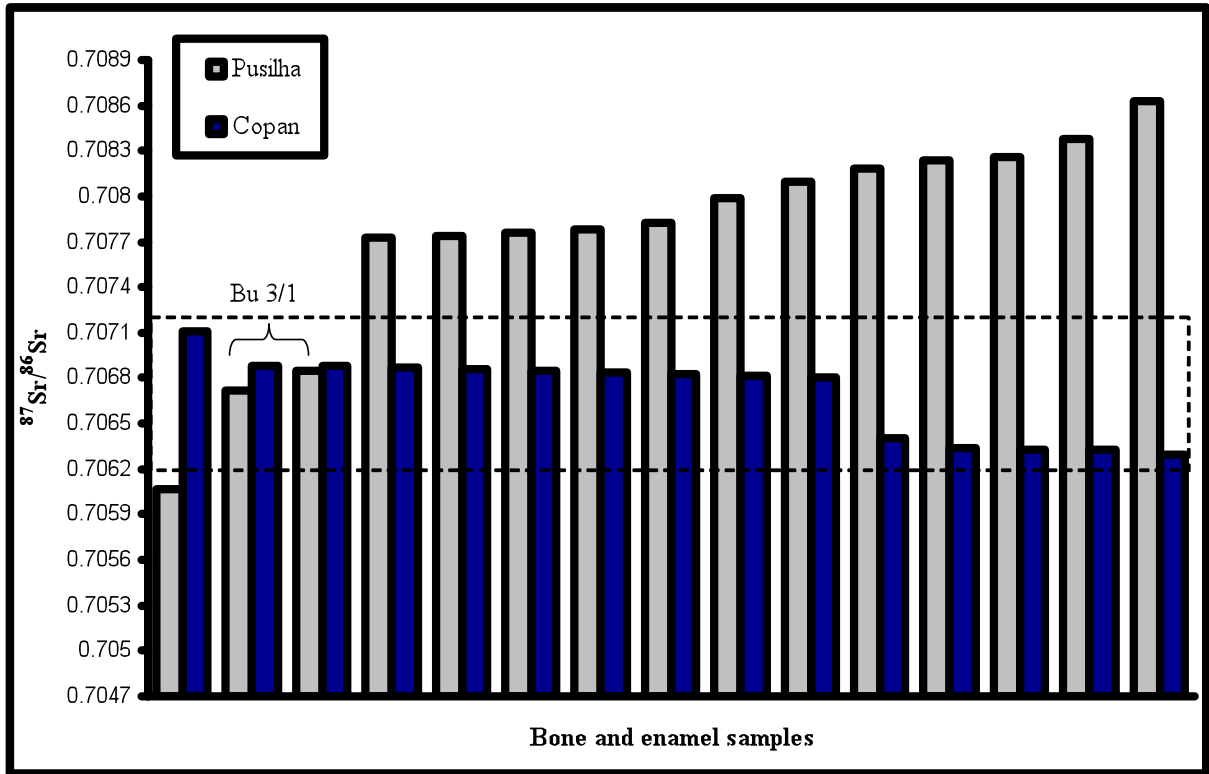


Figure 4.8. Graph of Pusilha Sr isotope values compared with Copan Sr isotope values. Dashed box represents the two sigma baseline range for local Copan values.

Table 4.1. Strontium isotope ratios of teeth from individual burials at Pusilha.

Burial	Tooth	Period	Sex	Age	Notes	$^{87}\text{Sr}/^{86}\text{Sr}$	U/Ca	La/Ca	Log(Ba/Ca)	Log(Sr/Ca)
1/25	rm2	TC		7-9		0.7082434	1.16123E-08	2.32245E-07	-4.983063544	-4.247286566
3/1	LM2	LC	M	YA	principal	0.7068487	4.93582E-08	1.19694E-06	-4.712556797	-3.849081129
3/1	LM2	LC		YA	companion	0.7067153	1.28278E-07	1.46937E-06	-4.829821257	-3.825066979
3/1A	LM2	LC		YA		0.7086336	-2.40777E-08	-1.80583E-07	-4.548797453	-3.98670312
3/1B	RM1	LC		OA		0.7077226	1.09714E-07	1.75543E-07	-4.771234521	-4.103605474
3/2	LC-	TC	M	OA	companion	0.7077875	2.41152E-08	2.29095E-07	-4.978702564	-4.081280819
3/2	LM2	TC	M	OA	principal	0.7079868	1.24857E-07	8.61512E-07	-4.862079875	-4.175405034
4/1	LM2	TC	F	A		0.7060699	-4.47593E-08	-2.01417E-07	-4.68732468	-3.18916778
5/1	rm1	LC		4-5		--		0	-4.355609747	-3.923174972
5/2	LM2	LC		SA		0.7083787	3.04364E-07	8.75045E-07	-4.936223826	-3.860972874
6/1	LM1	LC		YA		0.7077337	2.95053E-07	5.25964E-07	-4.658160511	-4.057459815
6/2	LM2	LC		A		0.7081875	1.37081E-07	-2.99086E-07	-4.931263066	-4.029329657
8/1	LM3	TC	M	A		0.7078217	1.33691E-08	8.02144E-08	-4.95121118	-3.644743124
8/3	RM2	TC	M	A	individual #1	0.7081012	4.67569E-08	-3.27298E-07	-5.00629994	-3.983759215
8/3	LM2	TC	F	OA	individual #2	0.7082555	6.34234E-08	-2.28324E-07	-4.555044977	-3.644115238
8/4	RM2	TC	M	OA		0.7077607	2.43588E-08	7.30765E-08	-4.977974715	-3.887604247

M – Male
 F- Female
 SA - Subadult
 YA – Young Adult
 A - Adult
 OA – Old Adult

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