Sibun Valley from Late Classic through Colonial Times:
Investigations of the 2003 Season of the Xibun Archaeological Research Project

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Few can foretell how an archaeological field season will turn out. As Boston Red Sox fans know well, solid financing and a talented staff provide no guarantee that the game will go your way. Contingent events—injury and sickness, poor weather conditions, field strategies that just don’t work and, in the case of archaeological field work, vehicle breakdowns—can cause a well-planned season to spiral into a situation that one simply hopes to live through. Fortunately, the 2003 season of the Xibun Archaeological Research Project (XARP) did not fall prey to the curse of the Bambino (even though the Department of Archaeology at Boston University is located less than two blocks from Fenway Park).

Perhaps our good fortune was due, in part, to the stellar nature of the field team that gathered together in pursuit of the deep history of the Sibun Valley. Field directors—Eleanor Harrison-Buck and Steven Morandi—returned for their third field season on the Sibun and both planned to gather data for dissertations as part of their PhD program at Boston University. Ellie would further investigate the Terminal Classic occupation with special emphasis on circular shrine structures and Steve was returning to Cedar Bank where he had found Spanish-Colonial deposits during the previous 2001 season. Enjoying his first season in Belize, Boston University graduate student Satoru Murata maintained our field computer system, was part of our reconnaissance team, and conducted the first excavations at Queso Blanco. David G. Buck, a graduate student at the University of Florida, returned for his second season with XARP to run the mapping-grade GPS instrumentation and head up the reconnaissance and survey team. Three graduates of the 2001 XARP field school—Christa D. Cesario, Emily Hall, and Jessica L. King—were promoted to staff positions and all three supervised excavations. In addition, Jessica and Emily rotated responsibility for the field lab during the first and second half of the field season, respectively. Polly Peterson, a Boston University graduate student, conducted reconnaissance in some newly encountered caves and also assisted with field photography. Tori Saneda, of Ohio State University, joined the project with plans to conduct a geophysical survey of Cedar Bank with a fluxgate magnetometer. Unfortunately, her plans were stymied by technical difficulties with the instrumentation although her test excavation at the site of a magnetic anomaly in the northern plaza of Cedar Bank yielded significant obsidian artifacts.

Investigation of the Anglo and African Colonial Period in the valley continued under the capable direction of Daniel Finamore (Peabody Essex Museum) who focused his efforts on the area of Gracy Rock. Project ceramicist, Sandra L. López Varela (Universidad Autónoma del Estado de Morelos) continued a type-variety analysis of the Sibun Valley pottery, grappling with both the well-preserved but unsealed contexts of cave pottery and the often poorly preserved but contextually stratified pottery from surface settlements. Kirsten J. Tripplett, project paleoethnobotanist (University of California, Berkeley), spearheaded the large-scale systematic sampling of excavation contexts for retrieval of botanical remains via water flotation. Palynologist John G. Jones of Washington State University returned to face another season of core extraction from the crocodile-infested oxbows of the Sibun River. Finally, Thomas F. Bullard, project geomorphologist from the Desert Research Institute in Reno, Nevada, addressed the complexities of
the fluvial system in the upper valley and the compelling question of why Xibun Maya built the Hershey site on a floodplain that is inundated during extreme discharge events.

The job of this talented staff was two-fold: to conduct field research while simultaneously providing training in archaeological field methods and inter-disciplinary research to a group of highly motivated undergraduate students. Six students from Boston University matriculated in this program: Lauren Bateman, Keri De Verna, Wallis Lord, Keith McIntosh, Kevin Mitchell, and Donna Yates. A student from Cornell University, Katherine Belzowski, and Alyson Thibodeau from Amherst College completed the group of eight undergraduate students.

The physical work of clearing vegetation from sites, chopping tree roots out of excavation areas, hauling heavy buckets, screening deposits for hours on end, and backfilling excavation units demands a level of patience, endurance, and strength that few North Americans can claim. XARP will always be indebted to the following Belizeans who with smiles and good humor undertook the heavy work of the project: Lance Usher, Elias Ortiz, Samuel Ortiz, Genaro Barrera, Vaughn Brakeman, Gilbert Cardenas, Marvin Caballeros, Alejandro Davila, Freddy Galdamases, Derrick Hemens, Whitfield Hemens, Leonel Hernandez, Isaías Rodriguez, and Walter Usher. In addition, Roderick Burns provided tremendous support to Kirsten Trippllett at the float tank and processed countless numbers of samples.

Community or grass roots support for archaeological investigations is a critical part of the recipe for a successful field season. The project enjoyed the continued support of the village of Freetown Sibun and the family of Augustine Obispo. Upriver at Cedar Bank, community leader Lance Usher helped to interpret the goals of the Xibun Project to the larger community. At the base of the Gorge, Bert Faux as the general manager of Hummingbird Citrus, Ltd. provided continued support by supervising repeated clearing of the Hershey site. The family of Ramon Galvez welcomed our survey of their ranch and the site we came to call Queso Blanco after the homemade cheese produced by Mrs. Galvez. Victor Quan, likewise, embraced our survey of his land near the confluence of the Sibun and Caves Branch Rivers.

The ability to move crews between field and camp locations and to conduct reconnaissance and survey is dependent upon reliable vehicles. Unfortunately, most of the XARP fleet is past its prime and was held together largely by the mechanical ingenuity of Bruce Cullerton to whom we will remain forever grateful. During the first half of the season, the crew was housed at Monkey Bay Wildlife Sanctuary on the Western Highway. We thank Matthew Miller and Marga Waals Miller for providing us with spacious accommodations in a unique research-camp setting. Camp managers—Fiona Martin and Michael Gibbs—plus the cooking and maintenance staff of the Wildlife Sanctuary expended tremendous effort to feed and house the XARP crew. During the second half of the season, the project moved to the upper part of the valley and was housed at the incomparably beautiful Yam Wits, a small resort along the Hummingbird Highway. Hosted by the family of Joy and Rupert Smith, the crew enjoyed meals planned by Carolyn Bellini and early breakfasts prepared by the staff of Yam Wits.

Last but not least, the National Science Foundation (BCS-0096603) and the Division of International Programs at Boston University provided funding for the 2003 field season. Permission to investigate the archaeological record of the Sibun Valley was granted by the government of Belize and, at that time, the Department of Archaeology under the Ministry of Tourism (Permit No. DOA/H/2/1/03). We are grateful for the support of the departmental staff that was headed in 2003 by Acting Commissioner George Thompson, and assisted by Brian Woodye, who graced us with site visits and handled the administration of the XARP permit.
Many other individuals—in Belize, Boston, and elsewhere—contributed to the success of the 2003 XARP field season. Although not named here, we extend our heartfelt gratitude to all whose generosity in spirit and kind helped to maintain us through fieldwork and subsequent preparation of this report.

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# Sibun Valley from Late Classic through Colonial Times:
## Investigations of the 2003 Season
### of the Xibun Archaeological Research Project

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Part I: Further Investigations within Coastal-Oriented Transect 5
Chapter 2
Riverside Residential Midden at the Samuel Oshon Site (Operation 25)

Eleanor Harrison-Buck and Jessica L. King

Operation 25 was positioned near the northwest corner of Structure 424, a relatively small platform situated about 7 m from a high bank of the Sibun River. The singular platform structure appears as a satellite mound separate from the site center of Oshon, located roughly 200 m northwest of Group A. Creation of a schematic planview of the platform revealed the presence of two smaller platforms that abutted the eastern and western sides of the main structure (Figure 2.1). The two platform extensions create inset corners on either side of the structure, perhaps functioning as small kitchen, storage, and/or work areas associated with the main platform structure.

Previous investigations at Oshon (Morandi and Thomas 2001; Harrison 2003) had focused on structures located in the main plaza of the Oshon site. Investigations during the 2003 season shifted the focus to a small, riverside platform (presumably residential) in order to gain insight into a non-elite context at the site. The excavation of Structure 424 aimed to clarify the techniques of platform construction and to glean a sample of occupational debris from the residence to better understand the range of domestic activities.

To quickly isolate midden debris associated with the residence, a series of fifteen shovel test-pits (STPs) were carried out on the western side of the structure (refer to Figure 2.1). STPs 11, 12, 14, and 15 encountered a more compact matrix than other test-pits, possibly representing the remains of the western platform extension. Spikes in artifact densities were especially noticeable in the vicinity of one of the inset corners created by the western platform extension, close to the northwest corner of Structure 424. Of the fifteen total STPs, numbers 6 and 9 held the highest density of cultural material. Operation 25, a 2 x 2 m excavation unit, encompassed both STPs in an effort to expose the densest portion of the trash deposit associated with the west side of Structure 424. The excavation was divided into two 1 x 2 m squares (A and B). STP 9 was within Square B in the center of the southern edge of the square. STP 6 was within the center of Square A, along the northern edge of the unit. Due to time constraints, only Square B was excavated during the 2003 season.

Excavations revealed a rich midden deposit, presumably refuse from activities taking place on the main structure and western platform extension. The significantly high density of lithic and obsidian material that was recovered from the excavation appeared clearly to exceed the needs of a single household, suggesting that some level of workshop production was carried out in this locale. The following details these and other finds from Zones 1-6 that were excavated in Operation 25 from Square B.

Overview of Operation 25

Zone 1

As mentioned above, Square B is a 1 m (east-west) x 2 m (north-south) unit located along the western side of Structure 424, near the northwest corner. Excavation of Zone 1 removed the topsoil of Square B, roughly 20 cm in depth. The matrix included about 10 cm of clay-filled alluvium directly beneath a 10 cm
thick humic layer. Only 50% of all sediment was screened due to the general paucity of artifactual material recorded in the topzone of the operation and within all fifteen STPs dug in and around Operation 25. A light density of cultural material was recovered. Notably, several porcelain colonial period sherds were recovered, along with three obsidian blade fragments.

Zone 2

An earthen layer directly underneath Zone 1, Zone 2 appeared to be an alluvial deposit that likely accumulated and gradually covered the mound through repeated inundation as a result of heavy rains and periodic flooding of the nearby river. The matrix was devoid of any inclusions. Artifact density increased significantly in this zone, beginning roughly 30 cm below ground surface. A number of historical pieces of metal were recovered in Zone 2. Additionally, a large quantity of obsidian (N = 13) was found, along with a relatively high density of chert cores, flakes, and debitage, indicative of all phases of tool production. Artifact density appeared higher in the eastern half of the square, nearest to Structure 424, nearest to where a metate fragment also was found. A flotation sample (15 liters) was taken of the general matrix of Zone 2.
At the base of the zone, a significantly darker and more compact artifact-filled matrix was encountered. The midden-rich area was designated Zone 3 and may represent a living surface partially covered by heaps of trash debris.

Zone 3

A midden-rich deposit that encompassed most of Square B (Figure 2.2), the Zone 3 matrix was significantly darker and contained more artifacts than Zone 2. Common artifacts included ceramic sherds and lithic debris, with flecks of charcoal throughout the matrix. Very few rocks were present. Only a few tiny limestone and conglomerate inclusions, along with two or three gravel-sized river stones were noted. The midden deposit was heaped against the northwest corner of Structure 424. The structure was built with a very compact clayey matrix with no evidence of stone masonry.

Figure 2.2. East and south wall cross-sections showing the midden in relation to Structure 424 (drawn and inked by E. Harrison-Buck).

Artifact density remained high in Zone 3. Several chipped stone tool fragments were found in this zone. Four reconstructible metate fragments also were collected, as well as one larger stone that may be a fragment of a different metate. A total of 32 obsidian fragments were recovered from Zone 3, including a few points. In the heart of the midden, two flotation samples were collected (10 and 15 Liters total) from which two 1L bags were sub-sampled for both pollen and phytolith analysis.

Zone 4

A 1 x 1 m area that was in the vicinity of STP 9, Zone 4 was excavated only in the eastern half of Square B (Figure 2.2). The zone comprised a compact earthen layer that resembled Zone 3 in color. Artifact density remained high in this zone and included obsidian, debitage, and ceramics. However, the obsidian density was much lower (9 pieces) in comparison to Zone 3 and the quantity of debitage was also less. A few diagnostic sherds were found, including rim pieces and slipped fragments. A discrete dark area in the northwest corner of the unit yielded a C-14 sample, while another larger sample was collected from the bottom of Zone 4 in the southeast corner of the unit. Small flecks of charcoal were noted throughout the matrix, and larger pieces found in the screen were collected as archaeobotanical samples. About twenty small pieces of fire-cracked rock were noted in the screen, but not collected. During the excavation of
Zones 3 and 4, the northwest corner of Structure 424 was defined in the southeast corner of the unit and was designated Zone 5 (see below). Zone 4 terminated at a more compact level, which resembled Zone 5 in texture and color, and may represent an outside patio surface (Zone 6).

Zone 5

Zone 5 consisted of the remains of Structure 424, a packed earthen mound with no signs of facing stones or other inclusions associated with its construction (see Figure 2.2). The Zone 5 matrix, a very compact clay construction fill (10 YR 4/6), was defined but not excavated during 2003. It consisted of a very compact clay construction fill (10YR 4/6). The portion of the mound that was exposed had a top elevation of roughly 132 cm below the datum and a bottom elevation of around 179 cm below the datum.

Zone 6

An outside patio floor of compacted earth, Zone 6 appears to have been informally prepared with no remains of plaster. The zone still measured roughly 1 x 1 m in area within the eastern half of Square B. Only a small area in the southeast corner of the square was not excavated in Zone 6. This was the location of Structure 424. The packed floor of Zone 6 abuts Structure 424 in a sloping fashion. The contact between the structure and the patio floor were indistinguishable, as both comprised of a compact clayey matrix with little to no stone. As Zones 4 and 6 were taken down, a portion of the compact earthen fill where the structure and the floor come together was excavated.

The midden debris was found heaped on the floor and against the western side of Structure 424 (Figure 2.2). This contact was clearly discernable—the midden was a darker, organic-rich color. Although charcoal flecks were found throughout the zone, the Zone 6 matrix did not contain the same high concentration as that of Zone 4. Larger chunks of charcoal were removed as C-14 samples, while others were collected as archaeobotanical remains. In general, the artifact density was much lower than in the overlaying Zone 4. Obsidian fragments were very small and few in number (N=5). Diagnostic sherds were found, including several ring bases. The density of fire-cracked rock also was significantly lower. Zone 6 was removed to the level at which STP 9 bottoms out.

Zone 7

A posthole probe of basal deposits, Zone 7 measures about 25 cm wide and 60 cm in depth. It was placed in the center of the 1 x 1 m area in the eastern half of Square B (Figure 2.3). Although removed as one zone, the dirt was excavated in 20 cm increments to monitor any fluctuations in the artifact density. The first 20 cm yielded two small, eroded sherds and a piece of microdebitage. While the following 20 cm yielded a single piece of microdebitage, the next 20 cm lacked any cultural material. The 60 cm of sediment from the posthole probe was consistent in color (10YR 4/6). However, Zone 6 was more compact than Zone 7, suggesting its possible function as a packed floor surface. Excavations ceased at this level for Zone 7 appeared to be an alluvial deposit that was culturally sterile.
Figure 2.3. West and north wall cross-sections showing the posthole probe at the base of the unit (drawn and inked by E. Harrison-Buck).

References Cited

Harrison, Eleanor

Morandi, Steven and Ben Thomas
Chapter 3
Circular Shrine at the Augustine Obispo Site (Operation 32)

Eleanor Harrison-Buck

The Augustine Obispo site is located in the lower reaches of the Sibun Valley in Transect 5. The site is situated on the southern side of the Sibun River, about 5km from Oshon—the largest site in the lower reaches of the valley (see Harrison and King, chapter 2). The Obispo site (Figure 3.1) consists of a main plaza group that contains at least five platform structures (Structures 475, 476, 480, 479, and 482) that were mapped during the 1999 field season (Morandi and Norris 2001; see also Thomas and Secchiarioli 2001). The largest mound, Structure 475, was the focus of an excavation (Operation 31) carried out during the 2001 field season (Morandi 2003). Excavations revealed a masonry façade of large cut limestone blocks and the eastern wall of a centrally located, outset staircase leading to the top of the high platform. Midden debris associated with Structure 475 appeared to date primarily to the Late to Terminal Classic period.

During survey in 1999, two groups of stone monuments were identified within the main plaza at Obispo; one associated with Structure 479 and the other with Structure 480. An excavation in 2001 (Operation 30) investigated the monument complex just to the north of Structure 480 (Morandi 2003). The excavation revealed large fragments of an uncarved altar with high densities of incense burner fragments found on and around the broken monument that appeared to date from the Terminal Classic to Postclassic periods (López Varella 2003; see also López Varella, Chapter 14).

During the 2003 field season, the primary goal of excavation at Obispo was to continue to investigate parts of the main plaza area. Further investigation of the highest platform, Structure 475, revealed an elite burial positioned at the top of the main outset staircase along the structure’s central axis. This excavation (Operation 33) is discussed in the following chapter (see Hall, Chapter 4). In addition, Operation 32 at Obispo exposed an area of the plaza where a second stone monument was situated, along with a large section of Structure 479, an all-stone circular building.

Operation 32, discussed herein, was oriented on a cardinal axis and measured 9 m (east-west) x 6 m (north-south). The unit covered just over half of the northwestern side of Structure 479 (Figure 3.2). The unit was divided into six squares (A-F), each measuring 3 x 3 m (Figure 3.3). All squares were superimposed over a portion of the structure. Only Squares A, B, D, and E were excavated during the 2003 season and the size of Square B was reduced due to an intrusive avocado tree. Square A contained only a small section of the circular structure. Together, the four squares revealed slightly less than half of the round structure that measured roughly 9 meters in total diameter. Square E was superimposed over the top portion of the mound and exposed a large area of the interior room of Structure 479. Squares A, B, and D revealed the exterior of Structure 479 and portions of the surrounding plaza area to the north and west of the structure. Just west of the central doorway of Structure 479 a large fragment of a stela was situated at the interface of Squares A and D. The monument fragment had fallen and did not appear to be in its original location (Figure 3.4).

Previous investigations in the Sibun Valley at the sites of Pechtun Ha and Oshon uncovered two other circular structures with multiple construction sequences that were strikingly similar to one another in construction technique and style (Harrison 2001 and 2003). These all-stone structures were quite similar.
Both were associated with stone monuments and a high density of marine shell was found on and around these buildings. Each building was constructed with a plinth or step surrounding the outer perimeter of a one-room superstructure. In both cases, the interior room was later in-filled and transformed into a platform structure.

Excavations of Operation 32 aimed to 1) further investigate the presence of circular architecture in the Sibun Valley 2) compare patterns in construction techniques and architectural style across space and time and 3) clarify the overall chronology of the main plaza at Obispo. The following provides a review of the construction phases that were identified during the 2003 excavation of Operation 32. A detailed description of the individual zones defined in each square follows an overview of the excavation techniques that were utilized during excavation.
Construction Phases

Operation 32 revealed three major construction episodes (Phases 1-3) that were further subdivided into Phases 1a and 1b, Phases 2a and 2b, and Phase 3, which were defined based on the appearance of minor architectural modifications. The following provides an overview of each architectural phase.

Phase 1

Phase 1a comprised the initial building of a low circular platform, referred to a Substructure 479 that was associated with a packed earthen floor (Plaza Floor 3). The two-course high wall of Substructure 479 was built of large, roughly cut limestone blocks and the fill of the low platform consisted of a mix of limestone and chert cobbles. A small portion of an earthen mound (Structure 482) was identified in the northeast corner of Operation 32 in Square B that also was associated with Plaza Floor 3. Additionally, a line of three stones, two-courses high running roughly north-south was revealed in the southwest corner of the excavation unit (Square D) that appeared to have been built during Phase 1a. The portion of the wall rested on Plaza Floor 3 and abutted the southern edge of the circular platform. The wall construction was associated with Substructure 479, but its function could not be discerned due to limited horizontal exposure. During Phase 1b, another plaza floor (Plaza Floor 2) with a 15-20 cm thick fill layer covered the earlier plaza floor and the first course of stone on Substructure 479. This second plaza floor also was associated with Substructure 479 and Structure 482, as well as the corner of a one-course high wall identified in the

![Aerial photo of Structure 479, showing earlier Substructure 479](photo taken by P. A. McAnany).
Figure 3.3. Planview of Operation 32, showing features of and Plaza Floor 1 and Structure 479 during Phase 2 (drawn and inked by E. Harrison-Buck).

Figure 3.4. Cross-section of stela fragment, looking north.
southwest corner of the unit in Square D. This low wall appeared to be part of another structure to the south of Substructure 479, but cornered south into the wall of Square D and continued outside the limits of excavation.

Phase 2

During Phase 2a, Substructure 479 was entirely covered over by another floor (Plaza Floor 1) and the low-walled superstructure of Structure 479 with its interior room was constructed overtop. The new plaza floor did not appear to run underneath Structure 479, but a separate floor (Interior Floor 1) was built inside the room of Structure 479. Thus, the new plaza floor and the superstructure of Structure 479 seem to have been built at the same time during the initial part of Phase 2. During this phase, a trash pit was dug into Plaza Floor 1 and intruded into the two earlier floors. The midden pit was located just to the north of Structure 479 in Square B, in the northeast corner of the excavation unit. Subsequently, a plinth or low step was added to the outside of the superstructure during Phase 2b. Continued use of the midden pit throughout the site’s history is possible considering the quantity of debris that was heaped overtop of the pit feature. At this time, the interior room floor of Structure 479 was resurfaced. A thick floor covered almost the entire first course of the interior wall of the superstructure and ramped down through the doorway and merged with the existing Plaza Floor 3 that continued to be used throughout Phase 2 and into Phase 3.

Phase 3

During Phase 3, the interior room was in-filled with large limestone slabs and recycled stone material and transformed into a platform structure. The fill mostly comprised large limestone slabs that were positioned upright in the loose fill. The finely cut doorjamb stones of the superstructure were dismantled and used to block the doorway entrance. This makeshift retaining retained what appeared to be a haphazard and expedient in-filling job. The large quantity of recycled stones appear to have been robbed from other buildings at the site, suggesting a period of decline at the site. Surface preservation was poor, but some of the reused stone may have functioned as terracing on the newly formed platform surface. At this time, the stone monument seems to have been moved and re-positioned around the front of the structure’s doorway.

Excavation Techniques

In an effort to glean a maximum level of information, one hundred percent of all soil excavated was screened through a quarter-inch screen. At least one 30-liter soil sample was removed from each zone for water flotation carried out in the field lab. More intensive soil sampling was conducted on organic-rich deposits, such as the midden deposit that was identified in Square B. During excavation trowels were primarily used, with picks and shovels being used infrequently to remove dirt and large stones from areas of heavier overburden, such as the large quantity of construction fill that in-filled the interior room as part of Phase 3. Trowels (and dental tools when necessary) were utilized to define the surface of architecture and in situ deposits. Excavation removed levels of sediment in the context of defined zones within the individual squares that measured 3 x 3 m. Any changes in zone size are noted in the zone descriptions. Any links in construction sequences between zones are indicated in the descriptions and through their phase designations. Two datums were used throughout excavations. Datum 1 was used for all elevation measurements for Squares A and B and Datum 2 was used for elevation measurements in Squares D and E. The following provides the details of excavation by zone, grouped together by construction episode beginning with the latest architectural phase.
Phase 3

Zone 1

Zone 1 consisted of a thin layer of topsoil covering the surface of the entire operation (Squares A, B, D, and E). Considerable vegetation covered the ground surface of the operation prior to excavation. A high density of roots was encountered throughout Zone 1. In addition to an existing avocado tree in Squares B and C, numerous tree stumps and other modern disturbances were present throughout the unit. There were a number of pitted areas, likely representing past tree fall that had slightly disturbed portions of the structure. The mound also showed evidence of modern burning. High densities of charred organic material, blackened limestone, and reddened chert material were recovered throughout Zone 1. The stela fragment, partially visible on the surface, also was blackened. Excavation of Zone 1 revealed numerous ant nests that also have contributed to the disturbance of the ancient remains. Additionally, cows roamed the vicinity of the site, which was in relatively open pasture, and would graze on the mounds and sometimes enter the excavation units.

At the base of Zone 1, the top portion of the superstructure walls (Zone 20) of Structure 479 and an outer wall of a low step or plinth (Zone 19) surrounding the perimeter of the building was partially exposed. The top portion of also was exposed at the base of Zone 1. Artifact density throughout Zone 1 was generally low. There was about 20 unworked fragments of marine shell recovered from Zone 1. Only a light density of ceramics was found in the topzone. There was a high density of chert material collected, especially around the surrounding edge of the structure where a high density of collapsed stone debris was encountered toward the base of the zone. Much of the raw chert material may have been used as construction fill material. However, two large nodules found resting on the surface of the plinth were distinctive from the bulk of the material and perhaps represented raw material brought to the site for the purposes of tool production. Some of the chert collected from Zone 1 were indicative of each phase of tool production, worked in the form of cores, flakes, debitage, and chipped stone tool fragments.

Zone 2

Zone 2 was underlying the Zone 1 topsoil and consisted of tumble debris that had fallen from Structure 479. The collapsed debris was lying on the low step (Zone 19) that surrounded the structure and debris also was found within the plaza area. The collapsed debris consisted of a loose matrix with varying sized limestones. Some of the stones are cut and others were rough cobbles and pebbles that were likely collapse from the interior construction fill. Zone 2 in Square B comprised tumble only outside of the structure and Zone 5 consisted of the tumble over the plinth (Zone 19). However, Zone 2 in Square D comprised the tumble in both areas and Zone 5 consisted of a thin layer of residual tumble on the step.

At the base of Zone 2, tumble continued in the area surrounding the exterior of the structure. A nicely preserved 40 cm-high wall of the Zone 19 step was almost entirely exposed. A high frequency of large, cut limestone blocks were removed as part of the Zone 2 collapsed debris. Several areas of Operation 32 contained the remains of tree stumps that had disturbed parts of Structure 479. Artifact density gradually increased with depth. Zone 2 yielded roughly an equivalent amount of unworked marine shell (N=17).
Zone 3

Zone 3 was the tumble directly underneath Zone 2 and consisted of limestone and chert cobble and pebble debris collapsed from Structure 479. The matrix was similar to Zone 2, but toward the base of the zone the density of stone increased, especially the quantity of chert nodules. The artifact density increased steadily over the course of Zones 2 and 3 in Squares A, B and D. Square E encompassed a large portion of the interior room of the building and the fill inside the room was removed separately (see Zones 6, 7, and 15). A number of large metate fragments and one mano fragment were identified, point-plotted, and drawn in situ (Figure 3.3). In addition, a high density of marine shell (N=176 shell fragments) was recovered from around the plaza floor surface, in the vicinity of the doorway of Structure 479. These artifacts appeared to be associated with the latest plaza surface that was encountered at the base of Zone 3.

The latest plaza surface (Plaza Floor 1) was exposed at the bottom of Zone 3 in Squares A, B, and D, along with portions of the circular structure in Squares B, D, and E. In Squares B and D portions of the floor were relatively flat and well-constructed while other areas of the floor exposed in Squares A, B, and D were poorly preserved with a rough, undulating surface created by protruding limestone and chert cobbles. Further excavation revealed that the rough plaza floor represented the top of an earlier circular platform (Substructure 479) that ran underneath a portion of Structure 479. Although very poorly preserved, the latest plaza floor (Floor 1) covered over the earlier, two-course high circular platform. Excavations outside the earlier platform structure indicated that the surrounding plaza area was gradually built up over time to cover the earlier platform (see Zones 21-26).

Excavation of Zone 3 revealed the bottom course of stones on the exterior step (Zone 19) that post-dated the latest plaza floor, resting directly on its surface. Plaza Floor 1 appeared to have been built at the same time as the initial phase of Structure 479 (during Phase 2), following the discontinued use of Substructure 479 (Phase 1). During Phase 3, the structure was in-filled and transformed into a platform structure and the quality of construction declined significantly (see Zones 6, 7, and 15 below).

At the base of Zone 3, a rich midden deposit (Zone 4) that appeared to be entirely associated with Phase 2 occupation was exposed in Square B to the north of Structure 479. Some of this surface material was collected as part of Zone 3, but the bulk of the midden was removed separately as Zones 4 and 8 (see Phase 2a below).

Zone 5

Zone 5 was restricted to Squares B and D and comprised the tumble directly over a plinth (Zone 19) added to Structure 479 during a modification to the building (referred to as Phase 1b). The low step surrounded the perimeter of the (Zone 20) free-standing superstructure which represented the initial building phase of Structure 479 (Phase 1a). The thin layer of tumble was removed in an effort to define the surface of the plinth and any terminal debris lying on its surface. In Square D, some of the tumble over the step was removed as Zone 2 and the residual tumble was then taken out as Zone 5. In Square B, all tumble over the step was removed as Zone 5 and Zone 2 was restricted to the tumble north of the step. Ultimately, very few artifacts were recovered from the surface of the step. The tumble was similar to Zone 2, comprised of a rock-filled matrix that was primarily limestone.
Zone 6

Zone 6 appeared to be a mix of tumble and construction fill that effectively in-filled the interior room of Structure 479 during a final phase of construction (Phase 3). Zone 6 was restricted to an area of the interior room exposed in Squares D, E and a small part of B. Zone 6 was primarily located in Square E due to its relative position over a large area of the interior of the room of Structure 479. The interior room fill was differentiated from the overlying tumble by the presence of sizeable limestone blocks placed upright in the matrix. These large, upright stones and surrounding fill were removed as Zone 7. A light density of artifacts were recovered from all three squares, with slightly more found in Square E due to its size. Zone 6 yielded about 23 shells and two small speleothems positioned in and around the doorway of Structure 479. At the base of the zone the top portion of the interior wall construction of Structure 479 was exposed.

Zone 7

Zone 7 comprised more of the construction fill inside the interior room of Structure 479, primarily located in Square E. Zone 7 was directly underlying Zone 6 and the zone remained restricted to fill inside the interior room. A color change in the soil signified the change from Zones 6 to 7. The matrix of Zone 7 was a lighter gray, silty clay soil with more densely packed limestone boulders and cobbles. Most of the limestone blocks in the fill were positioned upright in the matrix. The use of large, upright stones in the interior of the structure appeared to have been an expedient method of in-filling the room and doorway. The largest upright limestone blocks were found in the vicinity of the western doorway, positioned in a rough line as if to block the entrance and function as rough retaining wall for the interior room fill (Figure 3.5). These large slabs were finely cut stones that may have been originally part of the doorjamb walls, which were partially dismantled.

![Figure 3.5. Western cross-section of Structure 479 showing the central doorway infilled during Phase 3 (drawn by J. King and inked by E. Harrison-Buck).](image-url)

Several discrete fill layers were recognized during excavation of the interior room (see Figure 3.5). There was an initial layer of packed limestone cobbles (Zone 15), followed by a series of large, limestone slabs positioned upright in a loose to semi-compact matrix (Zone 7), topped with a darker gray matrix with small and large cobbles (Zone 6) that comprised some cut stones with plaster that appeared to have been robbed from another structure. The poor method of construction and use of robbed stone suggests that the site witnessed a decline during the final occupation, perhaps during the Postclassic period, at a time when
labor forces were lacking at the site. Like Zone 6, artifact density remained relatively low. Square E yielded a metate fragment and a large conch shell fragment that were point-plotted and mapped in planview.

Zone 15

Zone 15 consisted of the last 15-20 cm of construction fill overlying the latest floor surface (Zone 16 – Interior Floor 1) inside Structure 479. The fill was comprised of mostly small to medium sized limestone cobbles (25-0.2 cm) densely packed in a semi-compact matrix. Like Zone 7, Zone 15 also contained a number of the larger, limestone slabs situated upright in the matrix along with a number of nicely cut, recycled limestone blocks, some with plaster facing. The zone was located directly below Zone 7 and the size of the zone did not change, restricted to the interior portion of the room. Excavations removed the remainder of the Phase 3 fill lodged within the interior of the building and defined a fairly well-preserved plaster-like interior floor, along with an arching interior wall that formed a portion of a circular room. The limestone blocks used for the doorjams were finely cut stone, but the other stones of the interior wall were less well-produced, constructed of softer, more roughly-hewn limestone masonry. Traces of mortar-like material suggested that originally they may have been covered with plaster. As noted, some of the doorjamb stones were purposefully dismantled when the interior room was in-filled during Phase 3 and it is possible that the interior walls also were partially defaced at this time.

Phase 2a

Zone 21

Zone 21 consisted of a portion of the latest Plaza Floor 1 found in Square D that was built during Phase 2a, when Structure 479 was initially constructed (Figure 3.6). The floor was found to run underneath the Zone 19 step that was later added to the exterior of Structure 479 during Phase 2b. The Zone 21 floor surface appeared to be equivalent to Plaza Floor 1 (Zone 9) found in Square B. Plaza Floor 1 continued to be used during Phases 2b and 3. Plaza Floor 1 was directly overlying Plaza Floor 2 and covered over Substructure 479.

Figure 3.6. South wall cross-section of Square D, showing Zones 21-24 and 26 in relation to the superstructure of Structure 479 (drawn and inked by E. Harrison-Buck).
Zone 9

Zone 9 represented both Plaza Floors 1 and 2, two consecutive plaza floors built one on top of the other that were partially exposed in Square B. The division between these two floors was not recognized during excavation, but was clarified in the east wall cross-section of Square B where a small area of the floors were excavated together (Figures 3.7 and 3.8). Other parts of the excavation, namely Zone 21 in Square D, clearly showed these floors as two discrete surfaces (refer to Figure 3.6). Only a light density of artifacts were recovered in association with Plaza Floor 1, with the exception of a concentration of artifacts found in a midden deposit overlying Floor 1 in Square B (see Zone 4 below).

Figure 3.7. Cross-section of Structure 479 and Substructure 479 running underneath, looking south. Note Plaza Floors 1-3 (drawn and inked by E. Harrison-Buck).

Figure 3.8. Schematic cross-section of the east wall of Square B, showing the relative location of Zones 4, 8, and 12 in relation to Structures 479 and 482 (drawn and inked by E. Harrison-Buck).
Zone 20

When Plaza Floor 1 was laid down during Phase 2a, Zone 20, the superstructure of Structure 479, also was constructed (see Figures 3.6 and 3.8). At its highest point, the exterior of this free-standing circular wall contained four courses of finely cut, veneer-type facing stones. The interior wall was less well constructed and comprised more roughly hewn facing stones. The two sets of walls sandwiched a 20 cm thick core construction fill. The core fill was made up of limestone and chert cobbles and pebbles that ranged from 0.5 cm to 15 cm in diameter. All together, the free-standing wall measured approximately 85 cm thick. It was not until Phase 2b that the exterior step (Zone 19) was built that surrounded the perimeter of Zone 20 superstructure.

Zone 17

Zone 17 (Figure 3.9) consisted of the initial interior floor surface inside the room of Structure 479 that corresponded with the first building phase of Structure 479 (Phase 2a). Although it appeared to be a separate construction, the initial interior floor of Structure 479 appeared to be contemporaneous with the building of the exterior Plaza Floor 1. The building (Zone 20) comprised a circular superstructure with low, 4-course high walls and an interior floor surface (Zone 17) that was laid down inside the room of Structure 479.

Figure 3.9. East wall cross-section in Square E, showing Zones 16, 17 and 18 in relation to the northern interior wall of Structure 479 (drawn and inked by E. Harrison-Buck).
Terminal debris, consisting of ceramic sherds, animal bone, two marine shells, and a worked jaguar canine, were found resting on the surface of this floor, covered over and protected by a later resurfacing of the interior floor (Zone 16). The builders of the following floor construction may not have been concerned with cleaning the surface of the floor before building another floor directly over it. However, it is possible that these artifacts were purposefully left as a termination ritual at the end of the floor’s use.

Z

Zone 4

During Phase 2, a large trash deposit was formed just to the north of Structure 479. Zone 4 consisted of a midden deposit restricted to Square B that was associated with Plaza Floor 1, Structure 482, and Structure 479 (Figure 3.10). The midden was originally part of a pit deposit (Zone 8) that was entirely in-filled with trash and overflowed onto the surrounding plaza floor. The dense layer of material removed in Zone 4 was an overflow of trash from the pit that was heaped on and around Plaza Floor 1, tapering out along the eastern and western edges of Square B, just north of the step of Structure 479. The pit cut into the southwestern corner of Structure 482 and trash was heaped on and around the corner of the structure.

Figure 3.10. Planview of Zone 4, the surface of a midden deposit found in Square B in the northeast corner of Operation 32 (drawn and inked by E. Harrison-Buck).
The midden debris in Zone 4 was comprised primarily of ceramic material. A high density of sherds lay relatively flat and layered over the pit and surrounding plaza floor area (refer to Figure 3.10). Lithics, shell, animal bone and other material also were recovered throughout Zone 4. Excavations of the zone entailed the removal of the layered trash debris. In the process of attempting to clear off the heaped midden material in Zone 4, intact portions of Plaza Floor 1 along the northern edge of Structure 479 in the southeast corner of the zone were partially removed with Zone 4. Further excavation of the plaza floor in this area of Square B (Zone 9) later revealed that there was two floors (Plaza Floors 1 and 2) built consecutively one on top of the other (Figure 3.7). The Zone 4 excavation had removed a small portion of Floor 1 along the northern edge of Structure 479, stopping at the surface of Floor 2. Excavations confirmed that the midden pit and heaped trash material was associated with the latest plaza floor (Phase 2). The debris stopped just north of the plinth (Zone 19) and the overflow of artifacts did not appear to run underneath the step, suggesting that the pit feature may have been dug during Phase 2b. However, the quantity of debris suggested it may have been dug during Phase 2a and perhaps was used for the duration of the site’s history. Zone 4 removed the heap of debris and some of the surrounding plaza floor and exposed a discrete pit feature filled with more refuse (Zone 8).

**Zone 8**

At the base of Zone 4, after excavating down roughly 10cm, the enigmatic pit feature was better defined (Figure 3.11). The material inside the pit was a continuation of the midden deposit in Zone 4, but was removed separately as Zone 8 to maintain vertical control of the deposit. Removing the deposit in arbitrary levels provides discrete stratigraphic levels with a relative chronology identifiable in the ceramic types from each zone. The methodology enables one to identify what the time depth was in the formation of the trash deposit (e.g., 50 years, 100 years, etc.).

The pit cut into the latest plaza floor and also cut into the side of Structure 482, an earthen mound to the north that was initially constructed during Phase 1 (see Phase 1a - Zones 10, 11 and 13). The western edge of the pit revealed a straight line of small, uncut stones that may relate to the edge of Structure 482, but limited horizontal exposure made this difficult to determine with any certainty. This rough line of stones abutted a portion of the outside of Substructure 479, the earlier round structure that also was associated with Phase 1. The straight line and orientation of the stones appeared to be in alignment with Structure 482 and not associated with Substructure 479. The pit appeared to cut into the edge of the southwestern corner of Structure 482 and may have been associated with later activities taking place on this mound during Phase 2 (perhaps functioning as a kitchen area?).

The midden pit cut into the surface of Plaza Floor 1 (Zone 9) and intruded into Plaza Floor 2 and a portion of an underlying midden-rich fill layer (Zone 11) that was part of an earlier Phase 1 construction. The interface between Zones 8 and 11 was difficult to discern—both were dark, organic-rich matrices filled with artifacts. As the edge of the pit was defined in Zone 8, small portions of the Zone 11 fill were removed as part of the pit fill. Zone 8 stopped short of the base of the pit. The bottom of the pit was removed as Zone 12 and may have included some of the Zone 11 fill as well. Figure 3.8 presents a schematic cross-section of the east wall of Square B that shows the relative position of Zones 4, 8, and 12, along with the surrounding floors and construction fill layers in relation to Structures 482 and 479.

Artifact density in Zone 8 was heavy, with high densities of partially reconstructable sherds, faunal material (primarily fish remains), freshwater and land snail, as well as some marine specimens, including one whole conch shell. Some lithics also were retrieved. Nearly all of the soil removed as Zone 8 was
subjected to water flotation. Only 40 out of 225 liters of dirt was screened through 1/8" screen—the remaining dirt was floted with heavy and light fraction still to be processed. Around 12 liters of the total soil collected was reserved for pollen and phytolith analyses.

Zone 12

Zone 12 represented a mixture of trash debris lying directly below Zone 8 at the base of the midden pit and some of the Zone 11 midden-rich fill layer (see Figure 3.8). As noted in Zone 8, the distinction between these two dark, organic-rich layers filled with charcoal and other cultural material was difficult to discern. Zone 12 maintained the boundaries of the pit that were defined at the surface of Zone 8 and tapered in only slightly. Zone 12 was cleared down to the level of Plaza Floor 3 (Zone 26), a compact gray
clayey surface that was identified in parts of Squares B, D, and E. Excavations in Square B did not continue any deeper than this floor level.

**Phase 2b**

**Zone 16**

During Phase 2b, the interior floor of Structure 479 was re-surfaced (Zone 16) and a new floor was laid down directly overtop of the initial Zone 17 interior floor (Figure 3.9). The resurfaced floor sloped down slightly as it ran through the western doorway and merged with Plaza Floor 1, which was re-used during the final facet of Phase 2. The Zone 16 floor covered the first course of the interior superstructure walls of Structure 479 and clearly post-dated the initial Phase 2a construction. The floor surface was very compact but was not a formally prepared plaster surface. The floor consisted of a compact clay mixed with flecks of limestone resembling sascab material. Zone 16 had a densely-packed limestone ballast fill below the smooth plaster-like surface. Both interior floors (Zones 16 and 17) were flat and fairly well-constructed. The fine preservation of the Zone 16 floor was likely due to the protective construction fill (Zones 6, 7 and 15) that later in-filled the room during Phase 3 and transformed the building into a solid platform construction.

Unlike the interior floor, very little plaster existed on the outside plaza surface, especially in the areas that covered an earlier construction of another circular platform (Substructure 479). Here, the plaza floor appeared as a rough, cobble-filled surface with a large number of limestone and chert cobbles protruding through the surface that represented the fill of Substructure 479. The latest interior floor (Zone 16) was built during Phase 2b as part of a modification corresponding with the building of the outer step (Zone 19) that surrounded the perimeter of Structure 479.

**Zone 19**

Zone 19 represented the retaining wall and associated fill of an exterior step that was added to the perimeter of the Zone 20 free-standing superstructure of Structure 479 during Phase 2b (see Figures 3.6 and 3.8). The step contained at least two courses of facing stones, although the top course was only preserved in Squares A and B. Only one course was found intact in Square D. The step was excavated in Square D and not removed in the other squares where it was best preserved. Excavations in Square D revealed a fill consisting of both limestone and chert cobbles measuring roughly 0.2 cm – 20 cm in length. The step rested directly on an earlier circular platform structure (Substructure 479) and the surrounding Plaza Floor 1 (Zone 9 in Square B and Zone 21 in Square D) and clearly post-dated the construction of this latest plaza floor (refer to Figure 3.7).

**Phase 1a**

**Zone 26**

Zone 26 represented the earliest plaza floor (Plaza Floor 3) that was exposed in Operation 32 (Figure 3.12). The packed earthen surface was constructed during Phase 1a and was associated with Structure 482, as well as the initial phase of Substructure 479. The floor appeared to run underneath
Substructure 479 and may pre-date the early round structure. Small portions of the Zone 26 floor were defined in Squares B, D, and E in association with the exterior of Substructure 479. The packed earthen floor contained organic-rich debris and artifacts, namely sherds that were tamped into the surface. The floor was significantly higher in Square B than in Squares D and E. This may have been due to a natural slope that appeared to angle downward to the south.

**Zone 13**

Zone 13 represented the southwestern corner of Structure 482, a compact, clay-filled mound situated to the north of Structure 479 that extended beyond the northern limits of the excavation unit. Structure 482 was constructed during Phase 1a, when the initial plaza floor (Plaza Floor 3 – Zone 26) was laid down. The structure appeared contemporaneous (or may have slightly pre-dated) Substructure 479.

The low earthen mound of Structure 482 contained little evidence of any stonework. A small line of stones revealed in the Zone 8 midden pit may represent the western edge of the structure, abutting the northeastern edge of Substructure 479, but no large cut stones were evident (see Figure 3.10). Any traces of retaining wall stones may have been removed when the midden pit was dug into the corner of the structure and the line of stones may have been added later to define and/or reinforce the southwestern corner edge of Structure 482.

Although partially submerged by the subsequent fill and floor construction episodes, Structure 482 appears to have been maintained through time based on evidence of a later fill layer that was added to the exterior of the structure (see Zone 10) during Phase 1b. The placement of the midden pit suggests that the platform structure may have remained functional throughout Phase 2. The refuse found associated with the midden pit, corresponding with Phase 2, was more reflective of food preparation and other kitchen-related activities that perhaps took place on top of Structure 482. While several metate fragments and some evidence of tool production were found in association with Plaza Floor 1 surrounding Structure 479, no other obvious evidence of domicile activities were identified in direct association with Structure 479. The terminal debris of marine shell and speleothems, as well as a worked jaguar canine found inside the round structure suggests that the circular building may have held a more special, ritual-related focus.
Zone 14 represented Substructure 479, an earlier circular platform structure identified in Squares B, D, and E associated with the initial Plaza Floor 3 (Zone 26). The earlier round structure contained a solid retaining wall consisting of two courses of roughly cut limestone blocks. Slightly more than half of the circular platform was exposed in Operation 32 (Figure 3.13). Interestingly, only a small portion of the platform overlapped with the later circular structure (Structure 479). There appeared to have been a conscious effort to expand the plaza area during Phase 2. The newer circular structure was positioned further north of the original round structure and to the far east side of the plaza. This significant modification in site layout suggests a longevity in site occupation at Obsipo that was previously unknown. Additionally, the presence of two different circular structures indicate that this foreign type of architecture and any attached ritual activity was introduced early on in the site’s history. Its position in the main plaza suggests that this special-purpose structure played a central role in the local society for an extended period of time. Due to time constraints, the earlier circular substructure was not excavated. However, artifacts relating with two of the structure’s associated plaza floors (Plaza Floors 1 and 2) may provide a rough date for the initial occupation.

Figure 3.13. Planview of Substructure 479, with Structure 479 superimposed overtop. Note the location of Zone 17 postholes in the southwest corner of unit (drawn and inked by E. Harrison-Buck).
Zone 25

Zone 25 comprised a north-south wall running along the western edge of Square D in Operation 32 (see Figures 3.12 and 3.13). Like Substructure 479, the wall construction was resting on Plaza Floor 3. The wall abutted the earlier circular structure (Substructure 479) and was clearly associated with Substructure 479. The surface of the two-course high wall appeared flush with the top of Substructure 479, indicating it was not a step but perhaps functioned as a platform added to the southwestern side of Substructure 479. The roughly cut facing stones were identical to those used in the construction of Substructure 479, suggesting it was either a contemporaneous construction or slightly post-dated Substructure 479. The platform extended further to the south and west of the excavation unit so the exact dimensions could not be ascertained.

Phase 1b

Zone 9

As noted, Zone 9 in Square B removed a small portion of Plaza Floor 2 (along with some of Plaza Floor 1). Plaza Floor 2 appeared to run underneath the step and superstructure of Structure 479 (Figures 3.7 and 3.8). Plaza Floor 2 may have been removed as part of Zone 18 in Square E, defined as the midden-rich fill layer found in Square B (Zone 11) and Square D (Zone 23). Figure 3.9 shows the relative location of Plaza Floor 2 between Zones 17 and 18. This floor surface was laid down over the initial Plaza Floor 1 and covered a portion of Structure 482. The floor also covered about half of the two-course high retaining wall of Substructure 479 exposed in Square B. A similar situation was recorded for Plaza Floor 2 in Squares D (Zone 18) and E (Zone 22).

Zone 11

Zone 11 was a 15 cm thick midden-rich fill layer found directly below Plaza Floor 2 (Zone 9) in Square B to the north of Structure 479 and to the south of Structure 482. The 15 cm thick fill layer was aimed at building up a plaza surface outside of Substructure 479, covering at least the first course of stones on the two-course high retaining wall of Substructure 479. Zone 23 in Square D and Zone 18 in Square E were likely part of the same construction fill event, characterized as a midden-rich fill measuring 15-20 cm in depth. Zone 11 was found below Zone 10, a small amount of reddish-orange fill added to the southern side of Structure 482, indicating that the Zone 10 modification to Structure 482 post-dated or coincided with the Floor 2 (Phase 1b) construction. Zone 11 contained a high density of charcoal, ceramics and animal bone. The Zone 11 fill rested on a clay-packed, grayish floor surface (Floor 3 – Zone 26) associated with Substructure 479 and Structure 482. Zone 12 was laid down directly overtop of this earlier floor surface (Floor 3). Excavations did not extend below this floor.

Zone 18

Zone 18 (Figure 3.9) consisted of a midden-rich construction fill and what appeared to be the remains of Plaza Floor 2, located directly below Zone 17 (Interior Floor 2). Zone 18 was restricted to Square E. The midden-rich fill appeared to be the same fill layer as Zone 11 in Square B and Zone 23 in Square D. In each case, the fill layer was roughly 15-20 cm thick and was overlying the earliest floor surface (Plaza Floor 1) associated with Substructure 479. However, the elevation of the fill layer and subsequent floors in both Squares E and D (see Zones 22, 23, and 26) were significantly lower than those
found in Square B (roughly 20 cm deeper). It remained unclear how these floors corresponded. It is possible that the ground surface naturally sloped downward to the south for which subsequent construction had to compensate.

Zone 10

Zone 10 was a fill layer that was added to the exterior of Structure 482 following the construction of a midden-rich fill layer that was laid down during Phase 1b prior to the construction of Plaza Floor 2 (Figure 3.8). The matrix of Zone 10 was very red in color with a clayey consistency. The reddish-orange matrix contained a high density of baked clay material, fire-cracked rock, and charcoal, suggestive of intense burning. The matrix contained very few artifacts and sloped down off the southern edge of Structure 482. Initially, it was thought that Zone 10 was part of the midden deposit, perhaps a re-deposited hearth dumping, due to the midden-rich material found in Zone 11 directly below Zone 10. However, the 15-20 cm thick midden-rich layer (Zone 11) continued east and south beyond Square B and the limits of excavation. It was later understood to be part of the Zone 11 fill encountered at the base of the midden pit that was down in preparation for Plaza Floor 2. The Zone 10 fill layer that was added to the exterior of Structure 482 indicated that this structure continued to be used during Phase 1b. The presence of an intrusive midden pit in the structure’s southwest corner may point to the continued use of the platform as a kitchen area during Phase 2.

Zone 22

Zone 22 represented Plaza Floor 2 in Square D, a surface comprised of small limestone gravel (10 cm - 0.2 cm) inclusions, tightly packed in a semi-compact silty-clay matrix (see Figure 3.6). Zone 22 (Floor 2) was underlying Plaza Floor 1 (Zone 21 in Square D). Floor 2 was associated with a one-course high east-west wall (Zone 25) running along the southern edge of Square D that was built directly on Floor 2. In addition, Floor 2 in Square D was associated with Substructure 479, a two-course high wall that was partially covered over by the Zone 22 floor and underlying fill (Zone 23). A pit feature was found in the western half of Floor 2 in Square D. The pit was difficult to discern and was not excavated as a separate zone. It appeared to be associated with Plaza Floor 1, but intruded into Floor 2. The bulk of artifacts recovered from Zone 22 were in the vicinity of the intrusive pit feature and likely correspond to Phase 2. Notable artifacts included three complete conch shells and several small shell fragments. In addition, an obsidian core fragment and two blade fragments were found in the screen that also may be part of the pit feature.

Zone 23

Zone 23 consisted of a midden-rich fill layer in Square D that appeared to be the same 15-20 cm thick fill layer (Zone 22) found underlying Plaza Floor 2 throughout the excavation unit (Zone 11 in Square B and Zone 18 in Square E). The fill contained a medium density of charcoal and ceramics relative to the size of the zone. However, there was significantly less debris compared to Zone 11 in Square B. Like Zones 11 and 18, Zone 23 rested on a clay-packed grayish floor surface (Floor 3 – Zone 26) associated with Substructure 479 (Figure 3.6). At the base of Zone 23, a two-course high north-south wall (Zone 25) was exposed at the western edge of the zone (and Square) that abutted Substructure 479 (Figure 3.12). This wall was resting on Floor 3 and corresponded to Phase 1a (see Zone 25).
Zone 24

Zone 24 represented a one-course high wall running east-west in the southwest corner of Square D associated with Phase 1b (Figure 3.6). The wall rested on Plaza Floor 2 and ran underneath the plinth and superstructure of Structure 479, clearly pre-dating Phase 2. A line of three stones of the east-west wall was exposed along the southern edge of Square D. The wall cornered at the edge of the excavation unit and ran to the south, outside of Operation 32. The wall appeared to represent another structure located to the south of Substructure 479 that related with the final phase of the earlier round structure, corresponding with Phase 1b. Limited horizontal exposure hindered a more complete reconstruction of the Zone 24 wall.

Zone 27

Zone 27 comprised three unexcavated postholes identified on the surface of Plaza Floor 3 (Zone 26) in Square D (Figure 3.13). The three postholes were darker in color than the surrounding packed earthen floor and measured between 15 and 25 cm in diameter. The largest posthole contained a flat limestone cobble on its surface. The three features, intruding into Floor 3, may represent the remains of a perishable structure that was associated with the circular substructure. The posthole features were drawn in planview but not excavated during the 2003 season.

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Chapter 4
Residence and Resting Place of the Obispo Elite: Excavation of Operation 33

Emily R. Hall

Located on the lower reaches of the Sibun River, a day’s canoe ride from the shores of the Caribbean, Obispo was a small but established Maya village. A description of the site center at Obispo is provided in the previous chapter (see Harrison, Chapter 3). During the 2003 season, Operation 33 was positioned at the top of the largest structure at the site, Structure 475, located in the main plaza (see Figure 3.1). Previous investigation of this elite residence (Operation 31) exposed a plaster surface of the plaza area abutting the southeast corner of Structure 475, as well as an inset corner that represented the eastern side of a central, outset staircase flanking the southern side of the platform structure (see Morandi 2003).

Operation 33 returned to Structure 475 with the intention of better understanding the architecture of the mound, and with the hope of refining the site’s occupational chronology. While extensive bioturbation and differential preservation affected exploration of the structure, it was determined that structure 475 was constructed of alluvial clay with limestone retaining walls oriented at 255 degrees. The structure likely was comprised of four terraces leading up to a top platform that contained a perishable structure (Figure 4.1). There were no traces of a stone foundation for the perishable structure. However, evidence of a central limestone and earthen staircase was uncovered, which led up to the remains of a packed clay surface. Beneath these features lay the remains of an earlier surface and staircase, which were modified after the interment of an elite individual. Burial 3 was interred in the center of the structure, under the stairs at the southern edge of the platform. The habitation of structure 475 likely stretched from the Late Classic to the Terminal Classic, with sporadic use during the Postclassic. Its occupation and use appeared to correspond with the prosperity and decline detected in other excavated areas of the Obispo village (see Morandi 2003; Harrison, Chapter 3).

Excavation Techniques

Operation 33 was a 4 x 3 m unit that was oriented on a cardinal axis (see Figure 3.1). The unit was subdivided into four 2 x 1.5 m squares (Squares A, B, C, D). Evidence of intrusive pits and an interment led excavators to expand the southern half of the unit two meters to the west and one meter to the south (Squares E, F, and G).

Excavators primarily utilized trowels, occasionally relying on picks and shovels. When defining ceramics and skeletal remains, excavations proceeded with dental tools and bamboo sticks. Unless otherwise noted, one hundred percent of the soil was screened through ¼ inch mesh. Phytolith, pollen, and flotation samples were taken from each zone. Additional samples, including C-14, were collected from promising contexts.
Figure 4.1. Planview of Square C, Zones 3, 5, and 6; Square D, Zone 4 and 7, and other limestone alignments to the south (drawn by E. Hall and inked by E. Harrison-Buck).
Operation 33 Zones

Zone 1

Zone 1 was a layer of topsoil containing many roots and few inclusions. The zone contained evidence of modern burning (fire-cracked rock [FCR], charcoal, burned limestone, and charred cohune nuts) and bioturbation. The zone yielded a light density of sherds, debitage, and baked clay material (BCM). Four obsidian blade fragments were recovered, two medial and two proximal. The zone ended with the onset of a lighter, more compact layer designated Zone 2.

Zone 2

The bioturbation evident in Zone 1 continued to varying degrees in Zone 2, and there was deferential preservation throughout. While the density of artifacts in Zone 2 was light, it was greater than the density of either Zone 1 or Zone 3, which supports the theory of a surface between Zones 2 and 3. The Zone 2 artifact assemblage included sherds, debitage, BCM, the tip of a chert biface, fish bones, and turtle shell. More than a dozen obsidian blade fragments were recovered, largely from the central area of the unit. A projectile point was recovered from Square C; its miniature side-notched form is consistent with Postclassic lithics (Harrison-Buck, personal communication 2003, see Figure 4.2). This assemblage was possibly a mix of terminal debris corresponding to the Terminal Classic period and debris from post-occupational transitory use of the mound dating to the Postclassic.

Figure 4.2. Postclassic side-notched projectile point (drawn by E. Hall and inked by S. Morandi).

In areas of Squares A, B, C, and D a more compact, more yellowish matrix was encountered at the base of Zone 2, seemingly the remains of an ancient packed clay surface. In the northwestern corner of Square A, a concentration of BCM marked the interface of Zones 2 and 3, perhaps evidence of a burning event that baked the packed clay surface. Cutting across the southern half meter of Squares C and D, as well as the southeastern portion of Square E, was an alignment of limestone cobbles that represented
remains of the mound’s central staircase. This alignment was designated Zone 5, while the tumble to the south and west was designated Zone 6.

Zone 3

In Squares A, B, and the northern meter and a half of Squares C and D, the postulated packed clay surface at the interface of Zones 2 and 3 covered a compact earthen construction-fill. Parts of Zone 3 were extensively bioturbated. The Zone 3 soil was predominantly mottled with a burned matrix—with reddish soils and higher densities of BCM, FCR, and sherds. The artifact density was light, though higher in the burned areas and in the upper portion of Zone 3. The assemblage included debitage, sherds, BCM, turtle shell, and a chert nodule, as well as more obsidian blade fragments.

Zones 4, 8, 9, 10, and 11

Zone 3 was ended arbitrarily, and was followed by Zones 4, 9, 10, and 11, all representative of construction fill. Zone 8 was a roughly circular area of darker, looser matrix measuring less than a meter in diameter, surrounded by the Zone 9 construction fill in Square C. Zone 8 was first thought to be a pit feature, but upon further investigation, it appeared to be the remains of a tree-fall depression. The differentiation between Zones 3, 4, 9, 10, and 11 was largely arbitrary for purposes of depth control. These zones were also compact clay construction fill mottled with burned soil. Due to the absence of architectural features, and the progressively lighter concentrations of artifacts, all zones were not excavated in all squares. Artifacts recovered from Zones 3, 4, 9, 10, and 11 included debitage, sherds, BCM, turtle shell, animal bone, and obsidian. At the base of Zone 11 a number of large sherds, lying flat, were encountered in the south central extremity of Square C, perhaps indicative of a floor surface. However, this underlying area, designated Zone 12, was ultimately characterized as fill.

Zone 12

Zone 12 was excavated only in the southern meter of Squares C and D. The zone appeared as a continuation of the mottled, compact, clay-rich construction fill that contained few artifacts, with the exception of several large, thick-walled friable sherds with a tan paste, probably from a large olla, in the southern end of the zone. The zone was ended when it was decided that these artifacts were associated with the zones underlying the area of the staircase, which was eventually discovered to be a mortuary deposit.

Zone 5

In the southern zones of Squares C, D, F and G, as well as the eastern half of Square E, lay tumble debris and a series of stone alignments. The stone alignments appeared to be the remains of a central, outset staircase. A two-course high wall constructed of roughly cut limestone cobbles (Zone 5), running in an east-west line (referred to as Alignment1), was retaining a thick fill layer and represented the top, northernmost step of the staircase. This step appeared to be part of a later modification to the stairs that was built following the interment of the burial, which lay almost directly beneath the Zone 5 step. Tumble (Zone 6) covering the stairs abutted the step to the south.
Zone 6

Zone 6 was the tumble to the south of Zone 5, which consisted of small limestone pebbles and larger inclusions in a clay-filled matrix. In Square E, partial removal of the tumble revealed a three-course high, north-south line of stones (Wall Alignment 1 - Zone 23), which was articulated and mapped, but not excavated. In Square F, another north-south wall (Wall Alignment 2) was identified and mapped. These stone alignments appeared to be the west and east edges, respectively, of the central staircase in its final phase of construction (Figure 4.3). This probable staircase was oriented 20 degrees east of north.

Figure 4.3. Planview, showing parallel north-south walls of outset staircase and relative position of burial deposit (drawn by E. Hall and inked by E. Harrison-Buck).
Zones 7 and 13

Zone 7 was an earthen layer, seemingly tumble that underlay the Zone 6 tumble, which roughly comprised the southern 150 cm of the unit, sloping off the structure to the south. The artifact density of this zone was light, consisting of animal bone, debitage, sherds, obsidian, and BCM. In Square F, to the east of the north-south wall (Wall Alignment 1 - Zone 23), Zone 7 ended when the remains of a plaster surface (Zone 14) were encountered. In the southeast of Square F, where the plaster was not preserved, the underlying cobbles layer was designated Zone 18. To the east of the north-south wall (Wall alignment 3 in Squares D and G), Zone 7 ended with the onset of the remains of a different plaster surface, Zone 22, and the underlying cobbles layer (Zone 18). Zone 7 ended in Square C when a slightly less compact, more olive-hued matrix with fewer inclusions was encountered. This underlying matrix, labeled Zone 13, was located in Squares C, E and F along the southern end of the unit and might represent a poorly preserved floor surface for the top step of the staircase. This surface overlay the Zone 14 step floor and may correspond or post-date the burial interment. A portion of Zone 13 in Square C represented a pit feature cutting into the surrounding floor surface, also designated Zone 13. It was a similar matrix to the rest of Zone 13. The artifact density in the intrusive pit feature of Zone 13 was higher than that of the surrounding matrix, and included debitage, sherds, BCM, and animal bone, including fish vertebrae.

Zone 14

Zone 14 was an earthen layer with limestone flecks, FCR and limestone pebbles in the area underlying and to the east of the Zone 23 wall. The zone was differentially preserved, but seemed to represent an eroded floor for the top step or steps of the staircase. On the border of Squares C and F, in the center of this area, the absence of pebbles and the mottled presence of an olive colored matrix indicated the continuation of the Zones 13 and 15 pit features. The two pit features, Zones 13 and 15, were originally thought to represent a single burial cut, but later it was realized that the two intrusive features were separate occurrences, though perhaps related to the same ritual event corresponding with the burial of the elite individual. Zone 14 ended with the designation of Zone 15, a clay-filled matrix with few inclusions, which consisted of both burial and construction fill only roughly defined by an enigmatic pit feature.

Zone 15

Zone 15 was a layer of mottled, compact clay relating to the burial interment. Zone 15 was initially thought to be an in-filled burial pit. However, the burial cut was virtually indiscernible. This was either because the individual was interred into fill as the staircase was being built, or, more likely, because the pit was dug into the packed clay surface of the top step and the mottled clay construction fill was then used as back-fill, leaving no visible signature. Overall, the parameters of the burial were difficult to discern. The only clear cut into the Zone 14 surface was the Zone 13 pit feature that was separate from the burial deposit, but may have been related to the ritual event. The area encompassed by the interment proved to be larger than initially thought and the excavation unit was expanded to the west and south (into Squares D, E, F and G). In the central area of the border between Squares C and F, there was evidence that the burial deposit cut into the Zone 14 floor. At the western end of Zone 15, to the east of the Zone 23 wall, there was a very high density of BCM and other evidence of burning which continued downward into other zones, perhaps indicating another pit feature.
The artifacts recovered in Zone 15 thus seem primarily to be associated with the burial, though some may relate to one or more pit features. The assemblage included animal bone (including fish vertebrae and worked turtle shell), debitage, obsidian, BCM, sherds, a conch, and two ceramic vessels. (Figure 4.4). A smashed, thin walled, dark vessel (Vessel 1, which consisted of about half of the original vessel), and an inverted, smashed red bowl (Vessel 2, which was more complete, though possibly missing the southwestern portion) were defined in situ. Dr. Sandra López Varela identified Vessel 1 as a Macal Orange jar, and Vessel 2 as a Roaring Creek Red serving bowl (personal communication, 2003). Beneath the sherds of Vessel 2 lay a conch shell and an obsidian blade fragment. About 40 cm below these objects were the knees of Burial 3. In the center of Zone 15 was a mottled burned area. Debitage, a number of large, thick-walled sherds, and worked turtle shell were also encountered. These thick-walled sherds, present in Zones 12, 14, 15, 16, 17, 19, and 21, were identified by Dr. López Varela as Tinaja Red sherds, probably all coming from the same large jar. These huge storage jars were identified with the very end of the Late Classic period (López Varela personal communication, 2003). The presence of sherds from this same vessel scattered throughout the matrix above and associated with the burial, but not in the matrix outside of this area, lent evidence to the view that Burial 3 was not interred at the time of the step’s construction, but rather was a pit burial with no visible signature. After 20 cm, the artifact density lightened, and Zone 16 was designated for purposes of vertical control.

Zone 16

Zone 16 was a continuation of the mottled, clay-rich burial/construction fill of Zone 15. The western end of the zone continued to exhibit evidence of intrusive features, in the form of intensive burning evidence, elevated concentrations of BCM, and fewer artifacts than were found in the rest of the zone. To a lesser degree, there was evidence of burning throughout the zone, in the form of charcoal, BCM, an area of ash, and a burned chipped stone tool. This evidence, combined with the overall medium-high density of artifacts (including animal bone, debitage, obsidian, sherds, shell, and a burnishing stone), suggested that the Zone 16 fill consisted at least partially of a re-deposited midden. Also, while some of the Zone 16 sherds seemed to be pieces of the same vessels, they were scattered throughout the zone. Zone 16 was terminated when bone was encountered in Square C. Zone 17 included the bones and the surrounding matrix (see further below).

Zones 19 and 21

Later, when it was discovered that the burial extended to the north and east of what had originally been thought of as the burial cut, excavations continued eastward into Squares D and G. Additionally in Square C, Zones 19 and 21 were removed to the north, and Zone 17 was expanded to expose the rest of the individual and the associated matrix. Zone 19 was comprised of the southern 70 cm of Squares C and D, and the northern 40 cm of Square G. These limits were laid out arbitrarily, but with the intention of exposing all of the mortuary deposit. There was no apparent color or texture difference throughout Zone 19, and the zone most probably represented a mix of burial pit fill and surrounding (non-discernable) construction fill. Zone 19 ended after 20 cm in depth and was followed by Zone 21, a similar deposit of construction and burial pit fill. Zone 21 ended at the approximate level at which the bone was encountered in Square C, and the matrix beneath was designated Zone 17.

Like Zones 15 and 16, Zones 19 and 21 showed evidence of burning. The artifact density in both Zones 19 and 21 was medium and consisted of animal bone, debitage, sherds, obsidian, pumice, coral, and a marine shell. Several large, friable sherds were recovered from Zone 19, probably part of the above-
Figure 4.4. Planview of Zone 15 pit feature (drawn by E. Hall and inked by E. Harrison-Buck).
mentioned Tinaja Red jar. Vessel 3 was discovered in Zone 21 of Square G, and is discussed in further detail below.

Zone 17

Zone 17 was composed of approximately the southern 40 cm of Squares C and D, as well as the northern 40 cm of Squares F and G. The zone contained the remains of an extended individual (Burial 3) and the associated matrix (Figure 4.5). Like the Zones 16 and 21 matrix above it, the soil of Zone 17 was a mottled, compact clay with charcoal, BCM, and few inclusions. The matrix of Zone 17 was slightly darker than the soils above it. Aside from the skeletal remains, the artifact density was light. The assemblage consisted of animal bone, sherds, debitage, obsidian, BCM, and coral.

Figure 4.5. Planview of Burial 3 (drawn by E. Hall and inked by E. Harrison-Buck).
Burial 3 comprised an articulated, extended, prone individual oriented 110 degrees east of north, with the head to the east. Steve Morandi identified the individual as an adult male (personal communication, 2003). The skeletal remains were somewhat fragmentary, but all excluding the hands and feet were articulated in situ (Figure 4.5). The preservation of the remains was superior on the individual’s right (southern) half. An obsidian blade fragment was encountered to the north of the left humerus. The left hand and wrist bones of the individual were located underneath the left side of the pelvis. Vessel 3, located in Zone 21 of Square G, lay directly over the right hand and wrist of the individual. This broken, very friable, thin-walled vessel was in an upright position. The small vessel had a pinkish paste and a black slip. Dr. López Varela identified the rounded bowl as an Achote Black vessel that could be characterized as a ceremonial or prestige object (personal communication, 2003). Beneath the south side of the cranium, an additional bone was encountered. Bone 30 was not part of the cranium, and may not be human. The bone was burned and possibly worked. It appeared to be part of a long bone, 9 cm by 13 cm, cut at one end and broken/tapering at the other. Excavation was halted several centimeters below the bones. All Zone 17 matrix was either subjected to water flotation or screened through 1/8" mesh.

Zone 20

Zone 20 was a North-south wall (Alignment 3) that post-dated the burial deposit (see Figure 4.3). This two-course high retaining wall ran 20 degrees east of north along the western edge of Squares D and G and was built over top of the burial. The wall ran the length of Square G, but was only present in the southern 40 cm of Square D. The limestone cobble wall was faced on the eastern side, and possibly retained Zones 7 and 13 that covered the burial on its western side. At the base of Zones 18 and 20, in the southwest corner of Square D and the northwest corner of Square G, limestone flecking was present, perhaps indicating the remains of an eroded floor. A light density of artifacts, perhaps representing the terminal debris of this surface, was recovered. They consisted of debitage, sherds, BCM, and a marine shell. This occupational phase perhaps corresponded with the use of the Zone 14 surface.

Zone 18

Zone 18 was a chert and limestone cobble layer in the southeastern area of the unit that likely functioned as ballast fill for the overlying Zone 22 floor surface. The cobbles covered nearly all of Square G, while they ended in an alignment about 30 cm to the north of the southern edge of Square D (see Figure 4.3). Deposited after the Zone 20 wall, Zone 18 abutted the faced stones on the east and covered the remains of the eroded floor. While all other diagnostic sherds from Operation 33 were identified as Late Classic, Dr. López Varela identified several Zone 18 sherds, including a ceramic spike from an incensario, to be Terminal Classic (personal communication, 2003).

Zone 22

Covering the Zone 18 cobble layer in the southwestern extremity of Square D, and the northwest quadrant of Square F, was Zone 22—a layer of pebbles, FCR, and limestone flecks. Presumably, after the use of the Zone 20 wall and the surface at the base of Zone 18 was terminated, the Zone 18 cobbles were added to level the ground, and were then capped by the Zone 22 surface. The Zone 22 artifacts (the terminal debris associated with this construction phase) were few, and consisted of worked and un-worked animal bone, debitage, and sherds.
Concluding Remarks

Three phases of construction are postulated. In the first phase of construction, the four-terraced earthen foundation was built, with limestone retaining walls and a central staircase. This staircase would have been bordered on the west by the Zone 23 north-south wall (Alignment 1). The stairs were evened out with pebbles and coated with plaster (Zone 14). At the top of the mound, at the interface of Zones 2 and 3, was a packed clay surface, presumably with a perishable structure. The artifact assemblage points to a domestic residence, while the size of structure 475 as well as the presence of marine shells, coral, decorative ceramics, and large numbers of obsidian blades indicate the elevated status and wealth of the inhabitants of the prominent platform structure.

When a male in the family, perhaps a community leader of Obsipo, died during the Late Classic period, he was interred, along with a number of ceramic pieces, marine and turtle shells, and obsidian blade fragments. It appears that one or more burning events were associated with the funerary rituals. It seems likely that the burial was a pit interment, as a number of similar artifacts (e.g. the Tinaja Red jar sherds) were recovered from the matrix above the burial that were not encountered in the general construction fill. However, no pit signature was recognized.

The burial pit, which was placed on the southern edge of the platform under the top of the staircase, appears to have intruded into the Zone 14 floor that covered the stairs and was possibly capped by the Zone 13 surface. The east-west wall (Zone 5) represented a top step that was built over top of the burial and was associated with the Zone 13 surface. Both Zones 13 and 14 floor surfaces were retained by the north-south walls of the outset staircase (Zones 20 and 23). Around this time, one or more pit features were dug into the Zone 13 floor, perhaps to dedicate the next phase of construction, and/or to honor the ancestor interred below.

During the Terminal Classic, the final construction phase occurred, involving the resurfacing of the surrounding terrace floors. A ballast fill comprised of cobbles and pebbles (Zone 18) with an associated plaster surface (Zone 22) were constructed. The packed-clay platform surface of the first construction phase continued to be utilized.

It seems that the mound fell into disuse during the late Terminal Classic/Early Postclassic phase. As evidenced by operation 30 excavations, the Obispo site was still being used in the Postclassic, perhaps as a ritual site (see Morandi 2003). This transient use would account for the lack of Postclassic artifacts from Operation 33, with the exception of the projectile point and perhaps a light scatter of ceramic debris.
Part II: Colonial Period and Earlier at the Entrance to the Karst
Chapter 5
The Search for Spanish Colonial Structures at Cedar Bank (Operations 40-44)

Steven Morandi and Christa D. Cesario

During the XARP 2003 season, two major goals were accomplished with respect to archaeological work at Cedar Bank. First, a program of survey and mapping of the core plaza group and peripheral structures at the site was completed. While Steve Morandi, Christa Cesario, and Satoru Murata carried out total station mapping of the site core, David Buck and Patricia McAnany, and Lance Usher located and mapped outlying structures using GPS and tape-and-compass techniques. The total station map was linked into the “grid” of known survey markers along the Western Highway in a long traverse completed by Steve Morandi, Christa Cesario, David Buck, and Jessica King. Ideally, such traverses are closed loops that reduce the error built up through measurements taken at successive survey points. Such a layout was not possible in this case, but the traverse was tied into a known government survey marker on one end, and to several GPS points (with an accuracy of a few centimeters) on the other end in order to minimize error over its length. Though the final topographic map is still in production, a preliminary rectified site map, based on GPS and tape-and-compass work from the 2001 and 2003 seasons, is included here (Figure 5.1).

The second goal reached during the 2003 XARP season was the significant expansion of excavations at Cedar Bank beyond the initial test unit completed in 2001. A summary of the results of this excavation program follows.

Operation 40: A Midden at the Base of Structure 351

The excavation of Operation 40 began as a small test unit during the XARP 2001 field season (Morandi 2003). At that time, the operation was the 2 x 2 m cardinally oriented Square A, located on the southern edge of Structure 351 in front of two huge limestone slabs thought to have been part of the basal retaining façade of the edifice. The unit was placed to investigate the construction sequence of Structure 351 and also to obtain diagnostic artifacts for dating the Cedar Bank occupation. Due to the intriguing discovery of Spanish and British Colonial Period artifacts, Operation 40 was expanded during the 2003 field season to investigate further the extent of this late occupation at Cedar Bank.

The 2003 Excavation Expansion

Operation 40 soon included Squares B, C, D, E, F, X, Y, and, Z (Figure 5.2). Square B was a 2 x 2 m excavation unit located directly east of Square A, while directly west of Square A lay Square Z, a 2 x 1.2 m unit aligned with the northern border of A. Square Y was located west of Square Z and is of identical size. Like Squares Y and Z, Square C was a 2 x 1.2 m unit placed east of Square B and aligned at the northern borders. East of Square C is Square D, yet another 2 x 1.2 m excavation unit. Excavation was limited to the western half of Square D, not only due to time constraints, but also because the eastern side of Square D was filled with large collapsed stone from the retaining wall of Structure 351 (Zones 19 and 20) that severely limited artifact recovery (Figure 5.2).
Figure 5.1. Preliminary map of Cedar Bank.
Figure 5.2. a) Final plan view of Operation 40; b) Enlarged portion of final plan view of Operation including Zones 23 sherds.
Set north of Square A was the 2 x 1 m unit, Square F. Just west of Square F lay Square E, with identical length and width measurements. Square E also shared its southern border with the northern border of Square Z. Squares E and F were excavated to explore behind and below the two massive, slightly tabular, overturned facing stones (Zone 6) sitting on the southern slope of Structure 351, as well as to better understand the artifact distribution above the facing stones of the lowest terrace (Figure 5.2). Identical in size to Squares E and F, Square X was located west of E and shares its northern border with the southern border of Square Y. Only a 0.7 x 1 m area of Square X was excavated (Figure 5.2), as this square was intended to fully expose a large cut limestone block of the second terrace of Structure 351 (Zone 26) and recover diagnostic incised sherds (Zone 23).

Zone 1

The topzone of Operation 40, Zone 1, was a layer of semi-compact clay sediment characterized by a light density of artifacts. The Zone 1 matrix ranged in color across the entire unit: dark brown (7.5YR 3/2) in Square Z, very dark brown (10YR 2/2) in Squares B, E, and F, dark grayish brown (10YR 4/2) in Square Y, and very dark grayish brown (10YR 3/2) in Squares C, D, X. Zone 1 also contained many small rootlets and burnt cohune nut fragments as well as a medium density of gravel and cobble-sized limestone inclusions. Animal bone and pottery sherds were common artifacts recovered from all squares of Zone 1.

One small (less than 1 cm long) sherd of Spanish colonial period Blue-on-White majolica (tin-glazed earthenware) was recovered from Square B, as well as a light density of pebble-sized baked clay material (BCM) and FCR or fire-cracked rock. A cohune tree stump was located in the southwest quadrant of the square, and its removal will be discussed later in the chapter.

Both Squares C and D yielded animal teeth and chipped stone debitage. Two pieces of obsidian and a crude spindle whorl were additionally recovered from the Square C matrix. Square D yielded several significant historical period artifacts. Dating to the Spanish colonial period was a Sevilla Blue-on-Blue rim sherd, as well as several reconstructible Blue-on-White majolica sherds. Three stoneware sherds, diagnostic British colonial artifacts, were recovered along with remnants of what appears to be a corroded metal knife. Near the bottom of Zone 1, within Squares C and D, several large cut limestone blocks, presumably tumbled from an outset staircase of Structure 351 were uncovered (Zone 20).

A few artifacts were recovered from the topzones of Squares E, F, and X; all squares yielded comparable quantities of debitage, obsidian, and jute shell. The most notable artifacts from Zone 1 of Squares E and F were three olive jar sherds. Towards the bottom of Zone 1 in Squares E and X, the large slabs of cut limestone from the second terrace of Structure 351 appeared (Zone 26).

Squares Y and Z revealed debitage and jute shell along with a large, thin sheet of corroded metal (with associated fragments) from Square Y, and one metal nail head from Square Z. These metal pieces are modern debris, most likely remnants from the Mosquito Coast film crew. The most notable artifact recovered from Square Z is a clay fragment that, upon initial examination in the field, appears to be either a figurine fragment or an incensario appliqué piece. This clay artifact may be diagnostic due to its suspicious irregularity.

Initially uncovered during the excavation of Zone 1 in Squares E and X, Zone 26, is a large cut limestone block that served as a retaining wall along the second terrace of Structure 351 (Figures 5.2 and 5.3). At its maximum extent, the stone measures 158 x 36 x 56 cm. To avoid destabilizing the lowest terrace stones,
the lower part of the block was not completely excavated. In Square E, however, the backside of Zone 26 was excavated completely and two layers of construction-fill (Zones 22 and 25) were found behind and below the large stone.

Zone 2

A layer of construction tumble below Zone 1 was called Zone 2 and was found across all squares of Operation 40 (Figure 5.3). It is characterized by an initial layer of gravel and cobble-sized limestone inclusions, overlaying loose, slightly loamy, silty clay with a medium density of gravel-sized limestone inclusions and rootlets. The Zone 2 matrix is very dark brown (10YR 2/2) in Squares B, E, F, X, and Z, dark brown (10YR 3/3) in Squares D and Y, and finally, black (10YR 2/1) in Square C. A medium-heavy density of artifacts was recovered from Zone 2, those common amongst all squares include debitage, obsidian, and pottery sherds.

The majority of artifacts recovered from Square B were found within the eastern half of the square and in front of Zone 6, the two large cut limestone blocks of the first terrace of Structure 351 (Figure 5.2). Additional animal remains found within Square B include snail shell (likely modern) and the right side of a peccary mandible. This square yielded a large number of chipped stone tool fragments such as medial and distal biface fragments, one 4-cm long projectile point fragment, and a possible fragment of Pachuca obsidian. Other notable artifacts include several small clay net weights, a tiny clay vessel handle, a small green stone bead measuring 0.5 cm in diameter, and a spindle whorl (or, possibly, figurine head) fragment. An 8-cm long speleothem was recovered from this square—no surprise given the widespread presence of caves in the Cedar Bank/Gracy Rock area.

Several diagnostic historic-period pottery fragments were encountered within the Zone 2, Square B matrix, including olive jar sherds and one rim with a neck and partial shoulder from a “Shape B” (or rounded) olive jar (Figure 5.4). One small Sevilla Blue-on-Blue sherd and several Columbia Plain sherds can be more precisely dated to the Spanish colonial period, as can the beige glaze/salmon temper sherds (a variant of Columbia Plain) and Blue-on-White majolica. The final historical period artifact remains found in Square B were a few lead plate fragments and two square-headed nails.

Figure 5.4. Olive jar rims from Operation 40, Zone 2: a) Type A jar rim; b) Type B jar rim.

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The Square C matrix yielded a negligible quantity of BCM and FCR, as well as a crystalline rock fragment of unknown provenance (Figure 5.3). Animal bones and teeth were encountered in high frequencies. Chipped-stone tools included the proximal fragment of a projectile point, one possible Pachuca obsidian medial blade fragment, and the medial section of a side-notched projectile point that is diagnostic of Postclassic or later periods. Also recovered from the Square C matrix were small clay net weights and several spindle whorl fragments. Definitive colonial period artifacts encountered in Square C included olive jar sherds and the ring base of a large Columbia Plain plate. Several reconstructible Blue-on-White majolica sherds were recovered from the eastern wall of Square C, which are from the same vessel as those found in Zone 1, Square D. Towards the bottom of the zone, a cut limestone block (Zone 19) appeared and likely formed the corner of an outset staircase at the southeastern end of Structure 351 (Figure 5.2). We also continued to uncover Zone 20, the three large cut limestone blocks tumbled from the structure.

Unlike the rest of Zone 2, Square D yielded only a light density of artifacts (Figure 5.3). This fact likely is due to the reduced area of excavation within Square D, as well as the presence of four large cut limestone blocks (Zone 20), which occupied close to fifty percent of the square (Figure 5.2). Along with a few large pieces of BCM and unknown crystalline rock, Zone 2, Square D yielded animal bone and teeth. While artifact recovery in Square D is minimal, the remains are significant: olive jar sherds, a fishing net weight, and a pink granite metate fragment. Finally, a complete vessel foot that may be indicative of Postclassic-period occupation at Structure 351 was excavated from Square D. Square E yielded two vessel feet (diagnostic of the Postclassic or Colonial period) as well as net weights and clay nodules that may be figurine fragments or incensario appliqués. A parrotfish jaw fragment was recovered among the large quantity of jute shell and animal bone.

A lighter density of artifacts came from the Square F matrix, though animal bone was common. Pottery included one Sevilla Blue-on-Blue sherd and one Columbia Plain sherd. A few clay nodules recovered from Square F may be figurine fragments or incensario appliqués. A small quantity of artifacts was recovered from Square X, due, in part, to the reduced area of excavation. Animal remains included bones and teeth, jute shell, and one unworked conch shell. Square X also yielded two clay net weights, but no obsidian. Zone 2, Square Y contained one unworked conch shell, and yet another unidentified crystalline rock fragment. A sizeable collection of historic period artifacts was recovered from this square, including olive jar sherds and a rim with partial neck from a “Shape A” (elongated) type olive jar (Figure 5.4). Also encountered were several fragments of green glass and a complete square-headed nail.

Zone 2, Square Z yielded a large quantity of animal bones and teeth, including two robust mandible fragments with rooted teeth (possibly bovine) and a large fragment of an unworked conch shell. Clay net weights and a spindle whorl fragment were also recovered. Historical period artifacts include a Columbia Plain sherd and two lead plate fragments. As in Squares C, D, and Y, several unknown crystalline rock fragments were found. Their presence at Sibun Valley sites seems rare enough to prompt closer examination for some kind of relevance to the Spanish colonial period occupants of Belize. Three travertine fragments and a large flowstone were recovered from Square Z, measuring between 10 and 15 cm in length. Due to the prevalence of caves in the Cedar Bank/Gracy Rock area these stones may indeed be speleothems, though, it is more likely that they were formed by river flow and brought to the site because of their resemblance to cave formations.
Zone 6

In Squares A, B, Y, and Z was a row of large cut rectangular limestone blocks with smoothed faces, designated Zone 6. These stones, oriented east-west, formed a retaining wall along the first terrace of Structure 351 (Figures 5.2 and 5.3). It was difficult to pinpoint the exact construction phase associated with Zone 6. However, it appeared to be sitting atop and within the construction-fill layer of Zone 7.

Zones 21 and 24

A layer of construction-fill, Zone 21 was composed of semi-compact, silty clay, with a medium to high density of gravel and cobble limestone inclusions. Zone 21 was below Zone 2 in Squares E, F, and X (Figure 5.2). Overlying Zone 21 at the interface between Squares E and X was Zone 24, a decomposing plaster surface (Figure 5.2). The plaster was fairly smooth with a very light density of pebble-sized BCM and limestone inclusions. It is evident that Zones 21 and 24 functioned together as a tread between the first and second terraces of Structure 351. The tread is constructed of plaster-covered fill, as opposed to a large cut limestone block. To avoid destabilizing the lowest terrace facing stones (Zone 6), which were exposed during the excavation of Squares Y, and Z, Zone 21 was not excavated.

Zones 19 and 20

Zone 19 was a cut limestone block measuring roughly 54 x 38 x 12 cm, was unearthed during the excavation of Zone 2 in Square C. The stone was oriented east-west, and thus, aligned with Zone 6. Zone 20 consisted of seven large cut limestone boulders randomly distributed throughout Squares C and D, with some stones exhibiting more precise cuts than others (Figures 5.2 and 5.3). Despite its level placement, it is unlikely that Zone 19 was a tread for the first terrace of Structure 351. The tread construction method was plaster over cobble construction-fill, as determined through the excavation of Zones 21 and 24. Instead, it seemed that Zone 19 was the corner of an outset staircase, located at the southeast edge of Structure 351, where the Zone 6 retaining wall abruptly ended. The large tumbled stones of Zone 20 were presumably part of this outset staircase but had been displaced over time because of the lack of large facing stones, such as those of Zone 6, to anchor them in place.

Zone 12

Zone 12 consisted of two large shaped limestone blocks found facing side down, and aligned east-west in the northeast quadrant of Square B. The blocks sat fairly level, directly south of the eastern-most stone of Zone 6. The eastern block had maximum dimensions of 69 x 38 x 10 cm, while the western block measured 48 x 34 x 10 cm. Due to the size of these blocks and their location near the southeastern edge of the structure, it was highly probable that Zone 12 originally also was part of the outset staircase of Structure 351 (in addition to Zones 19 and 20).

Zone 13

Below Zone 12 was Zone 13, an earthen layer of semi-compact, very dark brown (10YR 2/2) silty clay with a light density of gravel and cobble-sized limestone inclusions. This zone averaged 20 cm in depth, and was predominantly a result of the pedestaling of the Zone 12 blocks. The Zone 13 matrix was essentially the same as that of underlying Zone 3 but slightly more compact due to the pressure of the
stones. Zone 13 yielded a light density of artifacts including animal bone, debitage, obsidian, jute shell, and pottery sherds, most notably one possibly diagnostic historic period rim sherd.

Zone 23

Zone 23 was a cluster of pottery sherds that comprised parts of 2-4 vessels. All sherds were found resting above the decomposing plaster surface of Zone 24 (Figure 5.2). Some sherds are potentially diagnostic and postdate the terminal phase of the terrace construction. The first sherd cluster (Vessel 1) was incised with a scroll design possibly representing smoke, water, or a cloud. The post-slip incising is located just below the outflared vessel rim. Red slip was found on both the inside and outside of the sherds, which had an oxidized salmon-colored paste. Not all sherds are incised, but many of pieces are reconstructible. Next, we encountered a single, highly eroded, ring base sherd with a trace of red slip. The sherd exhibits a subtle incurving at the ring base, and a paste that is lighter in color than that of the Vessel 1 group (though still may belong with that collection). The third sherd cluster (Vessel 2) exhibits a fine grey paste. These sherds indicate that the vessel would have had an outflaring rim, with vessel thickness thinning out at the body. And finally, a few random eroded sherds were recovered, and may not be associated with any of the others.

Zone 22

A layer of construction-fill located behind the large second terrace facing stones of Structure 351 (Figure 5.2), Zone 22 was directly underneath Zone 2 in Squares E, F, and X, beginning just below the top surface of the large cut limestone blocks of the second terrace. The construction-fill was composed of a loose, very dark brown (10YR 2/2) silty clay sediment, with a medium density of cobble-sized limestone inclusions, and a light scatter of BCM and FCR. Excavation was restricted to Squares E and F where a light density of artifacts was recovered, including animal bones and teeth, debitage, obsidian, pottery sherds, jute shell. In addition, Square F yielded a distal biface fragment and one clay net weight. A speleothem was recovered from Square E, along with a vessel foot fragment and a clay nodule, which appears to be a spindle whorl fragment or incensario appliqué. Since no carbon-14 samples were recovered, these latter two artifacts should be examined further to determine a date for this construction episode.

Zone 25

Zone 22 terminated at the base of the stones (a depth of about 35 cm), where a zone change was made to maintain stratigraphic control throughout this deep layer of construction fill. The new zone, labeled Zone 25, was a continuation of the Zone 22 matrix. Animal bone, debitage, pottery sherds, and jute shell were recovered from the fill. Additionally, Square E yielded one potentially diagnostic sherd, which could be used to date the layer. The sherd exhibited red slip and three small thumbprints in a contiguous, horizontal line. A preliminary examination identified it as Kaway Impressed, made with a Pine Ridge carbonate paste. This is the local variety of Chaquiste Impressed, which is associated with the Late
Terminal Classic period. Below Zone 25 was Zone 7, a layer of construction fill found throughout Operation 40.

**Zone 11**

Zone 11 was a lens of semi-compact, very dark brown (10YR 2/2) silty clay characterized by a high density of charcoal flecks and chunks, as well as a light scatter of pebble-sized BCM and gravel-sized limestone inclusions. Located directly south of Zone 12 in Square B, Zone 11 overlays the layer of construction tumble of Zone 3. The lens was roughly 7 cm in depth, yielding a few pottery sherds and onedebitage flake. Several liters of sediment were collected for flotation analysis.

**Zone 3**

A layer of construction debris underlying Zone 2 in Squares B, C, D, Y, and Z was called Zone 3. Characterized by loose, very dark brown (10YR 2/2), silty clay with a high density of gravel and cobble-sized limestone inclusions, Zone 3 contained a light density of artifacts, including animal bone, debitage, and pottery sherds found within all five squares. Zone 3 was unevenly distributed across Square B, beginning at a level that is roughly 40 cm higher in the northwest corner, than in the remainder of the square. This is predominantly due to the presence of Zones 11, 12, and 13, which overlay Zone 3 in the eastern half of Square B. Artifacts unique to Zone 3, Square B include jute shell, and a 3-cm long speleothem fragment.

Excavation of Zone 3 in Square C yielded obsidian, a vessel foot (possibly diagnostic of the Postclassic period or later), Spanish colonial period Blue-on-White majolica, and much later British colonial period stoneware. An equally minimal quantity of artifacts was recovered from Square D, including olive jar sherds and three jaw fragments retaining teeth, which resemble those of a dog.

Artifact recovery from Square Y was low, with two historic period sherds and one travertine fragment, which appeared to be formed by river flow. Square Z, yielded a slightly higher quantity of artifacts than the rest of Operation 40, including jute and unworked conch shell. A vessel foot (again likely dating to the Postclassic period or later), a few potential figurine fragments, and a travertine fragment, comprised the more notable artifacts to come from Square Z. Some decomposing plaster pieces were also recovered, though most likely associated with Zone 24, having fallen from the first terrace during the collapse phase that created Zone 3. Underlying Zone 3 throughout Operation 40 was Zone 7, a construction-fill layer.

**Zone 4**

A lens of loose, black (10YR 2/1), organic clay sediment, Zone 4 had a medium density of fine-gravel to cobble-sized limestone inclusions. Roughly 10 cm in depth, Zone 4 was located against the western wall of Square B within and below Zone 3. An identical lens was found along the eastern wall of Square A (see Morandi 2003:154), and, when taken together, the two lenses appear to be the result of a
decomposed tree. Zone 4 yielded a light density of artifacts, including animal bone, debitage, pottery sherds, and jute shell.

**Zone 18**

A long, narrow pit found within Square C, Zone 18 measured roughly 23 cm in maximum length. Zone 18 began within the Zone 3 matrix and extended down through the cobble surface of Zone 8 (Figure 5.2). The sediment within the pit was very loose, very dark brown (10YR 2/2), silty clay, devoid of any inclusions, artifacts, or carbon-14 samples. Zone 18 was most likely an animal burrow. As the pit reached a depth of about 40 cm, it shifted from a vertical pit to one that angled to the northeast.

**Zone 7**

Zone 7 was a layer of construction-fill found across Squares B, C, D, E, F, Y and Z (Figure 5.2), was compact, dark brown (10YR 3/3) silty clay characterized by a medium density of BCM and a high density of gravel and cobble-sized limestone inclusions. Across Squares B, C, D, Y, and Z, Zone 7 was immediately beneath Zone 3 but, in Squares E and F, it was stratigraphically below Zone 25. Presumably, had Square X been excavated completely, Zone 7 would have been found below Zone 25 as well.

Within Square B, Zone 7 yielded a light density of artifacts including animal bone, jute shell, debitage, obsidian, and pottery sherds (Figure 5.6). Additionally, a granite metate fragment was recovered, which may match with that found in Zone 2, Square D. Because historic period artifacts ceased to be found in Zone 7, excavation in Squares C, D, E, F, Y, and Z was discontinued.

**Zone 14**

A circular lens of very loose, very dark brown (7.5YR 2.5/2) sediment, Zone 14 was a silty clay loam located within Zone 7 in the southwest quadrant of Square B. The lens measured roughly 22 cm north-south, 15 cm east-west, and 18 cm in depth. Zone 14 was uncovered after the removal of a cohune tree stump, during the excavation of Zone 7. This small lens contained a high density of artifacts including the reconstructible fragments of a rectangular green glass “case” bottle and stoneware vessel (probably British colonial period in date), as well as one Sevilla Blue-on-Blue sherd. Zone 14 was likely formed by bioturbation that transported the vessels down from an upper level.

**Zone 15**

A compact construction-fill layer, Zone 15 was unevenly distributed below Zone 7 in Square B (Figure 5.3). Zone 15 sediment was differentiated from that of Zone 7 by its lighter color, increased grain size and higher density of limestone inclusions. The matrix was characterized by a sandy clay sediment, grading in color from a dark yellowish brown (10YR 4/6) in the northeast to brown (10YR 4/3) in the southwest, as well as a light density of BCM, a high density of gravel and cobble-sized limestone inclusions. A light density of artifacts was recovered from this zone, including debitage and pottery sherds. It is
possible that Zone 15 was the result of a fusion between Zone 7 and Zone 16 (a decomposing plaster surface), thus explaining the increase in grittiness and lightening color (Figure 5.3).

Zones 8 and 16

Together, Zones 8 and 16 constituted the basal layer of Structure 351. Zone 16 was a decomposing plaster surface, preserved only in the northern half of Square B, in front of Zone 6 (Figure 5.3). Zone 8 was a compact cobble surface with dark yellowish brown (10YR 4/4) silty clay packed between the stones. These two zones yielded a very light density of artifacts including debitage and pottery sherds. In the southern half of Square B, where the plaster surface is no longer preserved, Zone 8 underlies Zones 7 and 15.

Zone 9

Zone 9, a non-cultural, alluvial layer of semi-compact, dark yellowish brown (10YR 4/6) clay loam, underlies Zone 8 in Square B (Figure 5.3). Not only was it devoid of inclusions, but only a negligible quantity of debitage, obsidian, and slipped pottery sherds were recovered. It is likely that these artifacts were brought to Cedar Bank during flooding periods of the Sibun River. To determine the extent of artifact depth, a posthole (Zone 17) was dug to probe below the excavated alluvial layer (Figures 5.2 and 5.3). The Zone 17 matrix is identical to that of Zone 9. It yielded only 5 artifacts (debitage and pottery sherds) and was completely sterile throughout its basal 30 cm.

The recent excavations at Operation 40 have enabled us to offer a brief description of the architecture of Structure 351. The basal layer of this structure was a plaster-covered compact cobble surface (Zones 8 and 16) built atop a non-cultural alluvium earthen layer (Zone 9; Figure 6). Overlying this plaster and cobble surface was a thick layer of construction-fill (Zone 7), which acted to support the first and second terrace facing stones (Zones 6 and 26) of Structure 351 (Figure 5.3). The tread between these two terraces was comprised of a plaster-covered construction-fill surface (Zones 21 and 24; Figure 1). Finally, the eastern and western corners along the front of Structure 351 appeared to have accommodated an outset staircase.

Operation 41: A Residence on the Top of Structure 351

Due to the relatively high density of Spanish colonial period artifacts recovered in Operation 40, it was suspected that a contemporaneous residence might exist at the top of the slope. The fact that several large pieces of limestone protruded from the surface on top of Structure 351 corroborated this hypothesis. Operation 41 was placed on top of Structure 351 and designed to investigate the central and eastern portions of the mound. It was a cardinally oriented 6 x 6 m unit divided into nine 2 x 2 m squares (lettered A through I, with A in the northwest corner and proceeding west to east in three rows; see Figure 5.5).

Even before excavations began, it was apparent that the mound had been disturbed. A gaping looter’s pit had taken a giant bite out of its northern edge. Large cohune and fig trees and old cohune pits dotted its surface. Excavations indicated that the damage was more widespread than even this scarred surface suggested.
Zone 1

Zone 1 appeared to be material deposited on the surface of the eastern end Structure 351 due to insect activity, as it represented the base of a large anthill. The sediment of this zone was lighter than the surrounding matrix and probably transported from deeper layers. Rounded nails and glass recovered from this zone indicated modern activity.
Zone 2

Zone 2 consisted of wooden planks, one in Square B and one in Square C. These were likely left over from the Mosquito Coast film crew (1985-1986), which, according to local informants, built scaffolding on the top of Structure 351 (Figure 5.5). The plank in Square B was removed intact from the modern ground surface, while the one in Square C was badly deteriorated and removed in small pieces. Neither plank was saved for lab analysis due to its obvious recent date.

Zone 3

An earthen layer that overlaid many limestone cobbles, Zone 3 contained most of the colonial artifacts found in Operation 41 (Figure 5.6). It also contains pre-contact artifacts, and thus is likely a disturbed layer with several time periods represented. Among the colonial artifacts were iron strapping (alternatively, knife fragments), clay pipe fragments, and British earthenware.

Zone 4

An earthen layer of the same texture as Zone 3, Zone 4 was slightly darker in color (Figures 5.5 and 5.6). It is located on the north side of Operation 41 and may be the result of some post-depositional processes that altered Zone 3 in this area.

Zone 5

An earthen layer immediately above a cobble surfaces and a free-standing wall, Zone 5 contained primarily pre-contact artifacts but also a few modern artifacts (Figures 5.5 and 5.6). This mixing indicates that the disturbance to the mound is not limited to near-surface contexts.

Zone 6

A pocket of sediment likely formed by the decomposition of a cohune tree stump, Zone 6 contained only a few artifacts and is considered to represent highly disturbed sediment (Figure 5.5).

Zone 7

Zone 7 represents a deteriorating free-standing wall built on the north side of the top of Structure 351 and running east-west parallel to the edge of the mound (Figures 5.5 and 5.6). It appeared to be a two-course wall made of roughly squared limestone blocks with no dimensions larger than 30 cm, and was best preserved toward its western end. This wall appeared to be part of a superstructure on the mound, though the date of its construction is unknown.

Zones 8 and 9

An irregular sscatter of limestone cobbles, Zone 8 was found only in Squares A-D. The size of the cobbles ranged from 3 to 30 cm in length and few exhibit any flat surfaces. Due to their lack of patterning, they likely were not in situ. The closely related Zone 9 was composed of closely packed regular and irregular limestone cobbles that covered the southern portion of Square D and all of Square G (Figure 5.5).
Figure 5.6. Cross-section of a) west and b) north walls, Operation 41.

The edge of this surface paralleled the Zone 7 free-standing wall and is thought to have been part of the Structure 351 superstructure.

**Zone 10**

Zone 10, an earthen layer that may be a decomposed fired clay surface, was located between Zones 7 and 9 (Figure 5.5). It contained small and large pieces of baked clay material (BCM). The largest pieces of BCM contain charred plant fibers and some nodules were discovered *in-situ*, pressed against limestone cobbles. These pieces of baked clay not only carried the impressions of the cobbles, but also contained a flat top surface that was likely part of a floor. These features provided good evidence that clay containing plant materials was pressed into place and then fired *in-situ* to produce a hardened living surface.

**Zones 11, 12, and 13**

Zone 11, excavated only in Square D, Zone 11 was a compact clay layer beneath the decomposed clay surface of Zone 10 (Figure 5.6). Zone 11 represented construction fill of the Structure 351 mound (deduced by comparison with the adjacent looter’s pit), and contained a light density of artifacts. Zone 12 was a continuation of Zone 11 separated purely for stratigraphic control. It was arbitrarily ended after 20 cm and contained only a single piece of obsidian. Zone 13 was a further extension of this matrix, again separated for stratigraphic control. It was arbitrarily ended after 20 cm and contained no artifacts.

**Operations 42 and 43: Investigations of Structure 357**

After the completion of Operations 40 and 41, we decided to test one of the structures in the northern plaza of Cedar Bank. Structure 357 was chosen because of its long, low shape, east-west axis, and curious rise on its eastern end. Two transverse trenches were positioned across Structure 357: Operation 42 and 43.
**Operation 42**

Operation 42, a 4 x 8 m unit divided into eight 2 x 2 m squares, was oriented cardinally with its long axis aligned north-south, and ran from the center of Structure 357 off the north side of the mound at its western end (Figure 5.7). This unit was positioned in order to collect information about the architecture of the structure as well as its function.

**Zone 1.** A topzone containing small roots, leaves, and other plant material, Zone 1 covered all squares and exhibits slight variation in color across the operation (probably due to moisture content), but was considered one zone because all squares contained sediments with the same texture, compactness, and lack of inclusions. Zone 1 was excavated only in the eastern row of the Operation 42 squares (specifically, B, D, F, and H) and contained no artifacts (Figure 5.7). Zone 1 is thought to be an alluvial layer deposited by occasional flooding of the Sibun River to the south.

**Zone 2.** Found directly beneath Zone 1 in all excavated squares of Operation 42 (B, D, F, and H), is Zone 2 also a silty-clay. This zone lacked any inclusions aside from a few small pieces of charcoal.

**Zone 3.** Zone 3 was a “test pit” on the western edge of Square H at the bottom of Zone 2, undertaken to determine the contents of the raised area on the eastern end of Structure 357. It turned out to be a product of bioturbation activity (several small burrows were noted in this zone), and Structure 357 should be thought of as one long flat platform with no special structure on its eastern end.

**Zone 4.** An earthen layer below Zone 2, Zone 4 blankets Structure 357. Below Zone 4 were the first traces of the underlying platform structure. The first artifacts of the excavation appeared in this zone, including large pieces of Columbia Plain pottery, a Spanish colonial type of majolica.

**Zones 5, 6, 7, and 8.** Zone 5 was an earthen layer located to the north of the northern retaining wall of Structure 357. The density of artifacts increased within this zone. Zone 6 represented tumbled stones from the northern retaining wall of Structure 357 while Zone 7 was the sediment below the Zone 6 tumble that rested against the northern retaining wall of Structure 357. Zone 8 is an earthen layer north of Structure 357, below Zone 5. This zone contained a light density of pottery sherds and debitage.

**Zone 9.** The northern retaining wall of Structure 357, Zone 9 was comprised of naturally shaped limestone cobbles chosen for their flat sides (though a few are quite rounded). The retaining wall was oriented at a bearing of roughly 100° and appeared to have been three courses high in its original state (Figure 5.7 and 5.8).

**Operation 43**

A 2 x 14 m excavation unit cardinally oriented perpendicular to the long axis of Structure 357, Operation 43 was located approximately 14 m west of Operation 42 (Figure 5.7). The operation was divided into seven 2 x 2 m squares, labeled A through G from north to south. The excavation was designed to examine the final occupational phase of Structure 357 and determine if the structure had been utilized during the Spanish colonial period.

**Zone 1.** Found across all squares, the topzone (Zone 1) of Operation 43 is a layer of loose, dark brown (10YR 3/3) silty clay sediment with a very high density of rootlet inclusions (Figure 5.9). This zone is
Figure 5.7. Plan view of Operation 42 and Operation 43.
Figure 5.8. Cross-section of west wall, Operation 42.
Figure 5.9. Cross-section of west wall, Operation 43.
quite thin, ranging from 1 to 7 cm in depth throughout the unit. Three surface cobbles were removed from the topzone of Square B, with one partially buried boulder remaining. Additionally, one cobble lay in Square C and two partially buried cobbles in Square F, all appearing to be tumble from the northern and southern retaining walls of Structure 357 (Zones 9 and 10).

**Zone 2.** Zone 2 was encountered directly below Zone 1 in all squares of Operation 43 (Figure 5.9), and was an earthen layer of semi-compact, dark yellowish brown (10YR 3/4) silty clay. A light density of small pebble-sized pieces of baked clay material (BCM) was found in Squares B, C, and D. Toward the bottom of Zone 2, along the east wall of Square B and south wall of Square F, we began to see the remnants of retaining walls (Zones 9 and 10, respectively). There are several cobble and boulder-sized limestone inclusions throughout Squares A, B, C, and G, which are likely to have tumbled from the retaining walls of the structure.

The first artifactual remains encountered at Operation 43 came from Zone 2 of Squares C, D, E, F, and G. These squares yielded a small scatter of chert debitage, obsidian, and poorly preserved sherds, which continued to be found consistently throughout Operation 43. Square D also revealed a large, 20 cm long chert adze that exhibited heavy polish at its beveled edge. This adze is likely not in situ, but rather, brought to its location just below the topzone by a flooding event or other post-depositional processes. A few large Columbia Plain sherds that date to the Spanish colonial period were recovered from Square E. Finally, Square F yielded a 7-cm long medial fragment of a chipped stone tool.

**Zone 3.** An earthen layer of semi-compact, dark yellowish brown (10YR 4/4), silty clay, Zone 3 was found below Zone 2 across all squares of Operation 43 (Figure 5.9). The artifact density within Zone 3 is light, with typical artifacts being obsidian, debitage, and poorly preserved sherds.

More notable artifacts recovered from Square A included a spindle whorl and a large reconstructable portion of a Columbia Plain dish, including rim, body, and ring base sections. It is possible that these sherds are associated with those recovered from Zone 2, Square E.

While excavating in Square B a fishing net weight was recovered. Within the northern half of this square, the excavation of Zone 3 exposed the top layer of a northern retaining wall (Zone 9) oriented roughly east-west, as well as a large layer of tumbled stones associated with the wall of Zone 6. The southern half of Square B, as well as Squares C and D were not excavated, as they were located inside of the retaining wall.

The southern extent of Square F revealed a southern retaining wall (Zone 10) oriented roughly east-west as in Square B. The remainder of Square F was excavated down to the level of Zone 10. At the surface of Zone 3, Square G, were five boulders, clearly displaced from Zone 10. Further, within the Zone 3 matrix a mano fragment, possibly of pink granite, was recovered.

Despite its location inside of the Structure 357 retaining walls (Zones 9 and 10) Zone 3 of Square E was excavated further in an effort to locate the surface of the structure. As we reached the top level of the retaining walls (Zones 9 and 10), no gravel or cobble surface was found. However, the sediment became completely sterile, and it is possible that instead of a cobble surface, Structure 357 had a surface of compact clay.
Zone 4. Located in the center of Square A, at the interface of Zones 3 and 5 (earthen layers), Zone 4 was a pit of dark brown (10YR 3/3), loose silty clay, measuring approximately 65 cm in diameter and 20 cm in depth. The Zone 4 matrix exhibited a very high density of wood charcoal flecks and chunks (1-2 cm), fire-cracked rock pebbles, and BCM. The semi-charred remains of three wooden sticks (10 cm in length by 3 cm in diameter) were recovered, as well as one large cobble that had most likely tumbled from the wall of Zone 9. Zone 4 yielded few artifacts, specifically a modern corroded metal nail and several small metal flakes. The evidence suggests that the pit is the result of a modern burning event.

Zone 5. Lying below Zone 3 in Square A was Zone 5, an earthen layer of compact, dark yellowish-brown (10YR 4/6), silty clay sediment (Figure 5.9). Only three cobble and boulder-sized inclusions were found in Zone 5, presumably tumbled from the northern retaining wall (Zone 9). Few artifacts were recovered from this layer, only the usual obsidian, debitage, and pottery sherds.

Zone 6. Located below Zone 3 in Square B, Zone 6 was a small layer of cobble tumble associated with the northern retaining wall (Zone 9). Zone 6 began directly north of the top course of Zone 9, spilling further northward slightly into Square A. The depth of Zone 6 ranged from approximately 5 cm at its northern extent to about 25 cm at its southern extent.

Zone 7. Zone 7, an earthen layer of compact, dark yellowish-brown (10YR 3/6) silty clay, located in Square B below the cobbles of Zone 6. This zone was created to distinguish the sediment directly below the Zone 6 tumble from the surrounding sediment in Squares A and B, specifically Zones 3 and 5. There were virtually no inclusions within the Zone 7 matrix that yielded only a light density of obsidian, debitage, and pottery sherds.

Zone 9. As mentioned above, Zone 9 was a retaining wall located on the northern side of Structure 357 (Figure 5.10). While the excavation units were oriented north-south (as it appeared that Structure 357 extended east-west) the wall ran diagonally across Square B at a bearing of 100°, in alignment with the wall uncovered in Operation 42 (Figure 5.7). This wall was composed of large cobbles and boulders, held together by a very compact, mottled clay (10YR 3/3 dark brown, 10YR 3/4 dark yellowish-brown, 10YR 4/6 dark yellowish-brown). The remains of the wall indicate that, at one time, it was three courses high. The second and basal courses were still intact, while the only indication of a top course is one large boulder oriented directly above the second course (Figures 5.7 and 5.10). It seemed possible, and highly likely, that part of the Zone 6 tumble once comprised this top course of stones, especially when compared with the section of wall excavated in Operation 42 to the east.

Zone 10. Discovered after the excavation of Zone 3, Zone 10 was a retaining wall on the southern side of Structure 357 (Figure 5.7 and 5.10). Like Zone 9, Zone 10 ran diagonally across the north-south oriented excavation unit at a bearing of 100° (Figure 5.7). While the wall was poorly preserved and barely intact, it appeared that 2 courses remained, composed of large limestone cobbles and boulders held together by a very compact, mottled clay (2.5Y 4/3 olive brown, 10YR 4/6 dark yellowish brown) matrix. Over time, the top course had shifted northward, past the basal course. It is possible that, like Zone 9, this wall had a third, uppermost course, indicated by the large cobbles and boulders found in Square G (Zones 2 and 3), which are presumably wall collapse. Again, few artifacts were recovered, specifically obsidian, chert debitage, and pottery sherds.

Zone 8. In Squares F and G, Zone 3 overlaid Zone 8, an earthen layer of loose, dark yellowish-brown (10YR 4/6), silty clay sediment (Figure 5.9). Zone 8 was excavated in steps, from the southern
extent of Square G down to the face of Zone 10. As is characteristic of this excavation unit, only a light density of obsidian, chert debitage, and pottery sherds were recovered from Zone 8, along with two animal bone fragments.

Zone 11. Zone 11 was an earthen layer of compact, dark yellowish brown (10YR 3/6), sandy clay located in Squares A and B (Figure 5.9). In Square A, Zone 11 underlay Zone 5 and was left unexcavated. Within Square B, though, Zone 11 was excavated in front of and below the retaining wall. As in the rest of the unit, a light density of obsidian, chert debitage, and pottery sherds were recovered. However, one unique ring base sherd came from the matrix and could potentially be diagnostic. Excavations did not continue below Zone 11, as it was already deeper than the basal course of Zone 9.

Zone 12. Zone 12 was an earthen layer of semi-compact, dark yellowish-brown (10YR 5/6), silty clay, underlying Zone 8 in Squares F and G (Figure 5.9). Zone 12 was excavated in front of the Zone 10 wall to probe for any additional courses of stones—none were found. A light density of obsidian, chert debitage, and pottery sherds were recovered from Zone 12, as well as a large distal biface fragment found in Square F. As was the case with Zone 11, excavations did not continue below Zone 12, as it was already deeper than the basal course of Zone 10.

Operation 44: A Test Unit in the Northern Plaza

Operation 44 was a 2 x 2 m test unit located in the northern plaza of the Cedar Bank center (north of Structure 351). This location was chosen by Tori Saneda who had conducted a magnetometer survey within the plaza and identified a magnetic anomaly. As the only plaza test, this unit also provides a comparison to the other architectural contexts investigated at the site.

Zone 1

A loose silty sediment containing many roots and a high density of burned cohune nut fragments, Zone 1 yielded a light density of artifacts, including a chipped stone tool fragment.

Zones 2 and 3

Zone 2 was an earthen layer also containing a high density of roots, but almost no cohune nut fragments. The density of artifacts continued to be very light, with only one piece of debitage and a handful of sherds recovered from this zone. The matrix of Zone 3 was nearly identical to that of Zone 1, but more compact and with no roots. Large limestone pebbles and a few limestone cobbles were found within this sediment. The density of artifacts remained light, but the artifact assemblage included a highly retouched obsidian blade fragment.

Zone 4

A dark-stained area at the bottom of Zone 3, Zone 4 may have been formed by the deterioration of wood. The artifacts are similar to those of Zone 3, with a few sherds, pieces of debitage, and one unusual ground obsidian disk.
Zone 5

Beneath the Zone 4 layer was a zone of very compact, olive brown sandy clay, labeled Zone 5. A few pottery sherds and a piece of obsidian were recovered from this zone. Due to the difficulty of screening this sticky clay, only 50% of the excavated material was sieved.

Zone 6

As with Zone 4, Zone 6 was a dark-stained area of sediment that also may have been formed by the deterioration of plant material. After Zone 6, only the southern half of the 2 x 2 was excavated due to the difficulty of screening the excavated sediment.

Zone 7

Zone 7, red and orange mottled clay, was found in the southeast corner of Operation 44. Debitage and pottery were recovered in light densities in this zone, continuing the pattern of sparse artifacts throughout the excavation unit. No further excavation was completed due to time constraints and the difficulty of screening the sediment. Overall, the cause of the magnetic anomaly was not discovered, though perhaps it was due to the dark staining in Zones 4, 6, or 7. Few artifacts were recovered from this unit, although two unusual pieces of obsidian were found: a ground disk perhaps used as a gaming piece and a highly retouched blade fragment (see discussion of artifacts in Chapter 16, this volume).

Discussion

The midden feature uncovered through excavation of Operation 40 left us with the conclusion that a Spanish Colonial Period residence probably existed on the top of the basal platform Structure 351 at Cedar Bank. The broad exposure of Operation 41 revealed a narrow floor of hardened clay bordered by low retaining wall on its north side and a cobble surface to its south. This may represent a change in architectural style similar to that in early Colonial Period Tipu, where covered cobble “porches” were located adjacent to residences (see Graham 1991: 321-3). Operation 41 excavations produced few artifacts, though more British Colonial than Spanish Colonial in number. This low frequency suggests that the superstructure, originally used by pre-contact Maya, regularly would have been swept clean. Perhaps the higher frequency of British Colonial Period artifacts represents a final phase of occupation whose residents left it strewn with their garbage.

Overall, surprisingly few artifacts were recovered from Operation 42 and 43, especially off the northern edge of the structure. The stratigraphy was very difficult to determine, and both the living surface of Structure 357 and the contemporaneous ground surface off its northern edge barely could be distinguished (Figure 5.11). Significantly, several of the limited sample of artifacts were sherds of Spanish colonial pottery, indicating that Structure 351 was not unique in bearing artifacts from the early colonial time period. The presence of Spanish colonial artifacts in all operations reinforces the significant, if difficult to tease out, occupation at Cedar Bank during this time period. Clearly, future analyses and investigations will reveal additional information about the Xibun Maya in the early colonial period.
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Graham, Elizabeth

Morandi, Steven
Diplomats and government officials of the eighteenth century viewed the Sibun River valley as a zone of light occupation on the margins of the British Bay Settlement. Later historians have pursued an ephemeral documentary trail that has confirmed the marginal nature of the region relative to the Belize and New River Valleys to the north, but which has also indicated the probability of significant undocumented habitation there as well (Waddell 1961: 20; Finamore 2004: 41). During the 2003 season of the Xibun Archaeological Research Project, investigations of British colonial-period occupations were focused on the section of the valley locally known as Gracy Rock and officially called Transect 4 (Figure 6.1). A transitional area within the valley, Gracy Rock marks the end of the lowlying mangrove estuary and the beginning of the towering Sibun-Manatee karst. Archaeological investigations undertaken at this key locale included three components: a shovel test pit and surface survey of the riverbanks where the river flows out of the karst terrain; excavation of a late nineteenth and twentieth century midden in Cedar Bank Village; and a reconnaissance survey of the Runaway Creek drainage.

Gracy Rock/Cedar Bank Survey

The 2001 season of survey illustrated that techniques employed to locate British colonial-period sites in other Belize river valleys would not be effective along the Sibun, which is prone to far more severe flooding, sediment deposition and bank erosion than rivers to the north (Finamore 1994: 114; Finamore 2003: 74). Consequently, a program of surface survey combined with shovel test pitting was instituted, taking into account small-scale topographical features as well as information gleaned from archival research.

Historical records indicate that several Anglo-colonial settlements had been established in the area by the 1780s, including woodcutting works of Sullivan, Jackson and Colonel English. One of the largest landholdings in the valley, identified as the claim of William Tucker, was located on the west side of the river directly downstream from Gracy Rock. Tucker’s house was just south of the first hills in the valley (PRO CO700 BH no. 13). Initial reconnaissance identified several points of high ground along the riverbanks, the most prominent of which is a cluster of Maya platforms at the site of Cedar Bank. This area, tested in 2001, had yielded pre-Columbian, Spanish colonial and Anglo colonial-period artifacts (Morandi 2003:159-164). More expansive excavations at Cedar Bank resumed during the 2003 field season (see Morandi and Cesario, Chapter 5).

Other areas of high ground were investigated in a program of twelve shovel test pits positioned at various points along the bank, each 50 cm on a side (see Figure 6.1). The first was located on the Brakeman property, just to the south of Gracy Rock itself, on the west side of the river. A diffuse scatter of eroded Maya ceramics was recovered in a zone beginning 52 cm below the surface within a matrix of uniform reddish brown sand, evidently an alluvial river deposit.

Two additional test pits (2 and 3) were excavated atop Gracy Rock which, according to local lore, is said to have been the home of a Miss Gracy two or three generations ago. She was reputed to access the hilltop
Figure 6.1. Map of Gracy Rock-Runaway Creek portion of the central Sibun River valley showing surface collection and subsurface testing areas.
via steps built into the south side of the karst tower, the remnants of which could not be located. The ascent to the summit was extremely difficult, and the excavated units were sterile.

The remaining nine shovel test pits were excavated at intervals along both sides of the river in areas that appeared to be less prone to flooding and more likely to yield preserved ground surfaces of some antiquity (large, old trees served as an indicator). Several of these units yielded discrete lenses of historical period and Maya artifacts, but all appeared to be water-worn secondary deposits, most likely from episodes of flooding.

Two test pits (8 and 10) were placed atop the riverbank near one of the Maya platforms at the site of Cedar Bank (see Figure 5.1). This area is enclosed by a meander bend that provides a natural southern and eastern boundary while a dirt road provides a western perimeter. Within this area, the land is heavily disturbed from construction and excavation. Local reports indicate that this was one of several film locations used for *The Mosquito Coast* (released in 1986). Large pits with modern refuse, including PVC pipe fragments, is visible through the overgrowth. Excavation in these units yielded broken concrete fragments and more PVC, evidently remnants of set construction.

In addition to subsurface testing, several areas along the riverbank yielded surface deposits of 18th-20th century artifacts. These five surface scatters were designated Areas A-E (see Figure 6.1). Most of these artifacts appeared on sand banks, strongly indicating that they had been carried downriver during periods of high water. In a few areas, artifacts were also embedded in the sides of the sloping banks and it is possible that they had eroded from primary refuse deposits.

In the course of surface survey along the riverbanks, a few residents showed us historical material they had found in the river after floods receded or while conducting small-scale mining of sandbars for construction material. While most of the objects dated from the late nineteenth century, one British-made glass bottle bore characteristics of early eighteenth century manufacture, being of the “mallet” style (Jones 1986: 73). This artifact offered tantalizing evidence of an illicit British occupation of the Sibun River Valley at a time when it was beyond the boundary of their treaty with Spain.

A sand bank on the east side of the river opposite the Cedar Bank sand operation truck ramp contained a secondary surface deposit identified as Area A. This area yielded many of the artifacts that local people had discovered while excavating sand for construction projects. Area B, downslope from a subsurface test unit, contained three large glass bottle fragments that perhaps had eroded from the bank above, but which more likely had been transported there by floodwater. Area C yielded a large piece of industrial iron machinery, perhaps a capstan or gear mechanism that was located on the ground surface near a footpath. Though it was measured and drawn, no artifacts were collected from Area C.

On the east side of the river at a locale designated Area D, a sand bank measuring approximately 50 m in length and 12 m in width contained a significant surface scatter of 18th-20th century artifacts. The densest concentration existed at the upriver end and was mixed with course sand. Downriver, to the north, there were fewer artifacts and finer sand indicating that—like the sand—the artifacts were sorted by the river according to weight. Large bottle fragments were also eroding from the riverbank at the upriver end of the sand spit. Far more 18th and 19th century material than 20th century material was collected from the surface suggesting that occupation, or at least deposition into the river, was greater in the more distant past. Such a distribution of artifacts indicates trash disposal into the river, perhaps complemented by the erosion and transport of artifacts from the surrounding land during overbank events. Assemblages such as that in
Area D are representative of large upriver areas, perhaps greater than a single specific settlement in the immediate area. How broad a catchment area the scatter represents is not known.

A large square-cut wedge of wood was located approximately 2 m off the south tip of the sand bank in an eddy of the river. Although the squared sides are smooth, one side is cut diagonally and bears a whittled appearance that is suggestive of an ax rather than a saw cut. At 75 cm in width, 36 cm depth, and 64 cm on the angle, the wood appears to have been cut to the shape of a wedge to hold mahogany logs and prevent them from rolling or sliding when stacked (Figure 6.2). The species of wood has not yet been identified, but it appears to have been cut from the end of a squared log of marketable timber such as mahogany, and then faceted with the diagonal cut into the desired shape for a wedge. The wedge was collected and has been accessioned into the holding of the Institute of Archaeology.

Figure 6.2. Wood wedge from the Cedar Bank area of the Sibun River, Surface Collection Area D.

Young Family Yard and Midden (Operation 69)

Investigations around the Young family house and property at the elbow of the road at Cedar Bank Village began with surface collecting at the river bank (Area E) and continued with excavation of a trash midden designated Operation 69. The property is strategically located at the point at which the Sibun River
departs the karst for flatter terrain, directly abutting the last karst hill along the bank. The grounds around the Young house are well manicured and are a popular picnic destination on weekends. Glass and ceramics are eroding from the hillside; grounds keepers collect this material and deposit it in the crotch of a tree located on an old colonial trash midden.

The property owner, a widow named Mrs. Young, said that she remembers the midden as an active trash dump a generation ago, but that she hasn’t used it. Her husband’s family has occupied this piece of land at least as far back as his grandparents’ time. Her husband’s uncle, a professional mahogany cutter, lived there as well.

A 1 x 1 m excavation unit was laid out over the midden, the north half of which was occupied by the tree and roots and so could not be excavated. Large quantities of artifacts were recovered with very little soil matrix, so the unit was only excavated to 20 cm below the highest point of ground surface. This excavation undoubtedly yielded a representative sample of Young family household refuse, but did not reach the bottom of the feature, preventing us from definitively assessing the earliest Anglo-colonial occupation at the property. The site was capped and backfilled, allowing continued investigation in the future. Although analysis will follow during the 2004 summer lab season, artifacts suggestive of settled domestic life, including lamp chimneys, medicine vials, and a glass table centerpiece, are an immediate indication that the assemblage varies significantly from seasonally occupied historical period sites investigated elsewhere (Finamore 1994).

Runaway Creek Reconnaissance

One of the least accessible areas of the Sibun River drainage is Runaway Creek, a completely unsettled waterway that flows due north, converging with the Sibun approximately 5 km upriver of Cedar Bank village. Managed by an organization known as Birds Without Borders (a joint project of the Zoological Society of Milwaukee and the Foundation for Wildlife Conservation, Inc.), the property is off-limits for hunting, logging or farming. No recorded Maya sites or archival documentation of historical period settlement exists for this area, but no known archaeological reconnaissance had been conducted in and around this tributary. The origin of the name “Runaway Creek” is not known, but with several recorded incidents of slaves running away up the Sibun drainage, it was determined that an investigation was warranted (Bolland 1988:40; Burdon 1934:2: 184; Finamore 2003:73; McAnany 2002:213).

With cooperation and participation of Mario Teul from Birds Without Borders, project surveyor David Buck, Cedar Bank resident Lance Usher, and the author conducted a two-day reconnaissance of the area. The headwaters of Runaway Creek were accessed from the Coastal Road, and the reconnaissance team explored down stream toward the confluence with the Sibun River. A relict logging road was identified, running north-northeast from the savanna toward the creek, situated between karst formations and areas of standing water. Investigations of the surrounding karstic hills resulted in the discovery of numerous small caves, several of which contained minor evidence of Maya occupation, but no historical period artifacts. Several valleys within the karst appeared to possess arable land. The mature forest also included 50-100 year old mahogany trees, indicating that the area had not been logged for many years.

Farther down river it became difficult to follow the relict logging road along the eastern bank of Runaway Creek due to thick undergrowth and trees. No hunting trails or clearances were encountered, slowing progress considerably and inhibiting a visual survey of the topography. The survey extended
northward and concluded at the peak of a steep karst tower with a wide cave mouth that had been first
sighted high above the forest canopy from a citrus grove off the Coastal Highway, approximately 5 km to
the south. Though enormous in size, the cave sloped downward to the mouth, and there was no evidence of
occupational debris within. If this drainage is so named because it was a thoroughfare for those escaping
enslavement, those on the run most likely kept heading from the headwaters of the creek south across the
Bocotora Pine Ridge into the next range of hills.

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Part III: First Exploration of Transect 2
Chapter 7
Reconnaissance and GPS Mapping within Transect 2
Satoru Murata, David G. Buck, and Steven J. Morandi

The XARP 2003 field season included investigation of an area of the Sibun Valley designated as Transect 2 (Figure 1.1), an area heretofore unexplored by the project. Examination of Transect 2 consisted of three components: a reconnaissance component designed to identify new archaeological sites, both on foot and utilizing motor vehicles; a survey component conducted on a newly identified site named Queso Blanco; and an excavation component conducted at the Queso Blanco site (Operations 60 and 61). Reconnaissance, completed by David Buck, Satoru Murata, and Steve Morandi, is described in this chapter. David Buck, Satoru Murata, Steve Morandi, and Christa Cesario undertook the survey and Satoru Murata supervised the excavations (see Chapter 8 for details).

Reconnaissance

One of the greatest challenges that we faced in the investigation of Transect 2 was access (or lack thereof) to the area in question. Transect 2 is situated in a region that lies between two highways—the Hummingbird and the Western—which required us to either penetrate the landscape northward from the Hummingbird Highway or southward from the Western Highway. By studying a topographical map of the region, we conceived of three possible routes into Transect 2: an eastern route that would take us northward from the Hummingbird Highway, utilizing a road that runs through St. Margaret’s Village (Lagoon Road); a western route that would take us northward (i.e., downstream) from the general area of the Hershey site (located in Transect 1); and a northern route that would take us southward from the Western Highway.

Our first attempt to reach Transect 2 involved the eastern route. We traveled north on Lagoon Road by vehicle. This road is also an access way to Five Blues Lake National Park. The turn-off is located at Mile 32 on the Hummingbird Highway. The road is relatively well traveled for the first 5.5 km or so, at which point the road splits—one path leading east towards the park and the other continuing north towards Transect 2. After traveling several kilometers farther north on the road, which degraded rapidly beyond the split, we entered a citrus orchard. The truck road which, according to our map, should have continued farther north, nevertheless ended inside this orchard, forcing us to continue the trek on foot. The owner of the citrus guided us across his land to its northern edge, where there was another truck road continuing north. This road took us through bush and into another citrus orchard.

We continued northward through the second orchard, although the landscape pushed us farther east than we would have liked. Beyond the northern edge of the orchard was bush. We walked through it for some time but were not able to reach the confluence of the Sibun River and Dry Creek, which marks the southern edge of Transect 2. We had decided by this time that the eastern route, even if it could be penetrated on foot, was not a practical one to pursue if our goals were also to conduct survey and excavation in Transect 2—the road that could be traveled by vehicle ended far too south of the Sibun/Dry Creek confluence. We decided to set aside the eastern route for the time being and to try the western route instead. It may be worth some effort to pursue the eastern route during future research, if only to discern whether an access
Figure 7.1. GPS map of Transect 2; shaded area shows the extent of the Queso Blanco site.

route exists or not. Furthermore, it may be worth the effort to retrace our steps on the eastern route to collect GPS coordinates, as we were not able to do so on this occasion.

Our second entry into Transect 2 was via the western route. A road leads north from the Hershey plantation, more or less following the flow of the Sibun. The road passes St. Thomas village to the left and crosses a small stream—a relatively easy crossing during the dry season with a 4WD vehicle—and continues several kilometers farther into one of the Caves Branch Citrus orchards within Transect 2. We conducted extensive reconnaissance within this orchard but were unable to locate any archaeological features, perhaps due to the heavy disturbances caused by the construction of the orchard.

Sandwiched between the Caves Branch Citrus and the Sibun is a ranch owned by Mr. Ramon Galvez. The holding is roughly 2,200 acres in size, out of which about 1,000 acres are cleared cattle pasture. Mr. Joe Galvez, the ranch manager, informed us of the presence of several “mounds” on their
property. A quick investigation of these mounds by vehicle and on foot strongly indicated that the mounds were indeed small house mounds. We were able to identify a total of 28 such mounds on the property, all of which were plotted using GPS (see Figure 7.1). These were assigned XARP structure numbers 600 through 627. The cluster of mounds was designated Queso Blanco in honor of the delicious white cheese produced by Ramon’s wife Elena Galvez. Subsequent survey and excavation conducted at the Queso Blanco site are covered in detail in Chapter 8.

After our preliminary investigation of the Galvez property, we attempted to penetrate deeper into Transect 2. There were two directions in which we could head: across the Sibun to the east in order to explore the eastern bank of the river, and farther north along the western bank. We were able to cross the Sibun by vehicle from the Galvez property at a point where the water was relatively low—a luxury that can only be enjoyed during the dry season. According to Mr. Galvez, the land on the eastern bank of the Sibun is owned by a Mr. Thompson—an individual who lives in Belize City and with whom we were not able to meet. We investigated the northern portion of the land by vehicle and the southern portion by foot. The northern area was covered with tall grass and was bordered by heavy bush along its northern boundary. No archaeological features were identified. The southern portion of the property was a remnant orchard. This area was explored in the direction of the Sibun/Dry River confluence and included terrain encircling a large karst feature south of the Thompson farm house. Of the territory we covered on Thompson’s land, we only were able to identify one possible platform mound, designated Structure 650 (see Figure 7.1).

Additional efforts to explore this area of Transect 2 were made north from the Galvez property. The northern edge of the Galvez pasture also was bordered by bush. We were able to cut through the bush down to the Sibun, but were unable to continue along the western bank. We found an area of relatively low water, crossed the river on foot, and continued northward along the eastern bank, which was a cobble beach for several hundred meters. When the cobble beach ended, we again entered bush on the east side of the river and attempted to continue north. The bush along the river was mostly cohune forest and relatively easy to navigate; however, we were unable to explore areas farther to the east, due to dense patches of spiny bamboo. Due to time constraints, we were forced to head back after traveling several hundred meters to the north. No archaeological features were identified in this area. Portions of this venture northward were mapped using GPS, although areas in heavy bush could not be mapped due to poor satellite reception. Additional reconnaissance to the north along the cohune forest is recommended.

Using the western route described above, we were able to cover the lower 2/3 of Transect 2. A more complete survey of Transect 2 was possible to the west of the Sibun River because local land use practices facilitated travel through this area. Within Transect 2, the area to the east of the Sibun still remains largely unexplored. Extensive reconnaissance of this area requires greater investment of time and labor. If we were to spend such resources on the reconnaissance of this area and were able to identify heretofore-unknown sites, it would remain difficult to conduct subsequent survey and excavation there, since vehicular access is highly limited, which would put a constraint on time as well as inhibit the transportation of necessary equipment. A possibility remains, however, of setting up a camp from which such survey and excavation could be conducted.

There are substantial karst formations along the eastern side of the Sibun, as well as some smaller formations on the western side, amongst the Caves Branch Citrus. There may be significant potential, therefore, for cave archaeology in Transect 2. Joe Galvez mentioned, on several occasions, encounters by family members with archaeological deposits in the Transect 2 karst. Finally, a more extensive reconnaissance of the lower part of Transect 2—at least of areas immediately adjacent to the Sibun
riverbanks—may be possible if we were to utilize canoes as a means of travel downriver, perhaps starting near the Galvez property. We would, however, need to overcome the challenge of transporting GPS equipment safely, if we are to acquire precise mapping data during such an investigation.

Reconnaissance in the northern section of Transect 2 was carried out with the goal of exploring the area surrounding the confluence of the Sibun River with Caves Branch River. In previous seasons, this area had not been surveyed and its coverage became a goal of the second half of the XARP 2003 season. Access into this area of the Sibun watershed was gained through the Frank’s Eddy/Jaguar Paw road (at mile 42 of the Western Highway). Mr. Victor Quan manages the property as an orange orchard and access to the property was granted by Mr. Quan and his assistant, Hilario Mes.

Initial survey and reconnaissance included driving the orchard roads of the property and mapping them using a Sokkia GPS receiver. The orchard roads cover an extensive area of land between the Caves Branch and Sibun Rivers (greater than 1200 acres) as well as approximately 150 acres of orchard on the SW side of the Sibun River. Survey within the larger parcel of orchard revealed only one small platform mound. This mound (height = 0.50m) contained a scattering of river cobbles around its eastern side with no visible artifacts on the surface. Survey within the 150 acres of orchard and the surrounding forest in the SW side of the Sibun River revealed no cultural material. All orchard land surveyed in the northern section of Transect 2 was thoroughly cleared and modified by earth moving equipment prior to planting for citrus. The earth moving activity may have disturbed pre-existing house mounds and associated cultural material. In the future, this area would benefit from a full-scale systematic survey of the orchard involving a team of surveyors who could walk the orchard rows, which are spaced roughly 3 to 4 meters apart, and survey for remnant mound construction material (such as river cobbles and limestone) as well as artifacts. Also, the potential of remote sensing (magnetometry, ground penetrating radar, etc.) should be explored in this area.

Additional reconnaissance in the northern section of Transect 2 included exploration of a network of hunters’ trails located between the Sibun and Caves Branch rivers that parallels a small fork of the Sibun, which rejoins the main river channel in the area of Hell Gate rocks. The trail leads to an area of interest for future XARP fieldwork. A large, crescent-shaped ox bow lake is located adjacent to the trail after approximately 0.75 km. The ox bow may provide a potential coring location for future paleoenvironmental work and archaeobotanical investigations. The ox bow is littered with fallen trees and other organic material limiting access, but merits further attention. On the banks of the ox bow there is a broad platform mound (height = 1.75 m; length = 10 m; width = 8 m) constructed of limestone blocks and earthen fill. The mound has been severely looted with a large (3 x 2 x 2m) looter’s pit placed in the center of the platform. No cultural material was visible in the sidewalls of the looter’s pit. More extensive survey in this area is warranted in order to expand the settlement map of Transect 2.

Further investigation in this area of Transect 2 will shed light on the settlement activity at the confluence of the Sibun and Caves Branch, the area that provides a gateway to the Maya mountains and the Sibun Gorge to the south and the complex karst and associated cave systems of the Caves Branch to the west.
Chapter 8
Survey and Excavations at Queso Blanco (Operations 60 & 61)
Satoru Murata, Steven J. Morandi, David G. Buck, and Christa Cesario

During reconnaissance on the Galvez property, we identified 28 potential platform mounds (see Chapter 7). The mounds were invariably small, the largest of them, Str. 619, being approximately 1.5 m tall. With the exception of one (Str. 600, located near the southern edge of the property) all of the mounds are situated in the northern half of the Galvez property. Significantly, all structures are located on the same river terrace, which XARP geomorphologist Thomas Bullard has tentatively identified as “T1,” the oldest terrace formed by the Sibun River. The mounds tended to be situated along the eastern side of the terrace—i.e., closer to the Sibun—perhaps indicating that proximity to the river was a major factor in the formation of the settlement. The mounds also were dispersed across the landscape, many of them being separated from each other by a distance of 60 to 90 meters (Figure 8.1). Such a distributional pattern also can be seen at other residential sites in the vicinity, such as the Echo Valley site. GPS was used to gather accurate UTM coordinates, as well as perimeter and area information, for each of the 28 mounds. Rough estimates of the heights for all of the mounds were also collected. These data are summarized in Table 8.1.

![Distance to nearest structure](image)

**Figure 8.1.** Distances to the nearest structure from each of the structures at Queso Blanco, excluding Structure 600. Note the strong mode in the 60 to 90 m range.

The survey component at Queso Blanco consisted of two sets of shovel test pits, remote sensing using a conductivity meter, and gathering of topographical data using a total station. The goal of the shovel-testing program was to identify possible middens near structures, which we could subsequently study more intensively through test excavations. Two structures were selected for testing: Strs. 604 and 618. Str. 604 is one of the few structures at Queso Blanco that bear any kind of discernable orientation. Str. 604 also is unique in that it features what appears to be an extension mound. Str. 618 is one of only three structures (including Strs. 623, and 625) with any visible stone on the surface, and the only one with visible limestone.
Table 8.1. UTM Coordinates, Perimeter, and Area for Structures of Queso Blanco and the Thompson Property.

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<td>329247.64</td>
<td>35.09</td>
<td>86.6</td>
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<td>1901379.81</td>
<td>329834.28</td>
<td>40.37</td>
<td>99.16</td>
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<td>1901379.81</td>
<td>329834.28</td>
<td>40.37</td>
<td>99.16</td>
</tr>
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<td>138.61</td>
</tr>
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<td>118.49</td>
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<td>329785.04</td>
<td>39.18</td>
<td>118.49</td>
</tr>
<tr>
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<td>329723.53</td>
<td>51.51</td>
<td>136.79</td>
<td>631</td>
<td>1901148.25</td>
<td>329723.53</td>
<td>51.51</td>
<td>136.79</td>
</tr>
</tbody>
</table>

Shovel-testing Program on Structure 604 (STP 1-12)

Str. 604 is located near the northern edge of the cluster of mounds at Queso Blanco. The long axis is oriented roughly 20° north of west. The main mound is approximately 7.4 x 6.8 m in dimension, with a small extension on its eastern side of about 2.1 x 3.5 m. A larger extension to the mound is present on the south side of about 5.8 x 2.6 m (Figure 8.2). Assuming that the corner created by the main mound and the large extension would be a likely area for a midden deposit, we laid out a grid of 12 test pits, 3 rows of 4 pits each. The rows were placed 1.5 m apart, and the pits along the rows 2 m from each other (Figure 8.2). Each pit was dug using a posthole digger to the depth of about 90 cm below ground surface (BGS). The data recovered from these pits are summarized in Table 8.2.
Figure 8.2. Structure 604 and the relative positions of STP 1-12 and Operation 60.

As is shown in Table 8.2 and to our surprise, STP 7, situated far off of the mound, yielded by far the largest number of artifacts. Furthermore, the pits immediately adjacent to STP 7—namely, STPs 4, 5, 8, 10, and 11—did not yield many more artifacts than pits farther away from STP 7. This fact suggested that the area around STP 7, if not necessarily a midden *per se*, was nevertheless a concentrated area of artifact deposit. We therefore laid out a midden test unit (Operation 60) on top of STP 7. The results of this test are described in detail below.
Table 8.2. Artifact Counts from 12 Posthole Tests at Structure 604.

<table>
<thead>
<tr>
<th>STP#</th>
<th>Artifact count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
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<tr>
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<td>7</td>
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<tr>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

EM38 Conductivity Meter Survey on and around Structure 618

Structure 618 is a circular mound situated near the center of the Queso Blanco site and on the eastern edge of the Galvez pasture. A barbed wire fence running roughly 55° east of north crosses the eastern part of the mound. Being one of only three mounds with stone visible on the surface, we decided that Str. 618 would be an ideal subject for testing not only for middens but also for remnants of stone construction.

We first conducted remote sensing survey, hoping to identify sub-surface construction. We used a GEONICS EM38 conductivity meter, which measures electrical conductivity of soils. If there are sub-surface remnants of stone construction, these are likely to have different properties of electrical conductivity when compared to their surrounding matrix; such differences show up as anomalies in the collected data. With this in mind, we laid out two 16 x 16 m squares for survey. Square 2 covered most, but not all, of Str. 618, as the barbed wire fence would have caused severe interference. The edge of Square 2, therefore, was placed parallel to the fence at a distance of 3 meters. Square 1 was placed immediately adjacent to Square 2, extending out into the pasture to the northwest (Figure 8.3). We hoped that data collected from the flat and featureless Square 1 would provide a control with which to compare data collected from on-mound (Square 2).

The instrument was hand-carried at a height of roughly 25 cm above ground surface using a shoulder strap as support. It was operated using the Vertical Dipole Mode and was set to take readings automatically every 0.5 seconds. The operator walked along lines that paralleled the barbed wire fence (i.e., at about 55° east of north) at a speed of 1 m per second. Therefore, each line yielded 32 readings. The lines were spaced 1 m apart. For each square, roughly 512 readings were taken (the numbers were slightly variable since the instrument would take one more or less reading than intended if the timer shut-off varied slightly).
Table 8.3. Artifact Counts, Depth of Pits, and Artifact Count/Depth Ratio for STP 13-27, Structure 618.

<table>
<thead>
<tr>
<th>STP#</th>
<th>Pit depth (cm)</th>
<th>Artifact count</th>
<th>count/depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>90</td>
<td>9</td>
<td>0.1</td>
</tr>
<tr>
<td>14</td>
<td>95</td>
<td>18</td>
<td>0.18947368</td>
</tr>
<tr>
<td>15</td>
<td>91</td>
<td>3</td>
<td>0.03296703</td>
</tr>
<tr>
<td>16</td>
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<td>16</td>
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</tr>
<tr>
<td>17</td>
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<td>4</td>
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</tr>
<tr>
<td>18</td>
<td>90</td>
<td>22</td>
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</tr>
<tr>
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<td>35</td>
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<td>20</td>
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<td>10</td>
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</tr>
<tr>
<td>27</td>
<td>92</td>
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<td>0.11956522</td>
</tr>
</tbody>
</table>

Figure 8.3. Structure 618 and the relative positions of the barbed wire fence, the two EM survey squares, and STP 13-27.
The data were collected using DL720, a data logger designed for use with the EM38. It records three numbers per reading: x and y, which correspond to two-dimensional coordinates, and z, which is the conductivity reading measured by the instrument. The data were transferred to a PC using the software DAT38W and subsequently were converted to a comma delimited (CSV) database file. The converted file was then imported into MicroSoft Excel, where the data were restructured for use with imaging software. The modified file was then imported into MicroImages TNTlite 6.8 to create digital imagery from the EM38 data (Figure 8.4).

Figure 8.4. Imagery created from the EM38 conductivity data. The encircled oblong area on the right may represent a sub-surface anomaly.

As is evident in Figure 8.4, the data produced strong anomaly lines that run both vertically and horizontally across the image at regular intervals. These lines undoubtedly are what is referred to as “walk lines”—anomalous data created by the actual walking of the lines and hence, have nothing to do with sub-surface features. That is, the lines are the product of the operator’s inexperience in handling the equipment. One possible sub-surface feature may be represented by the dark semi-circular banded area in the image (Figure 8.4); however, a circular anomaly in the image should not come as a surprise, as it may only be the “footprint” of a buried circular retaining wall—the circular shape being evident from surface observation. Further excavation at Str. 618 is required to assess the significance of this anomaly in the image.
Shovel-testing Program on Structure 618 (STP 13-27)

Unlike Str. 604, Str. 618 is circular and lacks any orientation or distinctive flanking features. Instead of picking a particular region and laying a grid of test pits over it as at Str. 604, we decided to distribute the test pits at Str. 618 all around the circumference of the mound. First, we put a center stake on the top of the mound, which later became our datum for both the shovel tests and Op. 61. After measuring the diameter of the structure to be roughly 6.3 m, we flagged points to dig, starting with STP 13 (numbers are continuous with the test pits at Str. 604), going around the mound counter-clockwise, and alternating between just off-mound and just on-mound (Figure 8.3). We laid out a total of 15 test pits, from STP 13 to STP 27. As with STP 1 through 12, each pit was excavated to about 90 cm BGS, except for 3 pits—STP 16, 24, and 25. There the presence of multiple large rocks precluded testing below 20 cm. The number of artifacts recovered from the test pits is summarized in Table 8.3.

As is shown in Table 8.3, there was not a single pit that significantly stood out in terms of artifact count (as opposed to Str. 604). STP 19 yielded the highest number of artifacts (n=35). The number of artifacts per volume of earth dug, however, was highest at STP 16, followed by STP 24. At both of the STP’s, the digging was halted at around 20 cm BGS due to the presence of large rocks. In light of these facts, STP 16 initially was considered a prime locale for a midden test excavation unit. Unfortunately, the area surrounding STP 16 displayed an obvious depression in the soil, suggesting disturbance, most likely by a tree. In the end, we chose the area around STP 19 to be excavated for the following three reasons: (1) STP 19 yielded the highest absolute number of artifacts; (2) STP 19 was located near the bottom of the mound, where the slope was gentle and hence optimal for conducting a “bottom-up” excavation of a possible retaining wall; and (3) STP 19 was proximate to the largest exposed limestone (about 50 cm in diameter) on the mound. The details of this excavation (Operation 61) are covered below.

Excavation at Structure 604 (Operation 60)

Operation 60 measured 1.5 x 3 m and was subdivided (squared) into two 1.5 x 1.5 m squares. The unit was oriented, not cardinally, but rather following the orientation of Str. 604 (i.e., 20Ü east of north). The northern square was designated Square A and the southern Square B. STP 7 was located more or less in the center of Square A (see Figure 8.2). Only Square A was excavated.

Zone 1

Zone 1 was a loose, dark humic clay layer (with a Munsell reading of 10YR 3/4) rich in organic material—mainly grass roots. There were some inclusions of river pebbles and gravel ranging between 1 and 4 cm, mostly angular but some very well rounded. The zone penetrated 4 cm BGS and no artifacts were recovered.

Zone 2

Zone 2 was slightly more compact than Zone 1, as well as being slightly darker in color (10YR 3/6). Still rich in organic material (mostly roots), Zone 2 contained artifacts (debitage and pottery sherds), although artifact density was low. We noticed the relative abundance of debitage as compared to pottery
sherds in this layer—a pattern that persisted throughout the excavation of Op. 60. The zone continued for approximately 10 cm.

Zone 3

Zone 3 was a silty-clay earthen layer, more compact than Zone 2 (semi-compact) and darker in color (7.5YR 4/6). Artifact count reached its peak in this layer, perhaps suggesting that the zone might be categorized as a midden layer; however, we saw little difference in the matrix besides the increase in artifact density. Neither did we find any faunal remains, although that may be a function of preservation. Zone 3 was deeper by 8 cm on the eastern side of Square A. If Zone 3 was a midden layer, the eastern part of the square may have been the central portion of a pit feature. Forty-nine pieces of debitage were recovered from Zone 3, compared to 100 pottery sherds—again displaying a relative abundance of debitage. The recovery of 7 pieces of obsidian from this zone may also be significant. The zone depth was roughly 20 cm on the western side of the square and 28 cm on the eastern side.

Zone 4

Zone 4 was a compact clay layer with a distinctive yellow color (10YR 5/8) and a slightly lower artifact density compared to Zone 3. There was, however, a distinct area of loose sediment in the southeast corner of the square, which we designated Zone 5 (see below). The decrease in pottery sherds in Zone 4 was especially noticeable. A possible mano fragment was recovered, as well as a charcoal sample suitable for radiocarbon dating. Zone 4 is roughly 15 to 20 cm thick, depending on the location within the square.

Zone 5

Zone 5 was an area of loose sediment in the southeast corner of Square A, below Zone 3 and continuing into Zone 4 for about 10 cm (see Figure 8.5). Several areas within Zone 5 were loosely packed—perhaps indicating that it was a bioturbated zone. The sediment was similar to zone 3—a silty-clay sediment with a Munsell color of 7.5YR 5/8—but artifact density was low, yielding only 2 pieces of debitage. As Zone 5 ended, the soil became uniform across the square, at which point we designated Zone 6, although zones 4 and 6 were basically identical.

Zone 6

Zone 6 was an arbitrary level that went down 10 cm from the bottom of zone 4. The soil is basically the same as that of zone 4, although there was a noticeable decrease in both artifact density and the number of artifact types recovered from this zone.

Zone 7

Zone 7 was an area of semi-compact clayey soil, with a darker color than zone 6 (7.5YR 4/6). It was located in the middle of Square A, below zone 6 (Figure 8.6). Artifact density was much higher in this area compared to the edges of the square, suggesting that this may have been a midden pit. In retrospect, the feature represented by Zone 7 may have begun in Zone 6; however, the differences in the matrix were hard to discern, and we were only able to take the feature out as a separate zone for the basal 5-7 cm. At the bottom of the zone, we encountered soil identical to the surrounding matrix (i.e., the compact soil of zones 4 and 6, with a low artifact density) at which point we stopped our excavation in Square A.
Zone 8 was a posthole test dug below zone 7 for 90 cm. It was completely sterile. The soil changed from that identical to Zones 4 and 6 to a yellowish red soil (Munsell: 5YR 5/8) at 30 cm below the bottom of Zone 7.

Comments

It is difficult to assess whether or not Op. 60 could be categorized as a midden as it lacked some features and characteristics often associated with a “typical” midden deposit. Namely, Op. 60 lacked charcoal remains (only one C-14 sample was recovered), which certainly contributed to the lack of distinctive color differences that often are associated with midden deposits. Perhaps more significantly, there was a complete lack of organic remains—i.e., bones and shells. Although the lack of organic remains may be a function of preservation rather than the original context of the deposit, it does not lend support in characterizing Op. 60 as a midden. Nevertheless, we were able to collect a fair number of artifacts from Op. 60. The C-14 sample from zone 4 may provide us with a relatively solid date. Pottery remains will be
analyzed during the 2004 XARP study season. There also was an abundance of greenish chert debitage recovered from Op. 60. Analyses of these artifacts should provide us with an opportunity to further investigate past settlement at the Queso Blanco site.

Excavation at Structure 618 (Operation 61)

Operation 61 was a 1 x 2 m unit. The unit was oriented so that the long axis was oriented toward the center of the mound (and the center stake) so that we could capture as much of the slope of the mound as possible. The orientation of the long axis was 45° west of north, i.e., due northwest. STP 19 was located near the northwestern edge of the square. The orientation of the unit made it difficult to decide what to call each of the four corners—strictly speaking, the corners were more or less pointed towards the cardinal directions; however, for convenience sake, we decided to call the north corner “northwest” (Figure 8.7). As we were unable to detect any distinctive changes in the soil matrix, all zones were demarcated arbitrarily.
Figure 8.7. Plan view of a portion of Structure 618 showing the location of Operation 61.

Figure 8.8. Green stone (possibly serpentine) found in Zone 1, Square A, Operation 61.

Figure 8.9. Ceramic bead found in Zone 1, celt Square A, Operation 61.
Zone 1

Zone 1 was an arbitrary level, down to 18 cm BGS. It had a loose, organic rich silty soil, with a Munsell color of 7.5YR 4/6. Artifacts were retrieved just below the grass roots, around 5 cm BGS. The artifact density was surprisingly high from the very top. Recovered artifacts included a green (perhaps serpentine) celt found at the north end of the square, 10-12 cm BGS (Figure 8.8), a ceramic bead (Figure 8.9), and ceramics that have been tentatively identified as Postclassic by Sandra López Varela. The matrix also contained well-rounded river stone and limestone inclusions, ranging in size from 3 to 20 cm.

Zone 2

Zone 2 was an arbitrary level between 18 and 30 cm BGS composed of a loose silty-clay soil with a Munsell reading of 7.5YR 4/4. The artifact density was medium to high, yielding more pottery sherds thandebitage (as opposed to the case at Op. 60). The pottery also showed fairly good preservation and was recovered in much larger sizes when compared to Op. 60. Inclusions were similar to those of Zone 1—namely, river stone and limestone ranging in size from 3 to 30 cm. Notably, there was a concentration of large limestone and river cobbles/boulders in the eastern end of the square at the bottom of the zone (Figure 8.10). In contrast, there were no large stones in the western half of the square. It seems that this concentration of stone represents some kind of construction tumble. As an intact wall was never found in the underlying zones, further extension of the unit farther east (towards the top of the mound) may expose the wall—if in fact there is one.

Figure 8.10. Plan view of the bottom of Zone 2, Operation 61.
Zone 3

Zone 3 was an arbitrary level between 30 and 43 cm BGS. There was a slight increase in artifact density—reaching its peak along with raw artifact count in this zone—with a noticeable abundance of well-preserved pottery sherds. The silty-clay matrix was more compact than Zone 2 and there also was a change in soil color to 10YR 4/6; however, a sharp boundary between the two different types of soil was not discernable as the change was gradual. Recovered artifacts included 2 pieces of chipped stone tools, 6 pieces of obsidian, and 3 speleothems. Overall, the inclusions in Zone 3 were smaller than those of Zone 2, with well rounded and eroded limestone ranging from 3 to 10 cm, and both rounded and angular river cobbles ranging from 3 to 13 cm.

Zone 4

Zone 4 was an arbitrary level between 43 and 55 cm BGS. The soil was slightly more compact than Zone 3, but there was no significant change in soil color or texture. Artifact density showed a slight decrease overall, with a noticeable drop in artifact density near the bottom of the zone. A large limestone boulder (about 40 cm in diameter) was found at the bottom of the zone on the eastern edge of the square but no other stone accompanied it, neither around nor below. The only C-14 sample from Op. 61 was taken from this zone.

Zone 5

Zone 5 was an arbitrary level between 55 and 70 cm BGS. The soil was basically identical to that of Zone 4. Artifact density was low, the artifact count dropped from 141 in Zone 4 to 40 in Zone 5. There were slightly more inclusions of limestone than Zone 4, but they were smaller, ranging from 3 to 7 cm.

Zone 6

Zone 6 was an arbitrary level between 70 and 85 cm BGS. The silty-clay soil showed the same density and color as Zone 5. Artifact density continued to be light and hence this zone was screened at 50%. A posthole test was dug at the bottom of the zone, from which no artifacts were retrieved. Therefore, Zone 6 probably represents the earliest occupation layer at Str. 618. Interestingly, a ceramic bead similar to that found in zone 1 was recovered from this zone (Figure 8.11).

Zone 7

Zone 7 was a posthole test dug into the middle of the unit, 60 cm in depth. The zone was sterile in terms of cultural material. There were two noticeable soil changes within the pit; one at 5 cm, where the soil turned into a semi-compact, yellow soil (10YR 5/8), then to a semi-compact red soil (5YR 4/6) at 30 cm. Both of these soils were less compact than that of Zone 6.

Comments

The artifacts retrieved from Op. 61 were greater in number and of more informational value that those collected at Op. 60. The presence of the green celt found in Zone 1 along with what appears to be a “celt blank” found in STP 19 suggests that the inhabitants of Str. 618 were working wood. The multiple finds of stone net weights, fashioned out of river cobbles, informs us that the inhabitants were utilizing the
nearby aquatic resources of the Sibun river. The presence of what seem to be several diagnostic pottery
sherds, along with the C-14 sample collected from zone 4, should aid us in achieving a fairly accurate dating
sequence across the strata. Sourcing of obsidian acquired from zones 1, 3, 4 and 5 should shed light on
changes in obsidian trade over time at Queso Blanco.

Comparison of the artifact assemblages between Op. 60 and Op. 61 provide valuable insights. For
example, the sheer difference in the number of artifacts collected (343 total for Op. 60 and 624 total for
Op. 61), the difference in the number of artifact types, and the differences in the quality of artifacts may
suggest a certain level of status differentiation between the inhabitants of the two structures. Another
notable difference between the two operations is the presence of what appears to be remnants of much later
occupation at Str. 618—suggested by the high density of near-surface artifacts found at Op. 61. It would
be interesting to see when each of the structures was first inhabited and finally abandoned.

Unfortunately, we were not able to identify any intact remnants of stone architecture, such as a
retaining wall. The presence of what appeared to be construction tumble found in Zone 2, however,
suggests that there is a good chance we would find such remnants if we were to excavate closer to the
center of the mound. In the future, it may well be worth the effort to extend the unit farther to the southeast
(Figure 8.12).

**Topographical Mapping around Structures 604 and 618 (Operations 60 & 61)**

In the last few days of fieldwork, Satoru Murata, Christa Cesario, and Steven Morandi gathered
topographical data from select areas of the Queso Blanco site—specifically, areas around the two
operations (Op. 60 and 61). The data were collected using a Sokkia Set-3B total station. We gathered
elevation data for a total of 207 points, encompassing structures 601 through 606, 615 through 619, 623,
625, and areas around them. Because of the wide area involved, not all of the points could be gathered
Figure 8.12. Profile view of the south wall of Operation 61. The mound rises to the left of this figure. Note the concentration of rocks towards the left (east).

from one station. To be specific, data collection was conducted from four different stations, generating four different datasets. These data have not yet been integrated, and I present here topographic maps generated from two of the four datasets—namely, the one which includes Str. 604 (Op. 60) and the other which includes Str. 618 (Op. 61).

The data, which were originally hand-recorded onto survey notebooks, were entered into Microsoft Excel spreadsheets. After some data manipulation within Excel, the data were exported as comma delimited files (CSV). These were imported into Golden Software’s Surfer, which generated the two topographical maps (Figures 8.13, 8.14). The two maps have not yet been georeferenced; hence, they are “floating” in respect to absolute elevations. The 10 cm contour interval is relative to the station from which the data were collected—specifically, the top of Str. 604 (Figure 8.13) and the top of Str. 618 (Figure 8.14).

Concluding Remarks

The successful identification, survey, and excavation of the Queso Blanco site is due to two factors of site visibility and preservation: (1) large areas of land had been cleared for cattle pasture, providing us with an enormous field of view across a relatively flat landscape, and (2) the Galvez family had not used heavy machinery to clear and flatten the land as is often practiced. As a result, most of the small mounds remain fairly intact. I believe it is safe to assume that the occurrence of the Queso Blanco site on the Galvez pasture is not a product of sheer chance; that is to say, if conditions were favorable—cleared land without major disturbances from heavy machinery—we should find many sites like Queso Blanco all along the Sibun River valley. In this sense, Queso Blanco is a “window into the past” (Patricia A. McAnany, personal communication, 2003) that provides us with a rare opportunity to study the archaeology of small settlements.
away from regional centers, such as the Hershey site. Continued investigations at the Queso Blanco site will complement past and current studies by the XARP project and give us a fuller understanding of the archaeology of the Sibun River Valley.

Figure 8.13. Topographic map of area of Structure 604.
Figure 8.14. Topographic map of area of Structure 618.
Part IV: Return to the Hershey Site
Chapter 9
Passageway From the Main Plaza of Group A to the East Plaza
(Operation 54)

Eleanor Harrison-Buck and Christa D. Cesario

The 2003 field season marked the second year of investigation at the Hershey site. Hershey is the largest ancient Maya settlement in the Sibun study area, located in the upper reaches of the river valley. Operation 54 was the focus of investigation in Group A (Figure 9.1), the largest plaza group at Hershey and home to the site’s ruling elite. Previous investigation of Structure 503 (Operation 51) in Group A uncovered a rich midden deposit that appeared to date primarily to the Late Classic period, ca. AD 600-850 (Harrison 2003). A thin layer of ceramic debris representing the Late-Terminal Classic transition was found capping the surface of the midden (López-Varella 2003). The evidence suggested that the elite core collapsed at around the end of the Late Classic period and did not continue to flourish beyond AD 850 like some sites in the middle and lower reaches of the Sibun Valley (e.g. Pakal Na, Pechtun Ha, Cedar Bank, Obispo, and Oshon). Excavations in Group A during the 2003 field season were aimed at 1) clarifying the chronology of the elite core area and 2) determining the nature of the site’s collapse and abandonment. Excavations of Operation 54 shed significant light on the “final hour” of Hershey and present evidence of a violent termination of the site’s elite body that lends further support to the notion of a site center collapse at the end of the Late Classic period.

Overview of Group A Investigations

Group A is a tightly enclosed plaza group that consists of a series of elongated platforms lining the sides of an inner central plaza area (Figure 9.1). Structures 503 and 504 are roughly equivalent in length and line the southern side of the plaza area (referred to as the North Plaza). A small space between the two structures served as a passageway and was the focus of the Operation 54 investigation carried out during the 2003 field season. The narrow passageway permitted access into the principle group from the East Plaza, an outside plaza area where a ballcourt (King, Chapter 10) and a small shrine structure (Harrison-Buck and Buck, Chapter 12) are located.

Operation 54 entailed a broad horizontal exposure of the passageway, which was partially visible on the surface prior to excavation, along with small areas of the North and East Plazas. The unit measured 16 m (north-south) x 3 m (east-west) and was oriented 16 degrees east of north, aligning with the building orientation of Group A (see Figure 1). The unit is divided into four squares (A-D), each measuring 4 m (north-south) x 3 m (east-west). The line of four squares that comprised Operation 54 were laid out with Square A furthest to the north and Square D furthest to the south (Figure 9.2). Due to a large number of trees, Square C was not excavated during the 2003 season.

Excavations revealed two tall, straight walls lining the sides of the passageway that represent the east wall of Structure 503 and the west wall of Structure 504 (Figure 9.3). The length of the passageway measured roughly 9 m long (north-south) and about 1.60 m wide (east-west), equivalent to the width of Structures 503 and 504.

The opening of the passageway is positioned just slightly east of center along the southern side of the North plaza (Figure 9.1). A staircase is located just to the west of the passageway opening and occupies the
central position along the plaza’s south side. The staircase appears to be a later addition constructed on the north side of Structure 503 that leads to the top of the platform structure. Structure 501, a large stone pyramid in Group A, abuts the southern side of Structure 503. The interface of Structures 501 and 503 was revealed during the excavation of Square D in Operation 54. The surface topography suggests that another staircase may exist on the north side of the pyramid that enabled access from Structure 503 to the rooms partially exposed toward the top of Structure 501.

Figure 9.1. Site map of Group A at Hershey, showing the location of Operation 54.

Group A appears to have been built primarily of stone masonry construction. Previous investigations of Structure revealed a series of plaster floors inside the platform structure associated with four distinct phases of construction 503 (see Harrison 2003). The exterior of Structure 503 contained nicely cut limestone facing blocks and a limestone and river cobble core construction fill, indicative of formal Maya platform construction found at many large Classic centers. The northern side of Structure 503, facing the enclosed North Plaza, contained several terraces and a nine-course high exterior northern wall with a
nicely preserved basal molding positioned along its base. The surfaces of the walls and stairs were once covered in plaster and remnants of a formally prepared plaza surface suggest that the central plaza area was entirely paved. The construction techniques at Hershey differ significantly from other sites in the Sibun Valley where plaster is limited and platforms are comprised of a packed earthen fill with stone restricted to terrace retaining walls.

The following provides a review of the construction phases that were identified during the 2003 excavation of Operation 54. A detailed description of the individual zones defined in each square follows an overview of the excavation techniques that were utilized during excavation.

Architecture & Construction Phases

Excavations of Operation 54 aimed to clear down the thick layer of collapse debris that existed within the passageway and expose its surface, along with the associated exterior floors in the North and East Plazas. One goal of excavation was to expose any terminal debris lying on the latest floor surfaces to better understand the final episode of the site’s history. In addition, excavations aimed to reveal any earlier phases of construction to clarify the overall chronology of Group A.

At least four phases of construction were identified throughout the excavation of Operation 54. Plaza Group A appears to have been built over a slightly modified earthen layer or alluvium naturally deposited over an old riverbed of sand and cobbles. During the first phase of construction, an initial plaza floor was laid down over a 5-10 cm thick ballast fill layer comprised of small river cobble and gravel fill. This initial floor (Floor 4 in Square A and Floor 3 in Square D) was constructed of finely-made plaster that runs underneath the final construction phases of Structures 503 and 504 and appears to pre-date this final architectural phase. As noted earlier, investigations into the interior of Structure 503 in the 2001 season revealed at least 4 floors representing multiple phases of construction and it is conceivable that this initial floor surface links up with one or more of these earlier phases of construction deeply buried beneath the interior of the platform. Further investigation of Structures 503 and 504 is necessary to determine whether any form of a passageway existed during an earlier phase of construction.

Phase 2 is defined as the final construction phase of Structures 503 and 504 where the outer walls of these structures were constructed and the 1.60 m wide passageway was formed. The same floor surface continued to be used in the North and East Plazas and functioned as the floor inside the passageway between the two structures.

Phase 3 saw two major architectural modifications, referred to as 3a and 3b. The initial modification, Phase 3a, was the construction of an elevated (35 cm high) corridor surface within the passageway that was built between the two structures. Modifications also comprised a new plaster floor (Floor 3) in the North Plaza (seen in Square A) that abutted the north side of Structure 504, but did not run underneath the structure like the earlier floor. Similarly, another floor (Floor 2) was constructed in the East Plaza (seen in Square D) that abutted the south side of Structure 504, but did not run underneath the platform. Additionally, a staircase was constructed on the south side of Structure 504, located just to the east of the passageway entrance.

During Phase 3b, a small portion of the Floor 3 in Square A appears to have been cut and repaired at this time. A thin strip of the floor was found in-filled with a pink marl construction fill, distinct from the
surrounding white, nicely preserved plaster floor. This patched area of the plaza floor was found just to the north of the passageway step in Square A. In addition, Phase 3b witnessed some additional modification to the northern facade of Structures 503 and 504, as well as the eastern side of Structure 501, with a basal molding added to the base of the exterior walls. No evidence of a basal molding was found inside the passageway on the east and west walls of Structures 503 and 504. This exterior element was identified along the northern wall of Structure 503 during the 2001 investigations of Operation 51 (see Harrison 2003). Both Structures 503 and 504 also appear to have a series of shallow terraces built toward the top of each platform. The findings indicate that the two structures may have mirrored one another in architectural style when looking at the buildings from inside the North Plaza.

In the fourth phase of construction (4a) the exterior floors were refurbished in the North Plaza (Floor 2) and East Plaza (Floor 1). Both plaza floors covered about half of the one-course high basal molding. During a final modification (Phase 4b), the floor appears to have been partially resurfaced in the North Plaza. Floor 1 covered only a portion of Floor 2 along the north side of Structures 503 and 504. The construction may have been in conjunction with the construction of a staircase built on the north side of Structure 503 in this final phase. Phase 4b in Square D may also have witnessed a minor resurfacing event when a small, 2-course high rectilinear construction (possibly a small shrine) was added to the east side of Structure 501.

Artifacts recovered from all four phases of construction appear to correspond primarily to the Late Classic period. No Formative material was identified. The multiple phases of construction and associated artifact assemblage suggest an elite occupation in Group A that may have lasted several centuries, perhaps extending throughout the Late Classic period (ca. AD 600-900).

Excavation Techniques

In an effort to glean a maximum level of information, one hundred percent of all soil excavated was screened through a quarter-inch screen, with the exception of a portion of collapse debris in Zones 1 and 2 where only 50% of the dirt was screened due to the paucity of artifacts recovered in these two zones. Trowels were primarily used in the excavation, with picks and shovels only being used to remove dirt and large stones from the heavy overburden of collapse that filled the interior of the passageway. Trowels (and dental tools when necessary) were utilized to define the surface of architecture and *in situ* deposits. Excavation removed levels of sediment in the context of defined zones within the individual squares that measured 4 m (north-south) x 3 m (east-west). Any changes in zone size are noted in the zone descriptions.

Only the topsoil and collapse debris overlying all three squares (A, B, and D) was excavated with the same zone designations (see Zones 1-4). Otherwise, zones in Squares A and B do not overlap with Square D. Any links in construction sequences between squares are noted. Descriptions of zones are found under the associated square in which they were excavated. Zones in Squares A and B, contiguous units which sometimes shared zone designations, are discussed in one section below, followed by a separate section that describes the zones defined in Square D.

Two datums were used throughout excavations. Datum 1 was used for all elevation measurements for Squares A and B and Datum 2 was used for elevation measurements in Squares C and D.
Overview of Operation 54: Squares A and B (North Plaza)

Square A exposed the northern end of the passageway and a low step that effectively elevated the interior passageway by about 35 cm during the final phase of construction (Figures 9.2 and 9.4). In addition, Square A defined the northwestern corner of Structure 504 and the northeastern corner of Structure 503, along with the eastern edge of a central staircase flanking the northern side of Structure 503. The western side of this staircase was defined in Operation 50 in Square A during the 2001 season (see Harrison 2003). Square B, abutting Square A to the south, exposed more of the passageway interior and defined two nicely preserved passageway walls representing the eastern and western walls of Structures 503 and 504, respectively. The following provides the details of excavation by zone for Squares A and B, grouped together by construction episode beginning with the latest architectural phase.

Phase 4

Zone 1

Zone 1 consisted of a thin humic layer and loose tumble debris with a high density of limestone material lying on and just below the surface in Squares A and B. The tumble ranged in size from boulders as large as 50 cm long to small gravel-size inclusions about 2 cm in size. Many of the boulder-size stones recovered in the collapse debris were cut facing stones that represent collapse from the exterior facades of Structures 503 and 504.

The zone was approximately 10-20 cm deep in Square A, where most of the excavation is off-mound. In the southern end of Square A and into Square B the surface of the mound slopes sharply upward. In Square B, Zone 1 measured over 75 cm below ground surface at the deepest point. This deep portion of the zone was inside the passageway where a large amount of collapse debris had filled the interior corridor. The two parallel walls that defined the passageway (the east wall of Structure 503 and west wall of Structure 504) were partially visible on the surface prior to excavation standing roughly 1.6 m apart.

While excavations in Zone 1 in Square B cleared a substantial portion of the collapse debris within the interior of the passageway, only a thin layer of loose rubble and organic debris was removed from the rest of the square. In the northwestern corner of Square B, the surface of the platform of Structure 504 was relatively intact at the modern ground level and only a small amount of debris was removed from this area. Excavations outside of the passageway also revealed a possible terrace edge running north-south on Structure 504, exposed at the base of Zone 1 and drawn on the final planview map (see Figure 9.2). This terrace appears to corner along the southern edge of Square A, mirroring the configuration of Structure 504’s outermost north and west walls.

Only 50% of all dirt removed from Zone 1 in Squares A and B was screened due to the overall paucity of artifactual material. A drilled river cobble was found in the southwest corner of Square B near the surface of the unit, positioned along the top of the eastern wall of Structure 503. The drilled river cobble measures 23.5 cm long, 13.5 cm wide, and .5 cm thick with a diameter of approximately 5 cm and possibly functioned as a hole for a curtain rod within the passageway wall.

Although Square C was not excavated during the 2003 season, the tumble on the surface was sketch-mapped and a surface find of one pottery sherd was collected.
Figure 9.2. Plan view of Operation 54, showing Squares A-D.
Zone 2

Zone 2 was much lighter and more orange in color than Zone 1. The zone was characterized as tumble, packed with limestone boulders, cobbles, and gravel-size inclusions in a clay-filled matrix. Most of the larger inclusions were finely cut limestone that represent collapsed facing stones from the walls of Structures 503 and 504. Less than 10 cm of dirt was removed from the off-mound area in the northern end of Square A where a relatively thin layer of collapse debris overlies the plaza floor. The zone was significantly deeper in the southern end of Square A where the unit interfaces the passageway and northern walls of Structures 503 and 504. The zone in Square A covered the entire square with the exception of an area in the southeast corner where the remains of the northwestern corner of Structure 504 was encountered at the base of Zone 1. In this southern end of the unit, between 40 and 85 cm of collapse...
debris was removed. In Square B, where the unit was entirely on-mound, the zone was restricted to the interior of the passageway, measuring approximately 1.60 m east-west (roughly the width of the passageway corridor).

![Figure 9.4. Northern entrance of passageway, looking south from the North Plaza.](image)

Figure 9.4. Northern entrance of passageway, looking south from the North Plaza.

Only 50% of all dirt was screened and excavations continued to yield a light density of artifacts. The artifact density in Zone 2 was slightly higher than Zone 1. However, the depth of the zone also increased and therefore more cubic meters of dirt were removed. One mano fragment was found in the top portion of Zone 2 of Square A, close to another fragment of ground stone that was collected at the base of Zone 1 in Square A. Both appeared to be pink granite, a resource that was locally available in the Sibun gorge and transported down river in the form of sizeable boulders and cobbles.
In Square B, a concentration of human bone was found around the northeast corner of Zone 2 toward the base of the zone. Additionally, a worked animal bone also was found toward the base of the zone from the central area of the zone in Square B. A similar worked specimen was found in Square D.

Zone 2 ended arbitrarily. At the base of the zone, a good portion of the eastern stairside was revealed along the western edge of Square A, along with more of the northwestern corner of Structure 504. In Square B, the eastern and western walls of the passageway were further exposed.

Zone 3

Zone 3 consisted of tumble debris, continuing from Zone 2. The matrix was a semi-compact, clayey soil with a high density of limestone boulders, cobbles, and gravel inclusions that have fallen from the surrounding structures. The walls discussed in Zone 2 were further defined through the removal of a large quantity of tumble in Zone 3 in both Squares A and B.

During the excavation of Zone 3 in Square A, the northern doorway of the passageway (Figure 9.4) was exposed in the southern end of this square. A low step was defined at the northern opening of the passageway, elevating the interior corridor about 35 cm above the surrounding plaza area. A portion of the elevated passageway surface (Zone 7), measuring roughly 165 cm wide (east-west) x 120 cm (north-south) was exposed in Square A at the base of Zone 3. Knowing the location of the elevated surface that extended 4 meters further to the south in the passageway, the last 15 cm of tumble directly over the passageway floor surface in Square B was excavated separately as Zone 5. The debris was removed separately in an effort to isolate any terminal debris left on the corridor surface. Likewise, in Square A the last 5-10 cm of tumble directly over the outside plaza surfaces also was excavated separately (see Zone 4 below).

A spike in artifact density was noted toward the base of Zone 3, around 10-15 cm above the floor surfaces of the plaza and passageway in Squares A and B. The area outside the passageway in Square A yielded a heavier artifact density than Square B. The most notable finds from Zone 3 were clusters of human bone identified toward the base of the zone in Squares A (N=453 fragments) and B (N=10 fragments). The human remains were located beneath the last of the large stone tumble, beginning about 10 cm above the plaza floor. Concentrations of bone were grouped together, labeled, measured with elevations, and removed as separate groups of bone in foil packets. Some of the bone was point-plotted in planview (see Figure 9.2).

The ten bones lying directly on the floor of the northern end of the passageway included fragments of long bone and the top portion of a human skull, along with fragments of a mandible. The skull may belong to a juvenile based on the small size of the cranial fragments and teeth. The skull was located at the interface of Squares A and B and was removed as part of Zone 5 in Square B (see Zone 5 below).

Within the outside plaza area, the 453 fragments of human bone were recovered from the central portion of Square A, including more fragments of a skull, a large number of human teeth, several vertebrae, and long bone fragments. Some of the teeth are worked and contain evidence of drilling for inlays, suggestive of elite status. Additionally, a shell pendant was found in this area, proximate to the skull fragments, suggesting that personal adornment was associated with the human remains.
Zone 4

Zone 4 consisted of a thin layer of collapse debris, measuring less than 10 cm thick, that lay directly over a poorly preserved plaza floor surface (Zone 6) in Square A. Zone 4 was a continuation of a midden-rich tumble layer encountered toward the base of Zone 3. The matrix contained a higher density of small limestone gravel sized inclusions (0.2 - 1.5 cm) with little to no cobbles or boulders. The loose, pebbly layer of Zone 4 may represent part of the deteriorated remains of the latest plaza floor (Zone 6). Within Zone 4, more clusters of human bone (N=192) were identified, drawn, collected and photographed (see Figure 9.2). The disarticulated human bone was mapped, numbered and collected in discrete clusters. Toward the base of Zone 4, the area in Square A was divided into equal quadrants and bone was collected based on its location in the northwest, northeast, southeast, or southwest section of the square.

Zone 5

Zone 5 was restricted to Square B and, like Zone 4 in Square A, consisted of a thin, 10-15 cm thick layer of sediment lying directly over the passageway floor surface (Zone 7), representing the final layer of collapse. The floor of the passageway was elevated by a two course (35 cm high) step evident in the southern end of Square A (see Figures 9.2 and 9.3).

The goal of Zone 5 was to isolate any terminal debris lying directly on the passageway surface. Although a high density of cultural material was recovered from the base of Zones 3 and 4 over the plaza surface, very little cultural material was found associated with the inside passageway. Artifacts included a chipped stone tool, a single obsidian blade fragment, an archaeobotanical specimen, and a C-14 sample. In addition, fourteen fragments of human bone were found lying on the surface of the passageway. In sum, 669 bone fragments were recovered from Zones 3, 4, and 5 in Squares A and B, isolated to the final 10-15 cm of terminal debris overlying both the elevated passageway floor and the North Plaza floor. The bone concentrations are most dense in Square A, associated with the plaza area, namely in the southern half of the unit in close proximity to the northern structure walls. There was considerably less bone inside the passageway on the corridor floor.

The human bone in Square A appeared very disarticulated and may be in a secondary context. It is possible that the bone material originally covered the interior floor of the elevated passageway (Square B), but repeated rain and flooding activity in the ancient past transported the bone material (and dirt) out of the elevated passageway, north in the direction of the plaza floor. This would explain the 10 cm of fine-grained sediment mixed with dense concentrations of bone above the plaza surface. The findings in the passageway support this theory, where bone was found deposited directly on the plaster floor surface. The evidence suggests that the bone was deposited just prior to the collapse of the structure when the plaza group was still actively being maintained. The central area of the passageway corridor in the southern end of Square B contained little evidence of bone with the majority of the twenty-four fragments found at the far northern end of the passageway at the interface of Squares A and B, further supporting a gradual movement north in the direction of the plaza where the bulk of human bone was found (N=645).

Zone 6

Zone 6 was the latest plaza floor (Floor 1) in Square A that was underlying the Zone 4 midden-rich collapse debris. The floor surface was in a poor state of preservation. However, it appeared that Floor 1 was a localized resurfacing event that may have been built in conjunction with the construction of a staircase.
(Zone 31) that was added to the north side of Structure 503 in the final phase of construction (Phase 4b). The white plaster floor surface appeared disturbed in places, containing three different mottled soil colors. A small area directly to the north of the passageway entrance was a lighter, plaster-like floor (10YR 5/3 brown), perhaps the result of a repair to the floor. In the middle of Square A were several dark areas (10YR 3/2 very dark grayish brown) that may represent postholes or pit features. These enigmatic features contained a relatively high density of artifacts. The final soil color difference was identified along the northern wall of the excavation unit. It was dark yellowish brown (10 YR 4/6 dark) and more compact and clayey than the other two soil types. This matrix contained large cobbles.

Only half of the plaza floor exposed at the base of Zone 4 in Square A was excavated, an area measuring roughly 3 m (E-W) x 1.4 m (N-S). The remains of the latest plaza floor are poorly preserved, with the most intact area of floor within the first 80 cm (north) of Structure 504 and the passageway step. Presumably, the collapse debris, heaviest in the areas closest to the structures, effectively preserved this portion of the plaza floor. The tumble directly above the Zone 6 plaza floor yielded a high density of artifacts associated with the floor surface, namely a large quantity of disarticulated human bone (discussed above). The floor, in its best-preserved areas adjacent to Structure 503, measured around 10 cm in thickness. Very little of a smooth plaster surface remained intact. Most of the floor remains consisted of ballast fill comprised of small limestone inclusions, mortared together with slightly larger limestone gravel. In general, the plaster construction at Hershey (even in the ruling residential Plaza Group A) is of relatively poor quality when compared to other Classic period monumental architecture at Maya sites of similar size.

A high density of charcoal was recovered from within the North Plaza Floor 1 construction and a large C-14 sample was collected for radiocarbon dating. Several Pabellon Modeled-Carved ceramic pieces were recovered and a collection of diagnostic reconstructable sherds were also found, including a portion of a pedestal-base pyriform vessel similar to those found in northern Yucatán (see Figures 9.2 and 9.10).

**Zone 31**

Zone 31 consisted of the eastern side of a staircase that abutted the northern front side of Structure 503. It appeared to have been built during the final phase of construction (Phase 4b), providing access to the top of the platform and the adjacent pyramid (Structure 501) in Group A. At the base of Structure 501 there appears to be another staircase, leading from the platform of Structure 503 to a series of rooms partially visible on the surface at the top of the western side of the pyramidal structure.

The eastern wall of the lower staircase on the northern side of Structure 503 was partially exposed in Square A, but not excavated. The north-south wall of the staircase extended roughly 1.5 m to the north of the exterior platform wall (Figure 9.3a). The eastern stairside was poorly preserved and appeared almost entirely collapsed. The wall of the stairside was built of large, cut limestone blocks. The western wall of the staircase, partially exposed during the 2001 excavation of Operation 51 (Square A), revealed a wall with eight intact courses at its highest point that measured over a meter in height. The eastern side, on the other hand, was not as well-preserved and contained only about three courses of intact facing stone, measuring about 50 cm in height.
Zone 9

Zone 9 was built during Phase 4a, an earlier facet of construction that consisted of a poorly preserved plaza floor (Floor 2) in the North Plaza, located directly below the Zone 6 (Floor 1) resurfacing and above Floor 3 (Zone 10). All floor surfaces were most clearly discernable right along the northern edge of Structures 503 and 504 and to the north of the passageway entrance in Square A (Figure 9.5). The Zone 9 floor partially covered the basal molding at the base of the northern side of Structure 504. Both the Zone 6 and Zone 9 floors appeared to gradually slope down and taper out about 150 cm north of the architecture. Here, they merged with the Zone 10 plaza surface (Floor 3), a nicely preserved plaster floor directly below the Zone 9 floor (see Phase 3a below). Zones 6 and 9 may represent localized floor resurfacings that created a sloping surface, perhaps to more effectively drain water away from the structures and into the plaza. The configuration and surface topography of the North Plaza suggested that water drained out of the northeast corner of the enclosed plaza group through an opening between Structures 505 and 506, where water could move eastward in the direction of the river. Both floors abutted the front facing of Structures 503 and 504 and the step of the elevated passageway, but did not run underneath the architecture, post-dating this earlier construction.

Figure 9.5 Eastern cross-section of Squares A and B in Operation 54, showing sequence of floors in the North Plaza.

The Zone 9 floor was not well preserved, but consisted of some remnant plaster material and mostly ballast fill. There were flecks of limestone resembling sascab material throughout the matrix of the floor. The ballast fill comprised small, gravel sized inclusions and was more densely packed toward the base of the floor. Only a light density of artifacts was found within the floor fill.
Phase 3

Zone 10

The Zone 10 plaza floor (Floor 3), built during Phase 3a, was excavated only in the southern half of Square A (Figure 9.5). The Zone 10 plaza floor appeared to correspond or slightly pre-date the construction of an elevated corridor in the passageway (assigned to Phase 3b). The floor abutted the facing stones of the passageway step and did not run underneath the length of the corridor like the Zone 11 floor. A thin strip of the Zone 10 floor seemed to have been cut and in-filled with a packed, plaster-like surface, but was pinkish-brown in color as if exposed to burning prior to being laid down. The pink surface extended to the north only about 40 cm in Square A and did not continue beyond the northwestern corner of Structure 504. The pink patch was tamped down and made level with the rest of the Zone 10 floor and may have resulted from the construction of the elevated passageway during Phase 3b for while the Zone 10 floor did not run underneath the elevated passageway, the pinkish-brown patch extended slightly underneath the facing stones of the passageway step (see Zone 24 below). This suggests that the floor pre-dated the step construction, but was probably roughly contemporaneous with this construction episode. Nonetheless, they are sub-divided into Phases 3a and b.

While the Zone 10 floor was built either at the same time or just slightly before the elevated passageway, the Zone 10 floor clearly post-dated the final phase of Structure 503. The floor interfaced the middle of the first course of stones on the northern side of the structure. The floor also appeared to be coeval or post-date Structure 504, although it did run underneath the one-course high basal molding found at the base of the northern wall of Structure 504. The evidence suggests that the basal molding was a later addition (Phase 3b), grafted on to the exterior of this structure. The exterior molding post-dated the Zone 10 floor and may have been added to the building around the same time as the elevated passageway or slightly later.

Excavations of Zone 10 revealed limited remains of intact plaster, only existing in a small area measuring approximately 1 m x 1 m in the western half of the square. Along the eastern side of the square there was little to no plaster preservation, only ballast fill material. The fill was comprised of tightly packed gravel- and cobble-size limestone and river stone that was laid down on a relatively level plain.

The Zone 10 floor contained a large disturbed area in the center of the zone, just to the north-northeast of the passageway entrance. A clear pit feature could not be discerned and after 5-10 cm another plaza floor (Zone 11) was interfaced. Therefore, the disturbed area was not taken out as a separate zone. It is possible that the enigmatic feature represented the bottom of a pit that was dug into either the Zone 6 or Zone 9 plaza floor. A similar location of disturbance was noted cutting into Zones 6 and 9, but the state of poor floor preservation inhibited the clear definition of any cut into these floor levels. Tree disturbance is a possibility. Alternatively, the pit feature may have held a stela or stone monument. A concentration of large slate fragments were found distributed throughout the disturbed area of Zone 10 and may represent the remains of a destroyed slate stela. Similar intact slate monuments have been documented in both the Sibun and adjacent Stann Creek Valleys. It is conceivable that the pit feature was the location of a monument that was later removed. No concentrations of any other artifacts were found associated with the cut to suggest a ritual deposit, although concentrations of sherd fragments were noted in the disturbed areas of the upper zones.
Zones 7 and 25

Zone 7 comprised the floor surface inside the passageway and Zone 25 represented the northern retaining wall of the passageway step (Figures 9.2, 9.3 and 9.4). The construction of the elevated passageway was built during Phase 3b. The two-course high step consisted of large cut facing stones that rested on a pink and brown construction fill layer (Zone 24), which was associated with the Zone 10 floor. Like Zone 10, the passageway construction overlay (and post-dated) the initial plaster floor surface in Group A (Floor 4, Zone 11 in Square A). The wall retained a limestone boulder fill (Zone 23) that was capped with a nicely preserved floor surface (Zone 7). The construction elevated the interior corridor about 35 cm above the original floor (Zone 11) of the passageway. The Zone 25 retaining wall consisted almost entirely of cut limestone boulders with very little soil and only a light density of artifacts were recovered.

The northern step (Zone 25) at the passageway entrance was exposed in the southern end of square A. The Zone 7 floor of the passageway measured roughly 9 m in length, extending south through some of Square A and all of Squares B and C. Although Square C was not excavated, the southern entrance to the passageway was found along the northern edge of Square D (technically about 10 cm into Square C) and another step with facing stones was exposed in this location.

The area of the Zone 7 surface in Square A measured 120 cm (N-S) x 164 cm (E-W). Only a portion of Zone 7 was excavated in Square B that measured roughly 2 m (N-S) x 1.64 m (E-W). The zone consisted of the remains of the elevated plaster floor and an underlying fill layer containing gravel-sized limestone and river stone. The plaster surface was semicompact in density, but most of the underlying fill was relatively loose. There were many voids in the fill, resembling dry-laid construction fill. There was no evidence of mortar, only a loose, light brown and tan mottled soil. The lighter tan matrix was the remains of decomposed limestone mixed with the soil. A light density of artifacts was found in this zone. However, a number of interesting finds were recovered, including a worked human tooth with a jade inlay that was found around the northeast corner of Square B (Figure 9.11a). Additionally, a small shell tinkler (Figure 9.11b) was found in Zone 7 in the southern half of the zone and a human phalange that appeared to be worked was also collected from the southern end of the square.

Around 5-10 cm below the Zone 7 surface, the limestone and river stone fill increased to cobble-size inclusions. The fill containing larger inclusions (measuring roughly 32 cm long) was removed as Zone 23.

Zone 23

Zone 23 consisted of the construction fill that was the core interior fill of the passageway’s elevated floor surface. The fill was comprised of tightly packed limestone and river stone cobble-sized inclusions, along with significantly larger boulder-sized limestone and riverstones. The boulders ranged from 30-70 cm in size. The smaller cobble inclusions filled in the gaps between the boulders. The fill was capped with a layer of “dry laid” cobbles that contained many voids. Artifact density was light. Notably, a ceramic spindle whorl was recovered from the base of Zone 23 in the southeast corner of Square B. A C-14 sample, submitted for radiocarbon dating, was collected and an archaeobotanical sample and a possible speleothem were found.
Zone 24

Zone 24 consisted of a thin layer of fill underlying the Zone 25 step and portions of the Zone 23 boulder fill of the passageway. Together, Zones 23 and 24 make up the construction fill of the elevated floor surface inside the passageway that was retained by the Zone 25 2-course step and capped with the Zone 7 plaster surface.

Zone 24 comprised a brown and pink marl-rich matrix. The pink material was a compact, mortar-like substance that was primarily concentrated underneath the Zone 25 step and appeared to connect with the pinkish-brown patch found in the Zone 10 floor (see above) to the north of the passageway step. Both deposits may have been a result of the step construction. The Zone 24 fill layer extended a bit further to the south underneath Zone 23, but was more brown in color and less compact and tamped down. A similar pink patch resembling the area in the Zone 10 floor was found embedded in the Zone 20 floor that abutted the southern edge of the elevated passageway in Square D, suggesting a contemporaneous construction. In both cases, the pink patch appeared to have been tamped down to make it compact and relatively flush with the surface of the intact plaster floor. In Squares A and D, the pink and brownish-tan surface appeared to run underneath the passageway step. It may indicate that the Zone 10 floor slightly pre-dates the construction of the elevated floor surface (see discussion of Phases 3a and b above).

The pink mortar-like material directly underlying the 2-course wall was about 5-10 cm thick. The mortar-like substance was laid down over an earlier floor (Zone 11) that originally ran from the North Plaza area through the passageway to the East Plaza. The pinkish-brown mortar material is generally more compact than the overlying Zone 23 fill and may have provided some greater stability to the step construction and boulder and cobble fill that was laid down over it. The brownish-tan matrix further to the south tends to be a slightly looser fill material. Together, they make up a thin 5 cm fill layer, relatively devoid of artifacts, that becomes increasingly deeper to the north (up to 10 cm) underneath the Zone 25 facing stones. The matrix contains flecks of marl or decomposed limestone, as well as small limestone inclusions and some river gravel. Artifact density was generally light throughout the zone. In Square A, one piece of worked shell, a possible speleothem, and a C-14 sample were collected. In Square B, another possible speleothem was found and two archaeobotanical samples were collected.

At the base of Zone 24, a beautifully preserved plaster floor (Zone 11) was revealed throughout Square B. Along the northern edge of Square B, the floor appears to have been cut and later capped with a section of plaster flooring, about a centimeter higher than the existing floor (see Zone 26).

Phase 2

Zone 29

Zone 29 represented the east wall of Structure 503 (Figure 9.3a). The northeast corner of this wall was defined in the southwest corner of Square A and extended south down the western side of the passageway and at about 9 meters in length merged with Structure 501 at the interface of Squares C and D. The boundary between Structures 501 and 503 was difficult to discern (Figure 9.6). It was clear that Structure 501 (the pyramid) pre-dated Structure 503. Therefore, the remains of a faced northeast corner of Structure 501 were anticipated. However, the transition was relatively seamless and only a subtle vertical
line at the interface of the two structures could be discerned in the profile of the contiguous walls. The beginning of a one-course basal molding demarcated the interface between the two structures. The molding was restricted to the east side of Structure 501 and did not extend further to the north along the east side of Structure 503 through the passageway. In addition, the interface of the two platforms was clearly demarcated in the surface topography of the two platforms.

**Figure 9.6 East wall of Structures 503 and 501 at the southern end of the passageway in the East Plaza (Square D).**

In Square A, the east wall of Structure 503 (Zone 29) rested on the Zone 11 plaza floor (referred to as the Zone 21 floor in Square D). This surface represented the earliest plaza floor of the East and North Plazas in Group A. The construction of Zone 29 clearly post-dated the construction of this initial plaza floor. However, it may be contemporaneous with the construction of the pyramid, Structure 501 (seen in Square D). The best-preserved part of the wall was intact up to ten courses in height (see Figure 9.3a, Square B).

**Zone 30**

Zone 30 represented the western wall of Structure 504 that served as the eastern wall of the passageway (Figure 9.3b). The northwest corner of this wall was defined in the southeast corner of Square A and
extended south down the eastern side of the passageway and at about 9 meters in length the wall cornered to the east (at the interface of Squares C and D). Like Zone 29, the Zone 30 wall rested directly overtop of the initial plaza floor (Zone 11/Zone 21) and post-dated this initial floor construction. About two courses of the east and west walls of the passageway (Zones 29 and 30) were covered over when the elevated passageway surface was constructed.

**Phase 1**

**Zone 11**

Zone 11 was the initial plaza floor that was constructed in Group A and represented Phase 1 of construction (refer to Figures 9.3, 9.4 and 9.5). It appeared to be the original floor of the North and East Plazas of Group A (referred to as Zone 21 in Square D) and was utilized as the passageway floor during Phases 1 and 2 until it was covered over in Phase 3. The plaza floor ran underneath the final phases of Structures 503 and 504 and functioned as the initial passageway surface. Zone 11 consisted of a nicely preserved plaster floor underlying the Zone 10 plaster floor in Square A and was directly beneath the elevated passageway construction. The fill of the elevated passageway effectively preserved the floor surface of Zone 11. The surface of Zone 11 north of the passageway was less well preserved where a ballast fill with small amounts of intact plaster were found. The ballast fill comprised a compact layer of limestone inclusions with some river stone. The floor surface and associated ballast fill of Zone 11 extended 15-17 cm in depth.

**Zone 26**

Zone 26 was a plaster cap that was found superimposed on the Zone 11 floor inside the passageway (Figure 9.3). It appeared to be a repair to the Zone 11 floor for no other associated deposits were found. The plaster cap was discovered when a portion of the elevated passageway construction was removed. The large plaster patch was identified toward the northern end of the passageway entrance. The plaster capping measured roughly 90 cm (N-S) x 160 cm (E-W) and extended the entire width of the passageway (E-W) and ended just 23 cm south of the facing stones of the Phase 3 passageway step. Excavations removed the plaster cap and associated ballast fill. The floor was very compact and consisted of chunks of plaster, marl, and gravel sized limestones tightly packed in a brown colored matrix (10YR 4/6). Very few artifacts were recovered. Larger inclusions and some mottled soils were encountered in the lower half of the zone. At the base of the zone, a river gravel and cobble fill layer was encountered (Zones 27 and 15). The presence of this fill layer indicated that the plaster cap was a repair job to the Zone 11 floor and was not sealing any kind of special deposit.

A large piece of charcoal was collected for C-14 dating, found in the ballast fill of the floor cap. Small concentrations of charcoal and burned limestone were noted throughout the zone, especially evident along the eastern edge of the cut where the zone interfaced the western wall of Structure 504. The evidence suggested some *in situ* burning occurred just prior to or during the construction of the plaster cap that was laid over the cut in the floor.
Zones 27 and 15

Zones 27 and 15 comprised an all-river gravel and cobble fill underlying the Zone 11 floor. The fill layer was distinguished from the ballast fill of Zone 11 by a sandy-clay matrix filled with gravel- and cobble-sized riverstones mixed with the soil. A thin layer of sandy-gravel and river pebbles topped the surface of Zone 27. The large river cobbles and gravel were evenly distributed and formed a fairly level surface. The fill layer was roughly 10-15 cm thick and covered a modified natural earthen layer (see Zone 16 below). The fill layer was exposed in two locations within the excavation unit. One portion was exposed underneath the Zone 26 plaster capping (referred to as Zone 27) and another portion was identified further to the south, directly underneath the Zone 11 floor in Square A (referred to as Zone 15). This fill served as an initial construction fill layer for the Zone 11 plaza floor that ran underneath Structures 503 and 504. The same fill layer was identified in Square D in the East Plaza, but was removed as part of the Zone 21 floor (equivalent to the Zone 11 floor in Squares A and B). The modified earthen layer that underlay this cobble-rich construction fill layer and was exposed in Squares A, B and D, but was excavated only in Square A. A light density of artifacts was recovered from Zones 15 and 27.

Zone 16

Zone 16 was an earthen layer found directly below Zone 15 in Square A that was slightly modified prior to the construction of the initial plaza floor. The matrix consisted of a dark yellowish brown silty-clay soil, which was a distinctive change from the Zone 15 sandy-clay gravel fill layer. Zone 16 continued to produce artifacts, but in very small numbers. The soil became quite compact with few inclusions, with the largest being smooth river gravel that were probably naturally deposited.

Zone 17

Zone 17 was a continuation of the Zone 16 natural earthen layer excavated in Square A. The matrix comprised a silty-clay matrix with few inclusions. Unlike Zone 16, Zone 17 contained a high number of artifacts from the northern half of the square. The soil in Zone 17 was also slightly lighter in color than the Zone 16 matrix. The soil was mottled with a yellow clayey matrix that appeared to be the result of bioturbation (likely root action). Mottled soils with vertical linear patterning may represent past root activity (Bullard, personal communication 2003). The soil around the artifacts was of a more greenish-yellow color. This could indicate that root activity caused the translocation of the artifacts to this depth, rather than being a sign of an earlier occupation at this locale. A C-14 sample was collected at a depth of 337 cm below Datum 1.

Zone 18

Zone 18 was a continuation of the Zone 17 earthen layer, but the area of excavation was reduced to the western half of the unit and measured 1m (E-W) x 1.4m (N-S). The zone was completely devoid of artifacts. There was a higher density of inclusions in Zone 18 than in either Zones 16 or 17, but still a relatively light density of limestone and river stone inclusions. The sterile zone appeared to be a purely natural earthen layer that did not experience any human modification or occupational use, like perhaps Zones 16 and 17.
Zone 19

Zone 19 was a shallow shovel test pit dug into the bottom of Zone 18, toward the center of the zone in Square A. The zone consisted of a natural earthen layer of sand, river gravel and river cobble. The river cobbles were tightly packed with a loose, sandy matrix. Zone 19 may represent an old river bed deposit. It was underlying roughly 45 cm of a compact earthen layer (excavated as Zones 16-18) that may represent an alluvial deposit that accumulated over time from repeated flooding events. While Zone 17 had a small spike in artifacts, Zones 18 and 19 were culturally sterile. The evidence suggested that the top 20 cm of the natural earthen layer was occupied for some time prior to the construction of Group A, although no construction was identified. Limited horizontal exposure inhibits a full assessment of this early occupation. The natural slope of the land appears to have been leveled somewhat in preparation for the building of Group A.

Overview of Operation 54: Square D (East Plaza)

Excavation of Square D exposed the southwestern corner of Structure 504 and the western side of a staircase flanking the southern side of Structure 504, positioned at the far western end of the structure. In addition, Square D revealed the eastern side of Structures 503 and 501, a large pyramidal structure (Figure 9.6). The contact between these two structures was noted during excavation, though somewhat difficult to discern. As noted, previous excavations in 2001 (Operation 50, Sq. F - see Harrison 2003) revealed that Structure 503 contained at least four construction phases so it is possible that the final phase of construction merged these two structures and somewhat obscured the interface. Our division of the two structures was based on upper platform elevations that distinguished the two structures when the site was mapped in 2001 (Morandi et al. 2003). The following provides the details of excavation by zone for Square D, grouped together by construction episode beginning with the latest architectural phase.

Phase 4

Zone 1

As in Squares A and B, the topzone of Operation 54, Square D was a humic layer with a very high density of tumble debris, collapsed from Structures 501 and 503. The sediment graded in color from a brown (10YR 4/3) in the northern reaches of Square D, to a dark yellowish brown (10YR 4/4) in the southeast corner of the square. The tumble, ranging in size from 6 cm gravel to 60 cm boulders, was comprised of riverstones, which acted as construction-fill for Structures 501 and 503, as well as limestone, used as both facing stones and construction-fill. The entrance to the passageway, created by the east wall of Structure 501 (Zone 12) and the southwest corner of Structure 504 (Zone 30), was located at the northern extent of Square D (see Figures 9.2 and 9.7). The western edge of Square D follows the eastern walls of Structures 501 and 503 (Figure 9.6). The excavation of Square D was extended roughly 80 cm north into Square C, in an effort to fully expose the passageway entrance (all artifacts are designated “Square D”). It was during this expansion, that the southwest corner of Structure 504 was uncovered.

Prior to the excavation of Zone 1 within Square D, there were a line of three stones, two courses high, representing the remains of an eastern retaining wall of Structure 501, located in the northern extent of the square. As tumble was removed, it was revealed that the uppermost facing stones of the eastern wall of
Structure 501 had collapsed, leaving behind only construction-fill in their place (Figure 9.6). However, as the excavation of Square D continued (Zones 2, 3, and 4), several courses from this retaining wall were found preserved below. The excavation of Zone 1 revealed the top three preserved courses of this retaining wall. Only 50% of all dirt from Zone 1 was screened, due to the general paucity of cultural material. In total, only five poorly preserved pottery sherds were recovered.

Figure 9.7. Southern entrance to passageway, looking north from the East Plaza.
Zone 2

Like Zone 1, Zone 2 was comprised of collapse debris, but differentiated as a new zone due to a more compact nature and more orange sediment color. The zone was characterized as tumble, packed with limestone boulder, cobble, and gravel-sized inclusions in a clayey matrix. The primary soil color was a dark yellowish brown (10YR 4/4), with secondary areas of dark brown (10YR 3/3) and yellowish brown (10YR 5/4) along the northern wall of Square D. Most of the larger inclusions were finely cut limestone blocks, which represented collapsed facing stones, fallen from portions of Structures 501, 503, and 504. At the base of Zone 2, two additional courses of the east wall of Structure 501 (Zone 12) were uncovered, and the wall was found to run the entire length of the western side of Square D. Additionally, the southeast edge of Structure 503 (Zone 29) and the southwest corner of Structure 504 (Zone 30) were revealed during the excavation of Zone 2 in Square D.

There was a small area of burnt, dark orange clay (60 cm north-south x 95 cm east-west, 20 cm in depth) found midway along the east wall of Square D. This appeared to be the result of the modern burning of a tree root, from any one of the three large trees disturbing the square.

Fifty percent of all dirt was screened as excavations continued to yield a light density of artifacts. Notable artifacts recovered from Zone 2 included elongated “soda straw” specimens and a crystalline rock fragment that could possibly be cave formations. Additionally, a large volume of plaster and mortar fragments was recovered from Square D, which over time, had fallen from the east wall of Structure 501. Excavations have revealed that plaster and mortar were used in the construction of Group A. Several facing stones along the Structure 501 eastern wall still exhibited intact plaster and mortar, while some collapsed boulders also retain plaster and mortar remnants. The plaster and mortar fragments mostly comprised of a very high density of limestone pebble inclusions, and a light density of gravel limestone inclusions with very little fine paste material. Excavation of Zone 2 at the interface of Squares C and D yielded what appeared to be the remains of a monkey, including the radius, ulna, wrist bone, and two phalanges. Zone 2 ended arbitrarily.

Zone 3

Continuing from Zone 2 in Square D, Zone 3 was a tumble layer composed of collapse debris from Structures 501 and 504, though noticeably more compact than its overlaying zones. The matrix was a semi-compact to compact, dark yellowish brown (10YR 4/4), silty clay sediment, characterized by a high density of river cobble and gravel, as well as limestone boulder, cobble, and gravel inclusions. The majority of the limestone boulders and cobbles were cut stones, which had since fallen from the surrounding structures, while the river gravel and cobble were interior construction-fill.

The walls discussed in Zone 2 were further defined through the removal of this large quantity of tumble in Zone 3. At the base of Zone 3, a total of nine courses of cut stone were revealed along the east wall of Structure 501 (Zone 12), as well as several courses of the southeast corner of Structure 503 (Zone 29), where it abutted Structure 501 (Figure 9.6). Additionally, within Zone 3, the southwest corner of Structure 504 (Zone 30) was revealed, along with the side of a staircase (Zone 14). The staircase flanked the southern side of Structure 504, leading from the East Plaza to the top of the elongated platform structure. At the base of Zone 3, three courses of the stairside were exposed.
Along the southern edge of Square D, a linear alignment of four, large limestone blocks were uncovered (Zone 13; Figure 9.8). At the base of Zone 3 this enigmatic structure was 2 courses high. The southern entrance to the passageway (Zone 28) also was revealed in Zone 3. The doorway, measuring 1.64 m east-west, was located between the east wall of Structure 503 and the southwest corner of Structure 504. Like the northern entrance (see Figure 9.4), the southern entrance contained a low, 2-course high step leading up into the elevated passageway (Figure 9.7). Two floors (Floors 1 and 2) are associated with this step construction in Square D and are discussed further below (see Zones 8 and 20).

The most notable finds from Zone 3 were recovered toward the base of the zone, alongside the east wall of Structure 501 in the western half of the unit. The eastern half, on the other hand, was virtually sterile.

![Figure 9.8. Southern cross-section of Square D in Operation 54, showing enigmatic stone wall feature, possible shrine structure (Zone 13).](image)

Artifacts from Zone 3 included more “soda straw” specimens and fragments of plaster and mortar from the surrounding structures. Diagnostic pottery emerged from the Zone 3 matrix, including several large
rim and body sherds of several ollas. Two vessel foot fragments were recovered that may be indicative of Postclassic occupation. While Zone 3 yielded two biface fragments, only a small amount of debitage was found in Operation 54. Like Squares A and B, a large quantity of human bone fragments were recovered from the southwest and northwest quadrants of Square D, right alongside the east wall of Structure 501. The bone was found in concentrated clusters, but was highly disarticulated (Figure 9.9). A fragment of worked shell was found in the northwest corner of Square D. Though not directly associated with the clusters of bone, it was found at the same elevation, suggesting that it was personal adornment that may have been associated with the bone deposits.

![Figure 9.9. Close-up photo of the disarticulated human bone (Cluster B) in Square D.](image)

Zone 3 ended when a portion of a poorly preserved plaster floor surface (Zone 8) was interfaced in the northeast corner of Square D. There was a lighter density of collapse debris at this level. The last 5-10 cm of tumble lying directly over the outside East Plaza surface was excavated separately as Zone 4.

**Zone 4**

Zone 4 in Square D was the final thin layer of collapse debris directly overlaying the latest plaster floor (Zone 8) in the East Plaza of Group A. The Zone 4 matrix was a semi-compact, dark yellowish brown (10YR 4/4), silty clay sediment characterized by a minimal quantity of large cobble and boulder-sized tumble debris, and a high density small, gravel-sized limestone inclusions. The increased density of
Pebbley limestone inclusions encountered at the base of Zone 4 may represent deteriorated plaster and ballast of the Zone 8 floor.

The artifacts of Zone 4 were recovered from the sediment sitting directly in front of the east wall of Structure 501 (Zone 12). Additionally, some artifacts were recovered around the base of the western stairside near the southwest corner of Structure 504 (Zone 14) and the passageway entrance. The remaining regions of the square were virtually sterile and the sediment was cleared down to the highly eroded floor (Zone 8 - Floor 1) in the East Plaza. Since the plaster surface was not intact in most areas and the artifacts appeared only along the sides of the structures, it is highly probable that the both were washed away after years of repeated flooding.

Significant artifactual finds from Zone 4 included one slate flake, several obsidian fragments, and both well-preserved and diagnostic sherds. An incised, perforated ceramic disc (2.5 cm in diameter) with an image of a bird was recovered. The disc was very thin, and may possibly be a spindle whorl. A large volume of human bone was found in Square D, although predominantly concentrated in front of the Zone 12 wall at the center of the square. A few of the incisors were worked and drilled for inlays, similar to those found in Zones 3 and 4 in Square A. The human bone in within Zone 4 in Square D was concentrated in four discrete groups. The first group, Cluster A (Figure 9.2), was the heaviest concentration of bone, located directly in front the east wall of Structure 501 (Zone 12) at the interface of the northern and southern halves of Square D. Cluster B (Figure 9.9), the second group, had the same horizontal provenience as Cluster A, though beginning about 10 cm below the top of A, differentiated as a new cluster for stratigraphic control. The third group, the Northwest Quadrant, contained bone found at the periphery of the northwest corner of Square D. The final group, the Southwest Quadrant, included bone recovered from the periphery of the southwest quadrant of Square D. These bones were found along the low wall of Zone 13, as if washed there. Like the depositional pattern in Squares A and B, the human bone may have washed down from the elevated passageway and translocated to the edges of the surrounding structures.

**Zone 13**

Zone 13 was an enigmatic feature, underlying the collapse debris of Zone 3 and resting atop Zone 8 or Floor 1, the latest plaza floor in the East Plaza (Figure 9.8). Assigned to Phase 4b, the stone feature appears to post-date the Zone 8 floor and was part of a final episode of architectural modification. Zone 13 was only partially exposed. The small structure appeared rectangular in shape, with 3 courses of large cut limestone blocks, measuring on average 38 cm in length x 20 cm in width x 20 cm in height. The stone structure abutted, but clearly post-dated the basal molding of the east wall of Structure 501 (Zone 12). The structure extended beyond the southern wall of Square D. Limited horizontal exposure inhibited a clear interpretation of the stone feature. It may have functioned as a small shrine structure or stela house that was attached to the eastern side of the pyramid during the final period of site occupation. A small rectangular shrine structure, similar in size and shape to Zone 13, was found abutting a pyramid at the site of Lubaantun in southern Belize that may be comparable. Alternatively, a small, rectangular stela house with low walls found abutting a structure in the main plaza at Xunantunich in western Belize may offer another comparison, although this structure appears somewhat larger than the Zone 13 structure. One other possibility that was considered was that Zone 13 was part of a staircase once connected to the eastern side of Structure 501. Above Zone 13, and protruding out of the south wall of Square D were 4 large cut limestone blocks oriented in a step-like arrangement, suggesting the tread portion of a staircase (see Figure 9.8). However, there are two caveats to this hypothesis. First, this staircase would have been incredibly steep, as the east wall of Structure 501 (Zone 12) in Square D was very tall, while Zone 13 only extended out roughly 1.3 m
from this wall. And second, the basal molding of Structure 501 created a gap between the edge of the Zone 13 wall and the east wall of Structure 501 (Zone 12). Further investigation of the feature is necessary to confirm its function.

Although the Zone 13 feature was not excavated, a portion of the construction-fill was exposed as the surrounding collapse was cleared down. The fill was comprised of a compact, dark yellowish brown (10YR 3/6), silty clay sediment with a medium-high density of gravel and cobble-sized limestone inclusions.

Zone 8

Zone 8 (Floor 1) appeared to be the latest floor in the East Plaza of Group A, built during Phase 4a prior to the Zone 13 construction. The floor appeared to be contemporaneous with the Zone 9 floor found in Square A. The Zone 8 floor covered the first course of the elevated passageway step and measured roughly 15 cm to the level of the passageway corridor (Figures 9.6 and 9.7). The Zone 8 floor was composed of a layer of plaster covering a substantial ballast fill. The fill was semi-compact, dark yellowish brown (10YR 3/4), silty clay sediment, with a high density of pebble and gravel-sized limestone and river stone inclusions. The deteriorated Zone 8 floor was found underlying Zone 4, the final layer of tumble debris in Square D. The floor was best preserved along the southern entrance to the passageway (Zone 28) and along the east side of Structure 501 where the collapse debris from the surrounding structures has protected the floor. The Zone 8 floor did not run underneath any of the surrounding structures and clearly post-dated the passageway construction. Zone 8 was found overlying another plaza floor (Zone 20 - Floor 2) that was associated with the initial construction of the elevated step of the passageway.

A few discrete areas of preserved plaster floor were identified in front of the southern entrance to the passageway and alongside the east wall of Structure 503 (Zone 29) that were labeled Zone 8. These areas of floor were about 10 cm higher in elevation than the rest of the Zone 8 floor throughout the unit. While it is possible that Zone 8 was intentionally built as a sloping floor for the purpose of facilitating the drainage of the passageway, the discrepancy likely represents the remains of a later resurfacing event, probably contemporaneous with the Zone 6 resurfacing event in Square A. As noted, the poor preservation of plaster and the artifact distribution throughout the square suggests that multiple flooding events occurred in this area at the time of collapse that washed away artifacts and caused differential preservation of the East Plaza floors.

Zone 8 yielded a medium density of artifacts including animal bone, freshwater shell, two obsidian flakes, and a minimal quantity of debitage. An abundance of pottery sherds, many with slip and several partially reconstructable, were recovered from the ballast fill of Zone 8. One slipped sherd, possibly a Pabellon Modeled-Carved type, exhibited incising that resembled a glyph. Additionally, one potentially diagnostic vessel foot came from the ballast fill of the Zone 8 floor. It was a solid nubbin foot with rounded edges, slightly out-flaring at the base, measuring 2 cm tall and 1.5 cm in diameter. Several remnants of the plaster surface recovered from Zone 8 were collected. The plaster exhibited only a few areas of smooth, fine paste texture and contained a high density of compact limestone pebble and gravel-sized inclusions.
Phase 3

Zone 14

Zone 14 was a staircase that abutted the southern side of Structure 504, near the southwest corner of the structure (Figure 9.10). The staircase was a later addition to Structure 504 and was not associated with the earliest plaza floor (Zone 21). The western wall of the stairside exposed in Square D was built either after or in conjunction with the Zone 20 plaza floor. The staircase continued to be used after the latest plaza floor (Zone 8) was constructed, which partially covered the basal step.

Figure 9.10. Eastern cross-section of Square D in Operation 54, showing the stairside of the southern staircase of Structure 504.

The stairside was composed of large, cut limestone and riverstone facing blocks that represented the height of the steps of the staircase. The average size of these facing stones was 35 cm long x 28 cm wide x 20 cm high. While Zone 14 was not excavated, exposed construction fill was characterized as compact, dark yellowish-brown (10YR 3/6), silty-clay sediment with a high density of gravel and cobble-sized river stone inclusions. The stairside was poorly preserved, with only three or four intact courses of facing stone (and remnant stairs). Taking the height of Structure 504 into consideration, the Zone 14 staircase probably had around 6 or more steps leading up to the top of the Structure 504 platform.
Zone 20

Zone 20 (Floor 2) was a poorly preserved plaza floor found in the East Plaza of Group A directly underneath Floor 1 (Zone 8) in Square D (Figures 9.6 and 9.7). Little to no plaster surface remained, only the floor’s ballast fill was present. The floor appeared to be contemporaneous with Zone 10 (Floor 3) in Square A, restricted to the North Plaza (Figure 9.5). The floor pre-dated, or was built in conjunction with, the Zone 14 staircase on the south side of Structure 504 (Figure 9.10). Zone 20 was comprised of a loose to semi-compact, yellowish-brown (10YR 5/6), silty-clay sediment with a high density of limestone pebble and gravel-sized inclusions, chert nodules (some macro-debitage) and a lighter density of pebble and gravel-sized riverstones.

The Zone 20 floor abutted but did not run underneath the two-course high passageway step (Zone 28), which measured roughly 30 cm high. The plaza floor was only preserved for the first 50 cm south of the passageway step. The floor abutted the eastern wall of Structure 503 and the western wall of the stairside attached to the southern side of Structure 504. It did not appear to run underneath any of these structures. Zone 20 may have covered the entire East Plaza, but has since deteriorated. Like the Zone 10 floor, the Zone 20 floor contained a similar pinkish-brown fill around the entrance to the passageway that abutted and ran underneath the two-course step. This suggested that Zone 20 was constructed in conjunction with the elevated passageway and some of the underlying fill of Zone 20 served to build up and elevate the passageway. In this respect, Zone 20 in Square D mirrored the function of Zone 10 in Square A.

A very light density of artifacts were recovered from Zone 20, including a few pieces of slate, several slipped sherds, and macro-debitage. There was an abundance of chert nodules in Zone 20 not seen in any other zones in Operation 54. The macro debitage was of poor quality chert and was used as a major component of the ballast fill of Zone 20.

Zone 28

Zone 28 was the step located in Square D at the southern entrance of the passageway (Figure 9.2). The step comprised a two-course high stone wall construction that was wedged between Structures 503 and 504 (Figure 9.7). The step and elevated passageway appeared to have been built in conjunction with or just after the Zone 20 plaza floor was laid down. The pinkish-brown fill excavated in Zone 20 just to the south of the Zone 28 step appeared to be analogous to the Zone 24 fill found around the northern entrance of the passageway running underneath the step in Square A (see above). The pinkish-brown, mortar-like substance is distinctive from the whitish-gray plaster and ballast construction of the surrounding floor. The pinkish-brown material may have been laid down in preparation for the boulder fill of the passageway (not excavated in the southern end of the passageway).

Phase 2

Zone 29

Built during Phase 2, Zone 29 represented the east wall of Structure 503 (Figures 9.3a and 9.6), and latest phase of this structure. The wall measured roughly 9 m in length, beginning in the southern end of Square A and extending south along the passageway, until its termination in Square D (Figure 9.2). The best-preserved part of the wall in Square D was intact up to nine courses in height (see Figure 9.6). As
noted earlier, the boundary between the end of Structure 503’s east wall (Zone 29) and the beginning of the east wall of Structure 501 (Zone 12) to the south was difficult to discern (see Figure 9.6). It was clear that Structure 501 (the pyramid) pre-dated Structure 503. Therefore, the remains of a faced northeast corner of Structure 501 were anticipated. However, the transition was relatively seamless and only a subtle vertical line at the interface of the two structures could be identified in the profile of the contiguous walls. The beginning of a one-course basal molding demarcated the interface between the two structures. The molding was restricted to the east side of Structure 501 and did not extend further to the north along the east side of Structure 503 through the passageway. In addition, the interface of the two platforms was clearly demarcated in the surface topography of the two platforms.

In Square D, the east wall of Structure 503 (Zone 29) rested on the Zone 21 plaza floor (referred to as the Zone 11 floor in Square A). This surface represented the earliest plaza floor of the East and North Plazas in Group A. The construction of Zone 29 clearly post-dated the construction of this initial plaza floor. However, it may be contemporaneous with the construction of the pyramid, Structure 501, seen in Square D.

Zone 30

Zone 30 represented the western wall of Structure 504 and where it corners in Square D (Figure 9.7). This wall served as the eastern wall of the passageway (Figure 9.3b). In Square D. This southwestern corner of Structure 504 was defined in Square D, intact eight courses high. The western side of the wall extended through Squares C (unexcavated) and B to where it cornered in Square A. Like the eastern wall of Structure 503, it measured roughly 9 m in length. The Zone 30 wall rested directly overtop of the initial plaza floor (Zone 21/Zone 11) and post-dated this initial floor construction. About two courses of the east and west walls of the passageway (Zones 29 and 30) were covered over when the elevated passageway surface was constructed.

Phase 1

Zone 12

Zone 12 was the east wall of Structure 501, found only within Square D in Operation 54 (Figure 9.6). The Zone 21 floor abutted this structure, but did not run underneath it like Structures 503 and 504, indicating that it may be contemporaneous with this initial plaza floor. The Zone 12 wall of Structure 501 had the same orientation as the walls of Structures 503 and 504, 16 degrees east of north, and ran along the western edge of Square D. The wall of Structure 501 merged with the east wall of Structure 503 just south of the passageway entrance. At its tallest point, Zone 12 had eleven intact courses of stone, including a final course that contained a basal molding.

Zone 21

Zone 21 was the earliest plaza floor in Group A that appeared to connect with the Zone 11 floor revealed in Squares A and B, running underneath the elevated passageway construction (Figures 9.3, 9.6, 9.7, and 9.10). The floor was characterized by a layer of ballast fill comprised of compact, dark yellowish-brown (10YR 4/4-4/6), silty-clay sediment with gravel and pebble-sized limestone inclusions packed between larger river cobbles. Overlaying the ballast fill was a thin layer of plaster, best preserved in the
northwestern corner of Square D, between the passageway step and the last stone of basal molding of Structure 501. This small area of preserved plaster appeared to be finer than that of Zone 8. The floor exhibited many areas of smooth, fine paste plaster and contained only a lighter density of pebble-sized limestone inclusions. Zone 11 floor in Square A had the same composition.

Only the northern half of the entire East Plaza Floor 3 surface was excavated, reducing the unit size to 2 m (north-south) x 3 m (east-west). The ballast fill of Zone 21 yielded a negligible quantity of artifacts, just several sherds and one jute shell. This tiny assemblage laws in stark contrast to that of Zone 8 (East Plaza Floor 1), which offered a much higher density of artifacts.

Zone 22

Zone 22 Square D was an alluvium layer underlyng the river cobble ballast of Zone 21 (Floor 3), the earliest plaza floor in Group A. Zone 22 was composed of a semi-compact, dark yellowish-brown (10YR 4/4), silty-clay sediment, containing a very light density of pebble and gravel-sized river stone inclusions. Like Zone 21, Zone 22 was not excavated completely, but rather reduced in size to a 1 m (north-south) x 3 m (east-west) unit, positioned along the southern entrance of the passageway. The first 10 cm in depth was practically devoid of artifacts, yielding only a few poorly preserved sherds. There was a small spike in artifact density after these first 10 cm were excavated (lasting through 10 gallons of sediment or 2 buckets) where one obsidian blade, one debitage flake, and several larger, well preserved sherds were recovered. Following this brief spike, however, the sediment remained virtually sterile for the remainder of the excavation.

Zone 22 was stopped arbitrarily after 20 cm. It became clear that Zone 22 in Square D was the same matrix as Zones 16 through 18 in Square A, on the opposite side of the passageway. Zones 16 through 18 were excavated deeper and the alluvium became virtually sterile just before hitting a river cobble layer (Zone 19), which was most likely the remains of an old river bed. The excavation was terminated at this level for it was assumed that had Zone 22 been excavated further, the same results would have been observed as in Zone 16 through 19 in Square A.

Conclusion

Operation 54 revealed at least 4 phases of construction and shed light on the chronology of Group A. All four phases relate to the Group A architectural complex. This principle group at Hershey appears to have been built directly over a natural earthen layer or alluvial deposit that covered an old riverbed. The monumental architecture and the enclosed nature of the principle group, comprising formally prepared stone platforms and plaster surfaces, are indicative of the Late Classic period. There does not appear to be any other earlier construction prior to the initial plaza floor of Group A, suggesting a relatively short-lived elite occupation in this locale, maybe lasting several centuries (ca. AD 600-900). Ceramic material gleaned from excavations supports the notion that the elite compound at Hershey collapsed by the beginning of the Terminal Classic period (ca. AD 850-900).

A high density of terminal debris, including deposits of human bone, shell, pottery, and slate, found lying on the final phase of construction in Operation 54 sheds light on the final episode of the site’s history. Dense deposits of disarticulated human remains mixed within a 10-15 cm deep midden-rich layer of debris were found above the East and North Plaza floors. Finds of skeletal material lying directly on top of the
A large number of teeth were found within the bone deposits and many of them were worked with evidence of drilling for inlays, probably filled with jade like the specimen found inside the fill of the elevated passageway (Figure 9.11a). Additionally, several pieces of worked marine shell were found associated with the bone, including two shell pendants (Figures 9.11b and 9.11c). The presence of inlaid teeth and personal adornment suggest that the remains represent elite status individuals. Associated with the bone were high densities of smashed ceramic pots. Preliminary identifications of the ceramic material indicate that finely-made serving vessels were among the assemblage, including several pedestal-based pyriform vessels that are similar to northern-style wares stemming from Yucatán, Mexico. Mixed with the ceramics were large fragments of slate, recovered from the outside plaza areas. A concentration of slate material was associated with what looked to be a pit feature north of the passageway entrance in the North Plaza. It is possible that the slate is the remains of a stela, similar to other stone monuments found at sites in the Sibun and Stann Creek Valleys. Such acts of desecration often are cited as evidence of violence and warring activity. If the human remains represent sacrificed members of the ruling family at Hershey, the associated smashed vessels and desecrated monuments may be reflective of a violent overthrow of the site center, perhaps orchestrated by polities stemming from the north. Further archaeological investigation may clarify the presence of warfare at this site and yield more conclusive evidence regarding the site’s demise.

Figure 9.11. Photos of artifacts from Operation 54, including a) jade inlaid tooth; b) shell tinkler from Square A; c) shell pendent from Square D (photos taken by P. A. McAnany).
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Chapter 10
The Ballcourt at the Hershey Site (Operation 55)
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During the XARP 2001 field season, the Hershey Site was surveyed and mapped using a Total Station, GPS, and magnetometer. The survey revealed two elongated mounds, Structures 508 and 509, located southeast of Structure 502. The structures were parallel to each other and situated within the largest pyramidal group at the Hershey Site, Group A. The evidence suggested that the mounds were a possible ballcourt, which led to a magnetometer survey to detect any markers along the central axis of the court. The magnetometry research, conducted by Dan Welch, was completed in a 15 x 5 m area enclosed between the mounds. Results of the survey showed two strong dipole anomalies toward the northern area of the grid, which Welch suggested might indicate a stone marker that fractured into two pieces (Morandi et al. 2003). With this evidence in hand, the excavation of the ballcourt was conducted during the XARP 2003 field season as Operation 55.

The purpose of Operation 55 was to determine if Structures 508 and 509 defined a ballcourt playing alley and if a stone marker was present in the center of the “playing alley”. Survey of the area was conducted in order to decide on an excavation strategy. Structure 508 was found to connect directly to Structure 502—a platform flanking the south side of the main pyramid, Structure 501. The ballcourt mounds, Structure 508 (western mound) and Structure 509 (eastern mound) were both oriented 21° east of magnetic north. Survey also revealed the presence of four large looters’ pits on the two mounds. Looter’s Pit 1, located at the southwestern corner of Structure 508, was 3.3 x 1.7 x 1.3 m in size and may have been the result of stone robbing undertaken to build up the orchard road south of the mounds. Looter’s Pit 2, found at the eastern end of Structure 508, was the largest pit at 3.0 x 3.8 x 2.2 m in size. On the northeastern corner of Structure 508 was Looter’s Pit 3, which measured 1.5 x 2.2 x 1.7 m. Finally, Looter’s Pit 4, on the western end of Structure 509, measured 1.9 x 2.2 x 0.9 m in size, and was the most shallow of all the holes. Excavation was set to occur in the center between the mounds but the backfill piles from Looters’ Pits 2 and 4 interfered with plans for an axial trench across the two structures. It was decided that the largest and most apparent stones from the looters’ pits would be returned to their respective holes before the excavation unit was established. Some of the stones from Looter’s Pit 3 were also returned in order to create a screening area for Operation 55.

Description of Excavation

Operation 55, a 2 x 14 m unit with perpendicular sides at bearings of 21° (long axis) and 111° (short axis) was laid out across the center of the putative ballcourt. The unit incorporated the upper eastern wall of Structure 508 and the upper western wall of Structure 509, in order to include the architecture of both mounds. Operation 55 was divided into four squares, each 2 x 3.5 m, and designated A, B, C, and D from west to east across the unit. Excavation began in Square A and was carried out using trowels and picks.

Zone 1

The topzone of Operation 55, Zone 1, was a very loose sandy-silt sediment. Some stones from the looters’ pits that were still present were also removed as Zone 1 in Squares A, B, and D. The rock
inclusions were limestone and smooth river rocks ranging from gravel to boulder-sized (60 cm long). A few cut limestone pieces were also found among the rocks and were probably once part of the upper retaining walls of Structures 508 and 509. The stones from the looters’ pits indicate that the internal core of the ballcourt mounds were made from large, angular limestone blocks as well as rounded river cobbles and boulders. In Squares A and D, no excavation was conducted inside of the looters’ pits but adjacent, intact areas were investigated in order to find in situ architecture. The removal of Zone 1 in Squares A and D also revealed the upper retaining walls of Structures 508 and 509, respectively. The walls were constructed of cut limestone blocks ranging from 10 to 45 cm in length. Also, they were oriented at a bearing of 21° and were sloped towards the center of the ballcourt (Figure 10.1). The artifact density of Zone 1 was very light in Squares A, B, and C and included mostly eroded sherds, and some animal bones that may be modern. However, the artifact density of Square D was very heavy, especially in the area directly around the edge of Looter’s Pit 4. Artifacts included many sherds (some rim and slipped pieces), four fragments of obsidian blades, animal bone (including a parrotfish pharyngeal jaw), and jute shells. The artifacts may have come from inside the mound or from the top surface of Structure 509.

Zone 2

Restricted to Squares A and D, Zone 2 consisted of the wall collapse (not originating from looting activity) and sediment directly on top of the upper retaining walls of Structures 508 and 509. The semi-compact, 10YR 5/4 yellowish brown sediment matrix contained both limestone and river gravel as well as boulder-sized stones. A few collapsed, cut-limestone blocks were removed as Zone 2. Excavation of this zone exposed more courses of the upper retaining walls and revealed preserved plaster covering the cut limestone facing stones. The best preservation was discovered in Square D where the plaster appeared to be at least 2 cm thick. In Square D, the plaster was preserved nearly 30 cm from the wall indicating that the sloping terrace surface also had been covered by plaster. The angle of the in situ plaster sloped downwards toward the ballcourt center indicating that the terraces were sloped as were the upper retaining walls. A piece of obsidian was found in Square A at the bottom of Zone 2, right above the preserved plaster.

Zone 3

Zone 3 was a very compact alluvial layer overlying the terrace surfaces and was almost completely sterile throughout the four squares. Artifacts included a few small eroded sherds and a piece of obsidian that was found atop the cobbles in Square A. Excavation of Zone 3 revealed that the terrace surfaces of both mounds primarily were constructed of river gravels and cobbles (5 – 15 cm in maximum length) and some limestone blocks that had once been covered by plaster (see Zone 2 description). The cobbles were angled towards the center of the ballcourt, like the preserved plaster area—further proof that the terraces were sloped.

Zone 4

The silty-clay alluvial sediment in the center of the ballcourt, labeled Zone 4, was very compact and had a very light density of artifacts. This zone was restricted to Squares B and C. At the base of this zone, the lower terrace retaining walls of Structures 508 and 509 were revealed. A few stone inclusions were found in the zone and a small number of artifacts were collected. Two pieces of obsidian were found in Square B at the top of the terrace retaining wall. Four courses of the lower terrace retaining walls were uncovered upon the removal of Zone 4. The walls were made of cut, sub-rectangular limestone blocks of a
Figure 10.1. South wall cross-section view of Operation 55 showing sloping walls and terrace surfaces.
very powdery texture. The softness of the stone and the large amount of fine-grained sediment indicate that the lower terrace walls and center of the ballcourt had been buried in alluvial sediment. These deposits likely resulted from repeated overbank events as the main channel of the Sibun River is only 350 meters away. The lower retaining walls were sloped like the terraces and upper retaining walls. The terrace wall of Structure 508 exhibited the best preservation, with all stones intact, unlike Structure 509 where the stones in the southern portion of Square C were missing or disturbed.

Zone 5

A continuation of the Zone 4 alluvium, Zone 5 was arbitrarily designated as a new zone in order to establish stratigraphic control. Its very compact sediment was nearly sterile and had few inclusions. One flat limestone rock, 10 x 20 cm in size, was found along the northern wall of Square B but had no associated architecture. Excavation of Zone 5 did not reveal more courses of the terrace retaining walls. However, two small cut limestone blocks were uncovered in Square C and appeared to have tumbled from the terrace wall because they were found just below the disturbed portion of the wall. These cut stones appeared to be resting on a surface, so a new zone was created to determine if the alley surface had been discovered.

Zone 6

Zone 6 was a portion of preserved plaster in Square A, located in the southwest corner of the unit and directly east of the upper retaining wall of Structure 508. The excavation of the preserved plaster in this area revealed that the bottom course of limestone blocks of the upper retaining wall rested on top of this plaster surface. Because the Zone 6 plaster lips up to the retaining wall, it is evident that the terrace floor and upper retaining wall were constructed at the same time. The excavated plaster also showed that the river cobbles of the terrace were once covered. Some of the plaster was collected along with a few small sherds.

Zone 7

The alluvial sediment above the alley surface, Zone 7, was the same sediment found in Zone 5, and was separated for stratigraphic control. Excavation of Zone 7 was restricted to Squares B and C and revealed a layer of small river and limestone cobbles about 10 – 15 cm in size, which appeared to make up the alleyway surface between the two mounds. The highest concentration of cobbles was in the northern half of Squares B and C indicating the area with the best preservation (Figure 10.2). The flat limestone slab, initially uncovered and pedestaled in Zone 5, was removed and plaster was discovered on its underside surface, which rested on the cobbles. That seemed to indicate that the alley surface was also covered in plaster, but there was little evidence remaining due to the area having been inundated repeatedly by flooding. Artifacts from Zone 7 included debitage, sherds, and a C-14 sample that might be useful for dating the use of the alleyway surface.

Zone 8

The cobbles used to construct the underlying alley surface were designated as Zone 8, and were only excavated in Squares B and C. Initially, excavation of the zone began in the northern halves of the respective squares. As the cobbles were removed, a large limestone boulder was exposed in the center of the alley. The first thought was that this was the ballcourt marker. However, as excavation continued,
Figure 10.2. Operation 55 plan view, Zone 7, Squares B and C showing the cobble alleyway surface.
moving eastward and westward in the squares, more limestone boulders, 20 – 50 cm in size, were uncovered that created a line of stones running perpendicular to the ballcourt alley. As the stones were defined, it became clear that the southern vertical face of the stones had been shaped. The excavation of Zone 8 revealed that the line of stones underlay the terrace walls, indicating an earlier construction beneath the ballcourt, oriented at a bearing of 111°. The single line of stones was continuous from Squares B to C. A second line of stones just south of, and adjacent to, the first row ran west to east in Square B only and appeared to be a step or extension of the earlier construction (Figure 10.3). Excavation of Zone 8 also revealed that the limestone blocks were retaining a cobble fill, indicating that the shaped face of the stones represented the outer surface of an earlier structure.

Zone 9

Zone 9 was fill associated with the construction of the ballcourt alley. It was excavated in Squares B and C and was restricted to the area south of the row of limestone boulders. The soil was semi-compact and a 7.5YR 4/3 brown color. The matrix of the sediment contained river cobbles and a few limestone gravel-sized inclusions. The artifact density was very high and included sherds, obsidian anddebitage. Three C-14 samples were collected that may be useful for dating the construction of the fill. Excavation of Zone 9 revealed that the earlier structure had a single course of limestone blocks, and might have been a raised area of the plaza.

Zone 10

Located below Zone 9 in Squares B and C, Zone 10 was a very compact silty clay sediment, 7.5YR 3/4 dark brown in color. The interface between Zones 9 and 10 was distinguished by a change in sediment color and density. Zone 10 appeared to be a packed earthen floor aligned with the wall of the structure beneath the ballcourt. Artifact density was very heavy in this zone and included many well-preserved sherds and chunks of charcoal. Together, the charcoal (used for radiocarbon analysis) and the sherds (used for temporally sensitive type-variety analysis) may be useful for dating the terminal use of the earlier structure and initial construction of the ballcourt. Zone 10 had very few stone inclusions compared to Zone 9. The rocks consisted of a few small limestone chunks and river gravel that were found sporadically throughout the zone. The end of Zone 10 was noted by a change in sediment color and consistency and an abrupt change to artifact sterility.

Zone 11

Zone 11 was a very compact earthen layer, was located below Zone 10 and solely excavated in Square C. The sediment, 7.5YR 4/6 strong brown in color, had few artifacts or rock inclusions. The soil was a dense silty-clay that was homogenous throughout the zone.

Zone 12

A continuation of the compact earthen layer of Zone 11, Zone 12 was also restricted to Square C and had a light density of artifacts that included only sherds. The layer appeared to continue down further because no stone architecture was uncovered. The earthen layer of Zones 11 and 12 may have represented fill for an earlier structure because it was not completely sterile, like the alluvial sediment found in Zones 3
Figure 10.3. Operation 55 plan view, Zone 8, Squares B and C showing the earlier structure beneath the ballcourt.
Discussion

The excavation of Operation 55 proved that Structures 508 and 509 were configured to create a ballcourt at the Hershey Site. The parallel orientation was one of the first clues but excavations revealed that both structures featured the same architectural form. Both mounds were built with inclined upper retaining walls, sloping terraces, and lower terrace retaining walls. Evidence of inclination was apparent on both structures and the preserved plaster further supports the notion that the surfaces were sloping in towards the playing alley. Observation of the ballcourt at Nim Li Punit, in contrast, revealed that the ballcourt structures were built with sloped upper and lower retaining walls and flat terrace surfaces. The main ballcourt at Lubaantun features inclined lower terrace retaining walls but vertical upper retaining walls and flat terrace surfaces. The ballcourts at these sites show the variation in architectural styles used in Maya ballcourt construction. All evidence collected from excavation of the Hershey ballcourt points towards a single construction event for the ballcourt; no evidence of refurbishing or expansion was identified.

Although the excavation of Operation 55 did not reveal a ballcourt marker, it did uncover an earlier structure running beneath the two mounds. The low profile (one course of stone) of the structure and the fact that its long axis is perpendicular to the standing ballcourt argues against the possibility that this buried structure was an earlier ballcourt. Rather, this underlying construction appears to have been a small (possibly residential) platform or a raised plaza. Due to time constraints, Operation 55 was not expanded north through the center of the court in order to further define the earlier buried structure. Expanded excavation may have also uncovered a hearth or burned feature on top of the earlier structure or on the playing surface of the ballcourt, which might have been used to account for the strong anomalies read by the magnetometer. Analysis of pottery from Operation 55, especially from Zones 9 and 10, will help to date the earliest use of the ballcourt and terminal use of the underlying earlier structure.

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Chapter 11  
Construction Sequences at the Group B Pyramid (Operation 56)  
Steven Morandi

The Mystery of Group B

The Hershey Site is the largest identified site in the Sibun River valley, and the layout and architectural style of its structures are much different than any sites encountered downstream. Of the several major groups mapped at the Hershey Site, Group B has always stood out. Not only does it sit apart from other architectural groups and closest to the Sibun River, but also it consists of a large pyramid and smaller structures at or near the apices of a massive triangular substructure (see Morandi et al., 2003; Figure 11.1). The tallest side of this odd-shaped platform parallels the Sibun watercourse, and continually would have been eroded by flooding during the rainy season. In fact, Group B would have become an island during significant flooding events. All three Group B superstructures were found in looted condition, with pits at their summits.

Excavations were undertaken at Group B in order to glean some basic information about this unusual architectural complex. Structure 514 was chosen for this purpose because its large size offered the best chances to observe an undisturbed construction sequence within. One goal of the excavation was to understand the construction sequence of Structure 514 from both an architectural and chronological viewpoint. The other major goal was to relate Structure 514 stratigraphically to the underlying platform to get a glimpse of how the Group B complex took shape as a whole.

Operation 56

A cardinally-oriented 10 x 8 m excavation unit (Operation 56) was set up on the southern side of Structure 514 to capture as much data as possible given the time allotted. The unit was divided into eight squares measuring 2.5 meters wide (east-west) by 4 meters long (north-south) and lettered east to west A-D in a northern row, and E-H in a southern row. Squares A and E, toward the centerline of Structure 514, soon became the focus of excavation.

Zone 1

A topzone full of rootlets, Zone 1 was excavated across all squares of Operation 56 except Square H. This relatively thin layer of sediment covered the ultimate construction phase of Structure 514, indicated by the tumbled flat limestone blocks revealed underneath. This zone contained a low density of small rounded pebbles. Obsidian fragments and speleothems were found along with eroded pottery sherds in this layer.

Zone 2

Beneath this topzone was an earthen layer with associated tumbled limestone cobbles, designated Zone 2 (Figure 11.2). Though the color and texture of this sediment was the same as that of the topzone (7.5 YR 3/4 dark brown silty clay loam), it contained a high density of small rounded pebbles.
yielded a similar assemblage of artifacts as the topzone (pottery sherds, obsidian, speleothems) but in a much higher density. About 1000 sherds were retrieved from Square E alone. For stratigraphic purposes, the tumbled cobbles within this sediment were later called Zone 6. The removal of Zone 2 exposed several architectural features that comprise a clear sequence of construction events as described below.

\textit{Zone 3}

The least understood feature of Operation 56, consisted of a rectangular patch of limestone and river cobbles in Square E, called Zone 3. The purpose of this feature is unknown. It may be the remains of a wall or step that was partially removed. The cobbles were set in a single course layer.
Figure 11.2. West wall profile of Operation 56 (drawn and inked by S. Morandi).
Structure 514: The Final Construction Phase

Zones 4 and 5

Zones 4 and 5 can be considered together, since they appear to be non-contiguous examples of the same feature. These zones represent a surface located along the base of Structure 514 (Squares A, E, F, and G; see Figure 11.3). Due to taphonomic alterations, this surface deteriorated rapidly as it extended out from the edge of the bottom tier toward the center of the plaza. The well-preserved edge of this surface could be identified as plaster with gravel inclusions and was up to 14 centimeters thick at the base of Structure 514, where it formed a lip against Zone 15, the basal tier of the front staircase.

Zone 6

Comprised of tumbled limestone blocks strewn throughout Zone 2 sediment, Zone 6 was later separated out for the purposes of defining construction sequences for the Structure 514 complex (Figure 11.2). These rough limestone blocks probably originated as facing stones for Zones 12, 13, 14, 15, and 18, the tiers of the final construction phase. It should be noted that although the limestone cobbles were not artificially shaped in any way, it appears that they were selected for naturally flattened sides that could be used for construction purposes.

Zones 12, 13, 14, and 15

Four highly deteriorated tiers or steps of Structure 514 were identified as Zones 12, 13, 14, and 15, with Zone 15 at the base of the structure and Zone 12 as the fourth tier up from the contemporaneous plaza surface (Zones 4 and 5; see Figures 11.2 and 11.3). These tiers are of dimensions that allow easy access up the side of the structure. No trace of plaster was found anywhere on the surface of Structure 514, and it is unclear whether it ever had a plaster coating, though one would assume it did. In the eastern part of Operation 56, these steps follow a relatively straight line at about 7° south of east. They originally appeared to curve northward in Square A, but further excavation revealed that they undulate along their span (Figure 11.2), whether due to original design or taphonomic alteration.

Zone 18

A fifth tier of Structure 514, Zone 18 does not appear to have been a step, as it is high enough to block easy access to the top of the structure (Figures 11.2 and 11.4). The limestone blocks used to construct this tier are much flatter than those in the lower tiers, and quite soft and crumbly.

Zone 7

Zone 7 was an earthen layer considered to be the construction fill beneath the floor of Zones 4 and 5, can be chronologically associated with this overlying plaza surface (Figure 11.2). A light density of pottery sherds was recovered from this zone.

Zone 17

An earlier version of Structure 514 was indicated by the construction sequence beneath Zone 7. Though Zone 15 was the basal tier in the final phase of Structure 514, an even lower tier was uncovered
Figure 11.3. Plan view of Operation 56. Shown in cutaway view to display maximum information (drawn and inked by S. Morandi).
Figure 11.4. North wall profile of Operation 56, shown in cutaway view to display maximum information (drawn and inked by S. Morandi).
beneath the fill (Zone 7) of the final plaza surface (Zones 4 and 5). Labeled Zone 17, this bottom step was relatively well-preserved, with many in situ facing stones (Figures 11.2, 11.3, and 11.4).

**Zones 8 and 9**

This lower step sits on an earlier plaster surface (Zone 9) that, like Zones 4 and 5, is well preserved near the edge of the structure, but progressively more deteriorated to the south, toward the center of the plaza (Figure 11.3). Whereas the surface of Zones 4 and 5 terminated at the bottom edge of the Zone 15 tier, the Zone 9 surface continued beneath the Zone 17 step. In one area (Square F), a thick layer of plaster was found on top of the Zone 9 surface against the Zone 17 step. This layer, called Zone 8, was about 150 cm wide and 5 cm thick, protruding from the base of the step about 20 cm at its maximum extent. Likely a remnant of a resurfacing event, it remains curious that this new layer of plaster is preserved only in this one section.

One of the sherds associated with Structure 514 proved to have very fine incising on its surface. Once cleaned in the lab, it was revealed to exhibit a portion of a glyphic text. According to Stephen Houston (personal communication to Patricia McAnany, 2003), the symbol represents part of an early form of the Naranjo emblem glyph (Figure 11.5). This is a significant find, since the polity of Naranjo was perhaps the closest major center to the Hershey Site during the Classic Period. This link between the Hershey Site and a Petén center may reflect the broader control of the latter over Sibun Valley sites in prime cacao growing areas.

![Figure 11.5. Partial early-style Naranjo emblem glyph on sherd associated with Structure 514.](image)
**Structure 514-sub-1: A Well-Preserved Platform**

Maya ritual architecture often displays pronounced spatial constancy. Frequently, pyramidal structures are enlarged at which point the earlier structure may be used as a core for later architectural additions. In some cases, the facades of earlier structures were destroyed for practical or religious purposes while, in other cases, the underlying structures were perfectly preserved. The fact that the Zone 9 plaster surface ran beneath the Zone 17 step hinted that some other architectural features might be found beneath Structure 514; accordingly, further investigation of the construction sequence continued with deeper excavation in Squares A and E on the western edge of Operation 56. Balancing factors of time and the need for at least basic information about the construction sequence, we decided to excavate the westernmost portion of Square A in a section 1.5 meters wide.

**Zone 16**

Structure 514 was literally dismantled in steps, beginning with the Zone 18 terrace, working down the slope through Zones 12 to 15, finishing with the removal of the Zone 17 basal step. The removal of these tiers revealed two features. When Zone 18 was removed, it was found to have overlain a perfectly preserved plaster ledge about 30 centimeters wide that appeared to be part of a step. Beneath Zones 12, 13, 14, 15, and 17 was a homogeneous fill (Zone 16) of dark yellowish-brown, semi-compact silty clay loam that contained a high density of rounded pebbles up to 5 centimeters in size (Figure 11.2). This fill was removed as one unit and contained surprisingly few artifacts.

The removal of Zone 16 revealed a series of four steps of an earlier edifice (dubbed Structure 514-sub-1) that had an extremely well preserved plaster surface. The Zone 9 plaster surface that ran beneath the lowest step of Structure 514 formed a continuous layer with the Structure 514-sub-1 steps (Figures 11.2, 11.3, and 11.4). Interestingly, this surface sloped toward the base of Structure 514-sub-1, perhaps to channel water off of the plaza during times of significant rainfall. The steps of Structure 514-sub-1 are parallel and run in an orientation of approximately 7° south of east. Step elevations relative to the Structure 514 tiers (almost identical) indicate that the final construction phase was a carefully planned expansion of underlying Structure 514-sub-1.

**Zone 19**

Excavation of Zone 18 eastward across the very northern portions of Squares A, B, and C revealed what seem to be the well-preserved fifth and sixth steps of Structure 514-sub-1. A poorly preserved and non-contiguous portion of the fifth stair in Square A was labeled Zone 19 because it was excavated before the other portions of that step, but should be thought of as a part of the Zone 9 plaza surface (Figures 11.3 and 11.4).

**Structures 514-sub-2**

Shortly after beginning the excavation of Zone 20, a small portion of another plaster step was encountered (Zone 24; see Figure 11.2). This isolated feature could not be easily related to existing architecture, and remains enigmatic. Presently, it is considered to be part of a separate structure (514-sub-2), and only excavations farther to the north will clarify its relationship to other construction phases.
Structure 514-sub-3: An Incipient Architectural Complex

Due to time constraints coupled with the desire to leave a reference section of stratigraphy, we decided to excavate the westernmost portion of the lowest four stairs of Structure 514-sub-1, in a 1-meter wide section. This left a 0.5 meter-wide section of the Structure 514-sub-1 surface unexcavated.

Zones 20, 21, 22, 23

For purposes of stratigraphic control, Structure 514-sub-1, like the structure overlaying it, was excavated step-by-step. From top to bottom, the lowest four stairs were designated Zones 20, 21, 22, and 23 and the base of each zone was simply leveled with the top of the underlying stair (Figure 11.2).

Beneath the very hard plaster surface of the Structure 514-sub-1 stairs, some facing stones were found as well as a homogeneous construction fill of yellowish-brown loam with pebble and cobble-sized limestone and a low density of rounded river stones up to 4 centimeters in length. Zone 22 provided a rare C-14 sample that will be important in providing information about the construction date of the platform.

Zones 26, 27, and 30

As with Zone 16, the removal of Zones 22 and 23 revealed an earlier structure, this one designated Structure 514-sub-3. Only the southernmost edge of this platform could be exposed due to the limits of the excavation unit. Structure 514-sub-3 contains at least two tiers and a central core of limestone cobbles. The basal tier, labeled Zone 27, consists of a limestone wall that retains the fill of a strong brown sandy clay loam (7.5 YR 4/6) with no visible inclusions (Figures 11.2, 11.3, and 11.4). One piece of obsidian was recovered from this zone. The upper visible tier (Zone 26) consisted of a wall of limestone with some associated sediment (same color and texture as Zone 27), but was backed by a core of cobbles (Zone 30). Obsidian, pottery sherds, and a C-14 sample were found in the cobble core that resembled the matrix of Zone 11—the fill of the Group B platform (see below). Due to time constraints, a definite connection could not be established.

Earlier Construction at Group B

Zone 10

The deepest portion of Zone 9, the sloping edge of the Structure 514-sub-1 plaza, was also removed during excavation. Beneath it was a layer of construction fill (Zone 10) with some inclusions near the plaster surface, but none after the first 5 cm (Figures 11.2, 11.3, and 11.4). These inclusions may have been used to give “body” to the sediment for purposes of plaster surfacing, or they may have deteriorated from the bottom of the Zone 9 plaster.

Zone 11

Below this fill was Zone 11, a uniform layer of cobbles up to 40 cm across with no associated sediment (Figures 11.2, 11.3, and 11.4). The cobbles were naturally cemented by a material (likely
CaCO₃) that precipitated from the ground water. Tiny crystalline stalactite formations up to about 10 cm in length were found hanging from the bottoms of some of the stones. An attempt to excavate Zone 11 was thwarted by the extreme hardness of this natural cement. A rudimentary investigation of these holes was performed with a flashlight and probing stick. It appears that these cobbles continue to a depth of at least one meter; these cobbles probably form the core of the Group B platform. In comparison, the southern edge of this platform—which has been eroded by floods—reveals an exposed core of cobbles at least two meters deep (admittedly, the platform height on this edge is over five meters).

**Zone 29**

As the portion of Zone 10 most proximate to Structure 514-sub-3 was removed, it did not contact the cobble stratum of Zone 11. Rather, another plaster surface (Zone 29) was discovered (Figures 11.2 and 11.3). This surface was only explored in a limited area due to time constraints, and its relationship with Structure 514-sub-3 remains unknown.

**Zones 25 and 28**

A strange pit-like feature with a hard raised lip was found extending into the Zone 29 surface (Figure 11.2 and 11.3). Its contents were excavated as two separate zones (Zone 25 and 28) due to changes in sediment texture and inclusions.

Clearly, other architectural features may be found below the bottom levels of Operation 56 and, given the size of the Structure 514 mound, structures pre-dating 514-sub-3 could conceivably be found. C-14 dates from different construction phases should help guide both the reconstruction of the building sequence at Group B as well as future excavations.

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Chapter 12
The Eastern Shrine of Group A (Operation 57)
Eleanor Harrison-Buck and David G. Buck

Operation 57 is a 2 x 2 m unit located on the north/northeastern side of Structure 536, an isolated mound situated directly east of the main pyramid (Structure 501) at Hershey. The operation was excavated as one unit, Square A, and was not further sub-divided. The goal of the excavation was to expose the exterior wall of the structure and determine whether it was a rectilinear platform or a circular structure, like the shrines found at Pechtun Ha, Samuel Oshon, and Augustine Obispo—sites down river and closer to the coast. The structure was badly disturbed by tree root activity and heavy looting sometime in the past.

The isolated nature of the structure and its position in relation to the main elite residential complex (Group A), in alignment with the main pyramid and nearby ballcourt, suggested a special-purpose building with a ritual, rather than residential, function. Excavations were designed to gather both architectural and artifactual data from the test unit to better understand its relationship with Group A, as well as Group C directly to the east. This single structure is positioned within the center of a large plaza that separates Groups A and C.

Overview of Operation 57

The 2 x 2 m unit was positioned so that a portion of the northeastern exterior wall could be exposed, along with an area outside of the structure. The unit was oriented 30 degrees east of north, in line with the orientation of the structure. However, when referring to the southwestern side of the unit, where the northeastern exterior wall was exposed, it is referred to as the “south” side of the unit and, likewise, the northwestern side of the unit is referred to as “west”, and so forth.

Zone 1

The Zone 1 topzone of Operation 57 did not contain a pronounced humic layer. Rather, the surface was disturbed through active bioturbation (ants, rodent burrows, and tree growth). The unit was situated at the edge of a cacao orchard within which large shade trees have also been planted. One of these large trees is located on the top of the mound, along the southern edge of the unit (Figure 12.1). The structure has been heavily looted along the southeastern side of the structure. A large trench cuts through one side of the structure and deeply penetrates the interior of the small platform. The excavation unit was situated on the edge of the large looter’s trench, outside of the severely disturbed area. The shape of the mound suggests that it may also have endured some plowing or other disturbance, perhaps when the cacao orchard was established.

The soil of Zone 1 was quite loose and comprised a clay-filled matrix with few inclusions. There was quite a bit of tumbled construction debris (loose, boulder-size cut limestone blocks) on the southern edge of the unit, where the remains of the exterior wall were located. These loose stones were removed as part of Zone 1 that was a mix of loose topzone (rootlets and other organic debris) and tumbled debris.
At the base of Zone 1, the linear exterior wall of Structure 537 could be discerned and confirmed that the shrine was not of circular form. A planview sketch was drawn during the excavation of Zone 1. Collapsed construction stones were strewn on and around the intact wall that runs 30 degrees east of north. No artifacts were found in the disturbed Zone 1 topzone. Due to the disturbed and sterile nature of the matrix, only 50% of the matrix was screened.

Zone 2

Zone 2 consisted of the tumbled debris directly below the Zone 1 topsoil. The zone size changed slightly, restricted by the appearance of the intact, straight northeastern wall of Structure 536 running parallel with the southern edge of the excavation unit (aligned 30 degrees east of north). The area of Zone 2 measured roughly 140 x 200 cm. Excavations continued to reveal collapse debris, consisting of large boulder-size limestone (mostly cut facing stones) and river stones. By the bottom of Zone 2, more courses of the structure wall had been exposed. Artifact density was low (n=7), with several ceramic sherds appearing at the base of the zone, close to the wall. Only 50% of the matrix was screened due to the paucity of artifactual material within the collapse. An archaeobotanical sample was collected, though it appeared to be fragments of charred modern cacao pods. One possible fragment of ground stone was recovered. The largest limestone boulder from the matrix measured 55 cm in length by roughly 35 cm in thickness.
Zone 3

The upper 15 cm of Zone 3 contained the remaining collapse debris of large limestone tumble displaced from the northeastern side of Structure 536. Below this tumble is a loose matrix of soil filled with river cobbles (roughly 8 x 5 cm) associated with larger river cobbles (ranging between a measurement of 30 x 15 x 15 cm and 55 x 22 x 15 cm). These river cobbles, clustered in the northern portion of the excavation unit, were encountered at an elevation of approximately 157-165 cm below datum and appeared to be collapse debris. One looked possibly worked, suggesting it may have been used as a facing stone. However, most of the river cobbles were rounded and were likely interior construction fill material. They may represent collapse debris that spilled out from the structure interior following the collapse of facing stones. Alternatively, the river cobbles may be intact fill from a highly deteriorated floor construction. The matrix in the northwest corner of the excavation unit became slightly more packed in Zone 3, possibly marking the extent of root disturbance. The large river stones, ranging between 5 and 55 cm, appear to be located only in the northern portion of the unit.

At around 170 cm below datum, the nicely faced stones of the Structure 536 exterior wall ceased and a wall of stacked stones that were not faced continued beneath this level. The wall of roughly hewn stones and the fill to the north of the wall resembled a fill layer of a terrace construction, consisting of dry-laid boulder-sized limestone and river stone. No floor surface was identified, but the transition between the faced wall stones and the dry-laid fill layer was discernable in cross-section (Figure 12.1). Zone 3 ended about 10-15 cm into this fill layer when the change was more clearly identifiable. This change in construction may represent the level of the plaza floor that is no longer preserved. However, the substantial construction layers that continued beneath this level suggested that there may have been an elevated terrace surrounding the perimeter of Structure 536 that extends beyond the limits of the excavation unit.

The matrix removed as Zone 3 was virtually devoid of artifacts and only 50 % screened. Three or four sherds were found in the southeast and southwest corners of the zone, around the 170 cm below Datum. At least one of the sherds from the southeastern corner, found at about 173 cm below Datum, appeared to be diagnostic. Three other sherds were found at roughly the same elevation. These artifacts may be associated with the construction fill layer or, more likely, represent terminal debris on the surface of an outside plaza floor or terrace surface that surrounded the perimeter of the small structure. Cross-section drawings of the southern and eastern walls of the unit show this transition (see Figures 12.1 and 12.2), while the interface is more difficult to discern in the north and west wall cross-sections (Figures 12.3 and 12.4). There were no signs of a surface at this transition. However, the dry-laid boulder material, containing voids with little soil, was relatively compact and uniform and did not resemble the collapse found above.

Zone 4

Zone 4 began as an arbitrary level within the substantial dry-laid core fill of either a plaza floor or a terrace construction. The excavations in the Ballcourt (see King, Chapter 10) revealed no such dry-laid fill associated with the plaza floors in that section of the East Plaza, nor was there any evidence of this type of fill layer associated with a portion of the East Plaza excavated in Operation 54. This evidence suggests that the construction fill of Operation 57 was likely a discrete fill layer that formed an outer terrace ringing the perimeter of Structure 536 and elevating it from the surrounding East Plaza. The fill included a layer of cobbles and a few gravel-sized inclusions, followed by larger, boulder-sized limestones and river stones. At
Figure 12.2. East wall cross-section of Operation 57 showing profile of northern exterior wall of Structure 536 and surface level of construction fill (drawn and inked by E. Harrison-Buck).

Figure 12.3. North wall cross-section of Operation 57 (drawn and inked by E. Harrison-Buck).
Figure 12.4. West wall cross-section of Operation 57 (drawn and inked by E. Harrison-Buck).

Figure 12.5. Final plan view of Operation 57 (drawn and inked by E. Harrison-Buck).
the base of Zone 4, the boulder fill was tightly packed with large voids and little soil between the stones. Zone 4 was roughly 20 cm deep and was devoid of cultural material. Several charred cacao pod fragment were noted but not collected.

Zone 5

Zone 5 consisted of dry-laid construction fill of tightly-packed, boulder-size limestone and river stones. There were few cobble or gravel-size inclusions in this level. With the exception of a few animal bones, which may be modern (rodent holes were noted in and around the unit), the zone was devoid of cultural material. A final plan view was drawn (Figure 12.5) and excavations ceased at this level (ca. 230 cm below datum).
Part V: Artifact Analyses
Chapter 13
An Overview of Artifacts and Samples Collected During the 2003 Field Season

Satoru Murata

This chapter provides a brief overview of the excavations conducted and artifacts collected during the XARP 2003 field season. The information presented here is based on data entered into Yaxche, a FileMaker database utilized and maintained by the XARP project. Artifacts and samples collected during the XARP 2003 season came from fifteen excavation units and were classified as 26 different types of artifacts and samples (Table 13.1). A total of 45,360 pieces of information, including both artifacts and samples, were collected during the season. As might be expected from excavations at sites created by residentially stable and socially complex societies, pottery sherds, by far, were the most common of the artifacts collected, with a total of 21,737 specimens. Human bone came in second with 6,350 specimens collected, although the bulk of it (5,017) came from Operation 33 at the Augustine Obispo site where a poorly preserved and highly fragmented human burial was discovered. Debitage and animal bone came in a close third and fourth, with 5,550 and 4,263 specimens respectively.

Operations 25, 32, 33, 40 through 44, and 69 were completed during the first half of the season, while in the lower reaches of the Sibun River Valley. The total number of artifacts recovered during this time was 32,077, nearly two and a half times more than the number of artifacts collected during the second half of the season (13,283), in the upper reaches of the valley. This discrepancy may be a result of fewer operations excavated during the second half of the field season. Below, the efficacy of existing analytical categories is reviewed and then comparative analyses of artifact and sample counts by deposit type and site location are undertaken.

A Review of Analytical Categories

Several categories within Yaxche appear to be underutilized while others group together quite disparate types of things. For instance, only one “sediment sample” was collected during the entire season. This paucity may be due to the fact that most of the sediments collected were categorized as “flotation,” “pollen,” or “phytolith” samples (Table 13.1). Unless a program of sediment analysis is revived, this category could be removed in order to conserve space on field forms. Conversely, 980 specimens were collected and categorized as “other” during the 2003 season, making “other” the seventh most common artifact type. Many of the artifacts in this category are unique “small finds,” such as ceramic and jade beads, spindle whorls, egg shells, worked bone and stone, and net weights. There are, however, artifact types in this category that may be better off given categories of their own. For example, artifacts listed under “other” that were characterized as either plaster or mortar totaled over 380 specimens for the 2003 season. Similarly, there were over 280 specimens that were characterized as some form of metal object. Plaster/mortar should be given a separate category, especially in the light of the fact that plaster is one of the several artifact types exported from Belize for materials analyses. As for metal objects, it may be a good idea to classify them under a category first introduced during the XARP 2003 season—namely “historical metal”—as most metal objects found in the Maya region would be historical in origin. In the rare case of the discovery of a pre-Columbian metal object, they could easily be categorized as “other.” Similarly, there
Table 13.1. Artifacts and samples collected during the XARP 2003 field season.
were five specimens characterized as “olive jar neck” and “olive jar sherds.” Artifacts such as these should, in the future, be categorized under another newly introduced category—“historical ceramic.”

Another artifact type that might deserve its own category is “net weight.” A total of 35 net weights were recovered during the 2003 season, a number greater than that recorded for “daub,” “groundstone tool,” “historical pipe,” “historical…other,” “polished stone,” “sediment sample,” or “worked shell.” The only confounding variable with net weights lies in the fact that they were fabricated from both clay and stone.

Finally, there are several categories that need to be reconsidered in terms of their overly gross classification. For example, the current structure of the database lacks differentiation between thick-walled marine and thin-walled freshwater and land shells. Theoretically, it should be possible to differentiate between these two categories if there was a strict protocol that ensured the entry of such information in the “comments” section of the Yaxche database. Unfortunately, such a protocol does not exist, meaning that we could never be sure of the exact ratio of marine and fresh water shell. In light of the fact that there were only 35 specimens of “worked shell” collected during the 2003 season, I propose to restructure the categories so that we have an option between “marine shell” and “fresh water/land shell.” The “worked shell” category could remain, while making sure that it is clarified in the “comments” section whether or not the worked shell is marine or fresh water. Similarly, a separate classification for “worked bone” should be established. Currently, worked bone is variously classified as “animal bone” with the phrase “worked” added to the comments section or placed in the “other” category.

An obvious problem with changing data categories lies in the fact that it becomes difficult to integrate future data with existing data; however, I believe that the information gained through such restructuring far outweighs the hassles that arise because of it. With some effort, we could convert past data to comply with the new database structure. Even if such a conversion is not feasible, we could always “translate” the new data so as to be comparable with the old. For example, to compare “shell” between the new and old database structures, we would merely have to consolidate the categories “marine shell” and “fresh water shell / land snail” in order to compare them with the old category “unworked shell.”

**Comparative Analyses**

In this section, I present preliminary analyses of collected artifacts/samples and examine their relationship with factors such as excavation context (deposit type) and site location. It should be noted that, at the time of this writing, not all of the pertinent data had been entered into Yaxche; hence, the conclusion suggested below must be treated as being tentative.

First, I compared artifact counts according to the type of deposit from which the artifacts were retrieved. Figure 13.1 shows three graphs, each summarizing the number of artifacts collected from three different deposit types (midden, earthen layer, and construction fill) for three different artifact types (obsidian, animal bone, and pottery sherds). This information is presented by excavation unit (operation). For each of the graphs, I have included data only from operations that included at least two deposit types that yielded a particular type of artifact. For example, the graph for “animal bone” includes only data from Operations 32, 33, 40, and 54, because they were the only operations that yielded animal bone from two or all three of the deposit types in question.
Figure 13.1. Raw counts for three artifact types by deposit type.
As can be seen from the three graphs, the raw counts of artifacts seem to have little to do with deposit type. For example, in the case of animal bone, more bones were retrieved from “construction fill” at Operation 32 than “midden,” while at Operation 40 “construction fill” yielded by far the fewest animal bone specimens out of the three different deposit types. Similarly, at Operation 40 “midden” yielded more than three times more obsidian than the “earthen layer,” while at Operation 25 “earthen layer” produced more than four times obsidian than “midden.”

The lack of apparent patterning in the data presented above, however, should be expected. After all, we have not taken into account the volume of the context. For example, the large quantity of obsidian collected from a “midden” at Operation 40 might only mean that midden deposits comprised the bulk of the whole operation. An obvious way to get around this problem would be to use artifact count per volume of earth ratios; however, there is no easy way to make volumetric measurements within the current structure of Yaxche. For the following reasons, I decided to use another variable as the control—namely, the number of pottery sherds recovered from the different deposit types: (1) pottery sherds preserve well regardless of context; and (2) pottery sherds are found in almost any kind of deposit.

Since obsidian is not local to the Sibun Valley, the existence of obsidian artifacts signifies the presence of trade activity. Therefore, valuable information can be gathered by studying other artifacts associated with the obsidian. Table 13.2 provides a summary of obsidian, pottery sherds, and the obsidian/pottery sherd ratios for different deposit types at six different operations. Figure 13.2 was generated from the data shown in Table 13.2; it seems to show slightly more patterning than Figure 13.1. That is, in three of the five operations that yielded obsidian from earthen layers (Ops. 25, 33, 40, 41, 54), the earthen layers yielded much more obsidian than the other two deposit types. Although obsidian/pottery sherd ratios were lowest in “earthen layer” in the other two operations (Ops. 40 and 54), they did not trail the comparable ratios from the highest yielding context by far. Thus, it may be concluded that obsidian—in proportion to sherds—tends to be found just as much, if not more, in “earthen layer” than in either “midden” or “construction fill.”

The frequency and preservation of “animal bone” is highly variable archaeologically. Some contexts yield a great number of animal bones while others are completely devoid of bone. Therefore, it may be of interest to see if there is a correlation between context type and the relative number of animal bones present. Table 13.3 provides a summary of animal bone, pottery sherds, and the bone/pottery sherd ratios for the same three deposit types and five operations discussed above. Unlike the obsidian data, there seems to be little patterning by context in the frequency of animal bone (Figure 13.3). It is interesting to note that at Operation 32, the difference between the animal bone/pottery sherd ratio for “construction fill” and “midden” was—perhaps against intuition—actually larger in scale than the difference in the raw counts of animal bones from the same two deposit types. In any case, we cannot draw very useful conclusions from this particular set of data.

Next, I tried to assess whether we can discern differences in preservation conditions from these numbers. One artifact type that is largely affected by differential preservation is “animal bone.” Therefore, I measured the number of retrieved animal bone specimens along with C-14 samples against the number of collected pottery sherds (Table 13.4). This table provides an animal bone/C-14 sample ratio as well. The ratio of animal bones to pottery sherds and C-14 samples to pottery sherds reveals strikingly different patterns by operation (Figure 13.4). The animal bone/pottery sherd ratio is highest at Operation 40, followed by Operation 32 and Operation 33. When the ratio of animal bones to C-14 samples is graphed by operations, the pattern is highly divergent (Figure 13.5). Here again, the ratio is highest at Operation 40,
Table 13.2. Obsidian and pottery sherd counts and obsidian/pottery sherd ratios by deposit type and operation.

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Figure 13.2. Obsidian/pottery sherd ratios summarized by deposit type and excavation unit (operation).
Table 13.3. Animal bone, pottery sherds, and animal bone/pottery sherd ratios deposit type and operation.

<table>
<thead>
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Figure 13.3. Animal bone/pottery sherd ratios for three deposit types by operation.
Table 13.4. Raw counts of animal bone, C-14 samples, and pottery sherds and their ratios summarized by operation.

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Figure 13.4. Animal bone/pottery sherd ratios and C-14 sample/pottery sherd ratios by operation.
followed by Operation 32 and Operation 33. These two graphs suggest that Operations 40, 32, and 33 had favorable conditions for the preservation of organic material. It is worthy of note that Operations 32 and 40 both contained thick midden layers and that they are two of only three operations listed here that contained midden layers. It seems fairly safe to assume, therefore, that the presence of midden layers is strongly connected to conditions of preservation, although it does not answer “why” one context might display good preservation while another one might not.

The fact that the Figure 13.5 closely resembles that of Figure 13.4 suggests that C-14 may also be used (along with, or instead of, pottery sherds) as a relatively reliable control for measuring preservation conditions; however, we must remember that the total number of C-14 samples collected from a particular operation is not necessarily without bias. For example, an operation director might diligently collect all C-14 samples while another might decide, after having collected a certain amount of “good” C-14 samples from a particular zone, to stop collecting C-14 samples or to begin classifying them as “a-bot” (archaeological botanical samples).

Lastly, I examined whether the frequency of lithics (both chert and obsidian) was a simple function of distance from the mouth of the Sibun River. Again, I used pottery sherds as the control variable and tabulated the amount of obsidian anddebitage that was retrieved from the different operations (Table 13.5). The ratio of debitage/pottery sherds varies across the operations that are grouped according to transect
Table 13.5. Raw counts of chert debitage, obsidian, pottery sherds, and their ratios summarized by transect and operation numbers.

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number (Figure 13.6). The higher the transect number, the closer the site is located relative to the mouth of the Sibun and the coastal canoe trade as well as the near-coastal deposits of chert. We can see in Figure 13.6 that there is a general trend—the relative amount of debitage increases as you near the mouth of the river. This most likely has much to do with the proximity of Transect 5 sites to good chert sources. The data from Operation 60 displays an interesting anomaly—it is only one of four operations, and the only operation in transects 1 and 2 combined, to have a debitage/pottery ratio greater than 0.5. The graph of obsidian/pottery sherd ratios for the different operations (Figure 13.7) is not quite as distinctive as Figure 13.6; however, there does seem to be a gradual increase in the relative amount of obsidian as we near the coast. Future study of these trends and anomalies against the location of chert outcrops, sources of obsidian, and differential preservation (post-depositional processes) will facilitate understanding of the material basis of the livelihood of Sibun Valley residents.
Figure 13.6. Debitage/pottery sherd ratios for operations grouped by transect number. Larger transect numbers indicate proximity to the mouth of the river.

Figure 13.7. Obsidian/pottery sherd ratios for operations grouped by transect number. Larger transect numbers indicate proximity to the mouth of the river.
Pottery can be viewed as a kind of social expression that reveals the differing cosmologies, origins, and perhaps social organization of both its makers and users. All pottery producers confront challenges to production in the form of clay resources, temper and pigment availability, and sometimes fuel sources. For over two millennia, ancient Maya potters rose to these challenges and produced a supply of pottery vessels that encoded both subtle and not so subtle information regarding everything from cuisine preferences to cave rituals. Here, the sample of pottery from the Sibun area is considered in light of long-term cycles of repetition in vessel form and also in terms of its context. Collections from ritual deposits in caves adjacent to the valley tend to contain the best-preserved and longest temporal sequence of pottery, while those from the settlements have suffered the effects of weathering and inundation. Nevertheless, stratigraphic and architectural associations of pottery from the settlements may be used to address compelling questions regarding the Terminal Classic period.

The approach followed here is one that blends the social concerns of post-processualism and post-modernism with recognition of the importance of classification and materials analysis. The synthesis of these seemingly disjunctive approaches may provide an avenue by which we might learn about the institutions in a society that influence individuals’ acts and also about individuals’ acts that serve to create society within a natural environment (see Bourdieu 2000). Artifacts were not made so that archaeologists could construct and compare culture-histories by ordering artifacts through a variety of methods (e.g. Rice, Demarest and Rice 2004:7). Yet, classification often appears to be the beginning and end of many pottery analyses. The type-variety system is based on the subjective ordering of observable attributes, as defined by the analyst, into linear chunks of essentially static time. As Rice and Forsyth (2004) have noted, this type of investigation is modeled on a world of solid, stable entities, virtually permanent and unchanging. This classification technique is proven to yield accurate relative chronologies but does not really bring us any closer to understanding the dynamics of pottery production, the challenges that potters faced in the past, or the sources of potters’ inspiration regarding form and design elements. In order to answer these questions, we must go beyond the type-variety methods and conceptualize new types of analyses that will bring us closer to answering social questions.

In reality, pottery production is the result of interrelated processes that converge to satisfy social needs. The linearity of the production process can be modeled as a chaîne opératoire—an approach that identifies the transformational stages involved in the manufacture of an artifact including the decisions made by a potter as to which resources to use and which form to make (Lemmonier 1980; van der Leeuw 1993; Dobres 2000). This approach requires the use of archaeometric techniques that have not yet been applied to the Sibun Valley pottery. Qualitative aspects of the Sibun pottery, as discussed below, indicate dynamism in the pottery with pronounced shifts in production styles. The potters who produced the vessel fragments collected from Sibun caves and settlements appear to have been receiving and re-interpreting stylistic conventions regarding form and decoration. The scale of this sphere of influence is quite large and includes, at various times, the Peten, Teotihuacan, the Usumacinta, and northern Yucatan. Below, the
products of Sibun potters as well as a consideration of the larger Mesoamerican world from which they appear to have drawn inspiration is presented chronologically.

Early Pilgrimage to Sibun Caves

Caves from the middle and upper portions of the Sibun Valley contain pottery sherds displaying Xe and Xe-Real modes (Figure 14.1). For instance, fragments of Abelino Red: Abelino Variety, Achiote Unslipped, and Pico de Oro Incised were collected from Actun Chanona while a few fragments of Baldizon Punctated have been documented at Glenwood Cave. These early pottery types suggest that the caves were active sites ritual pilgrimage around 1000 B.C., although there appears to have been no settlement in the valley at this time. Middle Formative types—such as Jocote Orange brown—have also been collected from Actun Chanona. Stylistically, these sherds share modes with those found in the El Salvador region, which provides a notion of the large scale of the Middle Formative interaction sphere.

Figure 14.1. Preclassic pottery sherds from Sibun caves: (a) Abelino Red bowl rim with dark redslip; (b) rim with raised ridge and an outcurved neck.

Red serving dishes of the Late Formative—specifically elaborated Sierra Red types—were deposited in caves of the Middle Valley. During this time, the increasing popularity of large jar forms—apparently to cook or process new types of cuisine—in settlements throughout the Maya Lowlands is mirrored in the deposits of central Belizean caves that feature Monkey Falls Striated: Monkey Falls Variety and Sapote Striated vessels (Figure 14.2). Previous technological analysis of Late Formative jars from K’axob indicates that, although the vessel form may have been innovative, the technological knowledge of potters regarding the mixing of clay bodies appropriate for cooking vessels (non-calcareous matrix or high content of crushed coarse crystalline calcite temper) was very sophisticated.

In caves of the Sibun Valley, striated jars often were decorated with appliqués, impressions or incisions. Some jars were painted with a red slip on the neck and the body can exhibit light striations under a white layer of clay wash. This red-on-cream pottery is reminiscent of Cuadros pottery in the Pacific Coast of Chiapas. It is possible that potters were using a calcareous matrix for these jars that do not seem
to have been used for cooking. Although a full analysis of the types of jars chosen for cave offerings has not been undertaken, ritual supplicants may have chosen red slipped jars because of their visual link to bloodletting. Red-slipped jars are less common in settlements outside of the Sibun Valley.

During the Late Formative, it is clear that potters produced vessels—such as lidded censers—strictly for ritual activities. From the Sibun cave of Ek’ Waynal, a lid from a Chicago Orange senser (Figure 14.3) is strikingly similar to one collected by David Pendergast from the Sibun cave of Actun Polbilche (and currently housed at the Institute of Archaeology, Belmopan). Comparative material at a greater distance can also be cited, such as the lidded censer recovered from Tomb 3, Mound 12, of Chiapa de Corzo dating to the Jiquipilas phase (AD 100-200; Mason 1960:Figure 21.m; Plate 8c).
While ceramic indicators of Early Classic settlement within the Sibun Valley have not been recovered, the caves of the Sibun-Manatee karst continued to attract ritual supplicants. In the central Petén, the Pasión, the Usumacinta region, and northern Belize, the Early Classic is a time when styles were formalized and forms were standardized. Canons of pottery production—bearing information about social position within society—appear to have been codified during the Early Classic period. Emblematic types include Aguila Orange and polychromes such as Actuncan and Dos Arroyos, all of which have been recorded in the mid-valley caves of the Sibun region (Figure 14.4).

Figure 14.4. Early Classic Dos Arroyos polychrome flanged bowl fragment from the Sibun Cave of Actun Ibach.

Midway through the Early Classic, Maya potters began to adopt vessel forms and decorative modes that reflect the influence of the Mexican Highlands, such as the tripodal cylinder vessel. The increasing popularity of this form can be correlated with epigraphic data that records specific interactions (such as the arrival at Tikal of Siyaj K’ak’ from Teotihuacan in 378 AD; Martin and Grube 2000:29). On these Early Classic tripod vessels, potters depicted mythological scenes and scribes painted or carved dedicatory texts containing the names of rulers (Culbert 1993; Martin and Grube 2000). The impact of this political and social “sea change” can be seen in the Sibun cave of Actun Ibach where fragments of a gouged-incised tripod cylinder lid and a rounded bowl were deposited as cave offerings (Figure 14.5). The pattern of crisscrossed, gouged-incised intertwined bands is similar to those found on tripod vases and lids from Teotihuacan Pottery Group 3 as defined by Sejourné (1988:Figures 36, 102, 107). The Sibun sherds do not display any glyphs but rather geometric and scroll designs. Before the Early Classic period, Maya potters used techniques of incising and grooving but vessels were rarely gouged.
At the beginning of the 5th century, the political and cultural supremacy of Tikal began to decline. This slide appears to have reached a nadir in 562 when a “star war” attack on Tikal by an allied Calakmul-Caracol force brought further humiliation to the once dominant Early Classic capital (Martin and Grube 2000:29). The power void that resulted was filled by the victors and the ruling dynasties of the Usumacinta and Pasión Valleys. The rising influence of the latter can be perceived in the ensuing Late Classic pottery of the Sibun Valley.

Figure 14.5. Early Classic gouged-incised bowl fragment from the Sibun Cave of Actun Ibach.

_Sibun Valley Settlements and Late Classic Disengagement with Foreign Identities_

During the Late Classic period, settlements were established throughout the valley from the base of the Maya Mountains down to the coastal estuarine environment. With local settlement in place, cave pilgrimage intensified and the majority of cave pottery represent types from Late and Terminal Classic periods. Jars continue to be a popular container for cave offerings. In contrast to earlier times, Late Classic jars recorded in cave chambers are larger and more variable as to form. Cave assemblages include vessels from the Cambio, Encanto, and Tinaja groups that were also popular in the central Petén, the Usumacinta and the Pasión regions (see Smith 1955; Adams 1971; Sabloff 1975; López Varela 1989;
Foias 1996). Such jars fitted the cooking and storage demands of both large and small communities for almost three centuries. When these jars were placed inside a cave chamber that symbolized the Underworld, however, the “domestic formula” most certainly changed (Stone 1995).

In addition to the standard “kitchen” jars, sherds of a Macal Orange thin jar were found in the cave of Ek’Waynal and are associated with a 7th century AMS date. Both Sibun caves and settlements contain polychrome pottery of the Saxche and Palmar traditions and, as such, were participating in a larger sphere of production styles that included the Usumacinta, the Pasión, central Petén, the Belize Valley and, as far south as, the Alto Salama River (Ciudad Ruiz 1988) and Alta Verapaz (Arnauld 1987). In the Sibun Valley, these “status” wares were complemented by the production of local red wares such as Dolphin Head Red (Figure 14.6) and the Vaca Falls ceramic group.

Ceramicists have observed that particular Late Classic pottery styles return to a size and shape reminiscent of Early Classic or even Late Formative styles. For instance, Rands (1987:226) noted that dishes of the Murcielagos phase (circa A.D. 700) at Palenque are similar to Early Classic Motiepa dishes except that there is a reduction in the height-width ratio. A similar observation holds for a Late Classic type called Duck Run Incised (Figure 14.7) that has been observed in central Belizean caves, Belize Valley settlements, and in both caves and settlements of the Sibun Valley. The unusual bottle form of Duck Run Incised is reminiscent of a black burnished neckless jar with a concave base from Chiapa de Corzo (Agrinier 1964:Figure 37.2).

![Figure 14.6. Late Classic Dolphin Head Red bowl fragments from (a) Petroglyph Cave (housed at the Institute of Archaeology, Belmopan); and (b) a Sibun Valley settlement site.](image-url)
A strong marker of the Late Classic period in the Sibun Valley, and throughout Belize in general, is a large dish with outcurving sides, a basal break, and a ring or pedestal base (Graham 1987:78). Rims of these large bowls generally feature a wide, everted flare that is flattened on the interior and beveled near a rounded or squared lip (Gifford 1976:241). This form can occur in a variety of types; in the Sibun settlements and caves, Roaring Creek Red is a common large bowl form (see Chapter 14, section 2, this volume). The large bowl form can be traced back to the Protoclassic period and a polychrome dish form with flared sides, a basal break and a ring base. Increasing use of pedestal bases is a common trend of the Late and Terminal Classic periods the Sibun Valley (see below); this trend is paralleled throughout Belize and also in the central Pétén, and the Usumacinta-Pasión regions.

Another notable trend of the Late Classic period that is common to both the Sibun Valley and northern Belize is the occurrence of lightly striated, unslipped jars that are decorated with a deep red slip on their short outflaring neck. During the ensuing Terminal Classic period, however, the deep red slip can be
painted over the rim, neck, and shoulder of the jars and the body can be either striated or plain (Graham:1987:78).

Fine paste vessels of Belize Red are very common in the settlements and caves of the Sibun River Valley. Fine paste pottery production has been traced back to the Early Classic period in the area of Palenque (Rands 1973:187). The origins of fine paste ceramics relate to a fine-brown paste identified in the Picota Ceramic Complex of Palenque; potters continued to use that paste into the ensuing Otolum Complex (Rands 1973:187). Later, potters replace fine-brown paste with a fine-gray paste. This deep tradition of fine-paste pottery production entirely predates the Terminal Classic Balunte Ceramic Complex (Rands 1987:228). Accompanying this early tradition of fine-brown and fine-gray pastes is a fine-black paste observed on a dish at (Rands 1973:1987). I have identified a similar history of fine paste ceramic production at Pomoná with even a greater variety of early fine-paste examples, all of which predate the later Altar, Balancan, Chablekal and Tres Naciones Groups. While the advent of fine-paste ceramics may be a hallmark of the Terminal Classic in some parts of the Maya Lowlands, their presence in the Usumacinta is deeply rooted in the Early Classic. Their later popularity throughout a larger area, therefore, may signal either expansion of Usumacinta influence or co-opting of Usumacinta traditions of production.

New Encounters During the Peak of Terminal Classic Sibun Valley Settlement

Between the 9th and 10th centuries, political volatility seems to have pervaded the Maya Lowlands as rulers competed for a dwindling resource and population base (Martin and Grube 2000; Proskouriakoff 1963, 1964; Schele 1991; Pohl and Pohl 1994). Despite this volatile political climate, potters continued to produce cooking and storage jars of the Tinaja, Cambio, and Encanto groups. Innovation in cuisine preparation is also apparent in the presence of comal fragments that were buried inside the fill of a circular shrine at the Samuel Oshon site (Figure 14.8). Large serving bowls mounted on a pedestal base and slipped red (i.e., Roaring Creek Red) became extremely popular in the Sibun Valley (López Varela 2003; see also Chapter 14, Section 2, this volume) where they are associated with 9th century AMS dates in both caves and settlements. Not specific to the Sibun Valley, Terminal Classic pedestal bases are known throughout Belize, the central Petén, and the Usumacinta-Pasión regions.

At the site of Pakal Na, the focal individual of a multiple interment (Burial 1A, Operation 22) was interred with a complete, but fractured, pedestal conical bowl with a restricted orifice and a sagging bottom (Figure 14.9). Like the Duck Run bottle of the Late Classic, this form seems to constitute a revival of a Formative vessel shape with the new addition of a pedestal base. Distant similarities in form can traced back to the Locona Phase (1500-1350 B.C.) in the Mazatan region of the Chiapas Coast (Clark and Pye 2000:Figure 18). Vessels with a basal dome shape are also found in burials and caches at Chiapa de Corzo, many of which date to the Horcones phase (0-100 AD) or earlier (Agrinier and Lowe 1960; Agrinier 1964; Lowe 1960).

The pedestal conical bowl accompanying the Pakal Na mortuary interment is decorated with three circular depressions, resembling dimples, each of which is separated by an X-shaped motif (Figure 14.9). In the low hills of the Usumacinta, these motifs are common on pottery from the Balunte Ceramic Complex (A.D. 750-800), although the design is stamped and the “X’s” alternate with petals (see Rands 1987:Figures 12a, b). During the Early Classic period, circular depressions are seen in a Tzakol 2, cone-shaped and unslipped lid from Uaxactun (Smith 1955:Figure 78i). From the middle valley of the Chixoy River, Ichon and Grignon Cheesman (1983:Figure 83c) report that finger-made circular depressions on pottery are a common trait that increases in frequency during the Postclassic period. Most interestingly, the
“X” motif is found on a band placed near the rim of a Late Postclassic pedestal vessel from the Soconusco region that appears on Folio 68r of the Codex Mendoza (Berdan and Anawalt 1992; Figure 14.9). As the vessel is identified as containing cacao, the “X” motif may well mark the function of a vessel as a cacao-drinking container. At Pakal Na, the presence of such a container in the burial of a powerful and influential male (see Chapter 19, this volume, for details of Burial 1A) is not surprising. After all, ethnohistoric sources indicate that the Sibun Valley was an important cacao producer during the Colonial period and that production likely originated during earlier times.
Towards the end of the Terminal Classic period in the Usumacinta and Pasión region, Pabellon Modeled-carved fine paste pottery was crafted with scenes of interaction (Bishop and Rands 1982:314), possibly narrating the presence of a foreign population (Figure 14.10A). Fine paste Pabellon Modeled-carved pottery has been documented at El Cayo, Lubaantun, Altar de Sacrificios, Piedras Negras, Seibal (Bishop and Rands 1982) and Yaxchilan (López Varela 1989). A vessel found at Ucanal narrates the capture of an individual and is executed within the stylistic conventions of the Late Classic Usumacinta and Central Highlands (Helmke, Colas and Awe 1998:96). In the caves and settlements of Belize, modeled-carved vessels also have been reported. Called Belize Valley Modeled-carved by Helmke, Colas and Awe (1998), these vessels were made with local clay resources and also tend to contain scenes of warrior confrontations—perhaps a leitmotif of the Terminal Classic. In the Ulúa Valley to the south, however, Joyce (1987:397) notes that modeled-carved vessel narratives do not always show confrontational scenes. Helmke, Colas and Awe (1998) state that the glyphs carved on the Belize Valley Modeled-carved vases can be read in Yucatec Mayan.

Figure 14.10. Terminal Classic modeled-carved pottery: (a) Pabellon Modeled-carved from Yaxchilan; and (b) Belize Modeled-carved from a Sibun Valley settlement site.

Fragments of Belize Modeled-carved vessels have been found at Actun Chanona and several of the larger settlement sites (Figure 14.10B). Chemical characterization and provenance studies are needed to define the chemical and mineralogical characteristics of this sample of Belize Modeled-carved, particularly in light of recent assertions that the dispersal of fine paste ceramics may have been inspired by a messianic martial cult of Quetzalcoatl/Kukulcan (Ringle, Gallareta and Bey (1998:216). The fine orange paste of Pabellon Modeled-carved may have a manufacturing locus on the Rio Pasión (Bishop and Rands 1982:314). Clearly, potters in that region had been making and experimenting with fine paste for centuries prior to the Terminal Classic period.

Ladle censers (Miseria Appliqué) are a distinctive pottery form that is present in the terminal deposits of the coastal-oriented settlements of the Sibun Valley. Materials analyses of this functionally specific form also are needed since Ringle, Gallareta and Bey (1998:216), likewise, have used Miseria Appliqué to support their martial hypothesis. Known distributional patterns bring their assertion into question, however,
since ladle censers first appear in the Lowlands during the Late Formative and were very abundant in the Usumacinta and the Palenque environs during the Late Classic (López Varela 1989).

**Persistence of Production Styles Into the Postclassic Period**

Postclassic pottery has been recovered from the middle and lower parts of the Sibun Valley. Potters continued to produce pyriform jars, pedestal base cylinders, and open tripod bowls with bulbous or effigy molded supports. In the Sibun Valley, Postclassic pottery is marked by ceramic modes linked to the Yucatán Peninsula. Early Postclassic pottery at the Samuel Oshon site follows the Tayasal-Paxcaman styles with the presence of types such as Maskall Unslipped: Maskall Variety as originally defined by Chase (1984:36). Middle Postclassic pottery of the Paxcaman Ceramic Group was found at Pakal Na and several of the coastal-oriented sites. The Late Postclassic is characterized by the making of effigy incensarios within the Mayapan style and tripod bowls or dishes with cylindrical supports of Payil Red, exhibiting two circular vents. Graham places the making of these dishes from the late 14\textsuperscript{th} through the 15\textsuperscript{th} century. Once again, evidence of these types—in very low densities—has been collected from the coastal sites of Transects 4 and 5.

**Spanish Colonial Pottery in the Sibun Valley**

By the mid 16\textsuperscript{th} century, Spaniards had reached the Yucatán. *Conquistadores* encountered a weak political configuration of Maya communities and this political scenario facilitated their entrance into and eventual political control over the Maya region. Ethnohistorical sources describe the presence of the Spaniards in an area now known as Belize. To administer these lands, the Spanish Crown allotted *encomiendas* and each *encomendero* was charged with building a chapel for visiting friars. One of these *visitas* was built in the Sibun Valley and called Xibun or Xib’um; unfortunately, documents do not specify its location. At Cedar Bank, Spanish Colonial (as well as British Colonial) artifacts have been recovered (see Chapters 5 and 6, this volume); however, the artifact that is most evocative of Hispania was collected from Actun Chanona.

Between 1540 and 1630, the Spanish Caribbean colonies (including Belize) were receiving simple coarse tin-glazed wares such as Santo Domingo Blue-on-White and Sevilla Blue-on-Blue. This pottery likely was made by Christianized Moslems of Arabic-Berber descent living in Seville. One distinctive piece of pottery is an orange, non-glazed vessel spout modeled into an open-mouthed lion (Figure 14.11a). At some later time, this spout was deposited in the most impressive cave in the valley—Actun Chanona—that is located at the base of the Sibun Gorge. The shape and execution of this lion effigy bears a remarkable resemblance to those found in the Lion’s Courtyard of the Alhambra in Granada (Figure 14.11b). The marble fountain is decorated with the 12 lions that symbolize the Koranic and Biblical images of paradise—a garden with four rivers. Water spouts from the mouths of the lions and cascades into a square pool and then into four canals oriented to the cardinal points. All of these elements, water, plant fertility, directionality and the transition of humans into a paradisiacal world were shared elements of Maya, Spanish, and Moslem cosmologies. No wonder this extraordinary piece of pottery was placed as an offering within a portal to the Maya Underworld.

The pottery of the Sibun Valley is the materialization of centuries of pilgrimage to the Sibun caves and generations of settlement in the valley. The potters who fabricated the pottery left in caves and settlements have been conceptualized as part of “une action socialisée sur la matiere,” meaning that their material world
was the result of socialized actions. Hopefully, this chapter has moved us a little closer to understanding the social practice of pottery production—and the potters themselves—within the Sibun Valley.

Figure 14.11. Spanish-colonial influences in the Sibun Valley: (a) ceramic lion-head effigy from Actun Chanona (housed at the Institute of Archaeology, Belmopan); (b) fountain at the Alhambra supported by lions with similar romanesque eyes.


Section II: Roaring Creek Red Pottery from Glenwood Cave and Actun Chanona

Wallis Lord

The Late Classic period represents an apogee of Maya society in terms of population, construction activity, and codification of cosmology. A significant part of Maya cosmology dealt with the Underworld, and the importance of caves as portals to the Underworld. Maya ritual specialists visited the inner chambers of caves to conduct a variety of rituals which, as Thompson (1990: 277) noted long ago, likely included praying to gods who lived within caves such as Chak, the rain god, for ample rains and fertile crops. Incense, jars and bowls, figurines, and other items were brought into caves to be used in ceremonies of propitiation. When the ceremony was over, the pottery was left behind either as offerings or to be used during the next visit. Today, many caves in the Maya region are strewn with vessel fragments, left behind when cave pilgrimages ceased. The sherds that the Maya left behind may help us to answer important questions about the use of the different types of pottery found within these caves. What type of pottery did ritual supplicants choose to transport to caves, and how do their choices relate to their beliefs? What form are the vessels that were used within the cave ceremonies? Answers to these questions help us to understand even bigger questions about what activities were occurring in caves and when. One type of pottery that often was left in the caves of Belize is a type called Roaring Creek Red that was made during the Late Classic to Terminal Classic period. Its discovery in caves, as well as in settlements has brought forth questions as to the part it played within cave rituals, a question that this study was designed to answer.

Roaring Creek Red is monochrome pottery that is part of the later facet of the Spanish Lookout Ceramic Complex as originally defined by James C. Gifford (1976) for the site of Barton Ramie in the adjacent Belize River Valley. A pottery type that is restricted to the later part of the Classic period, Roaring Creek Red is well-known for its deep red slip which covers very large “thick walled dishes and thinner walled jars” (Gifford 1976: 240). Another characteristic of Roaring Creek Red vessels is a large flared rim, which sometimes is flattened near its lip. Vessel interiors tend to be well-polished and red-slipped.

In this study, 26 pottery sherds were examined: 16 rims and 10 bases. These sherds were removed from two caves, Actun Chanona, and Glenwood Cave, during the 1999 and 2001 XARP field seasons and have been classified as Roaring Creek Red by project ceramicist, Sandra L. López Varela who also provided guidance throughout this analysis. It was hoped that this investigation would help us to understand this pottery type’s usage within the caves by determining the size and form of the vessels of which the sherds were once part, and thus, if specific forms of Roaring Creek Red vessels were placed in caves by the Xibun Maya over a thousand years ago.

The Database

After careful consideration of what information needed to be gathered from each sherd, a database was created in order to standardize data collection and facilitate comparative analysis. Measurements on three different parts of each sherd were collected for size and thickness comparisons. Measurements differed slightly between rims and bases; thus, I have separated the data into Table 14.1 (rim data) and Table 14.2 (base data). In several instances, I was able to glue together sherds that were originally one piece in order to draw a more complete portion of a vessel. Each rim (single sherd or glued composite) was drawn in profile. If complete, the bases also were drawn in profile; if fragmentary, bases were drawn in plan view to show the size of the sherd. A tracing of each rim and base profile provided information on the angle of the base or rim.
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For each sherd, the following eleven variables were monitored:

**RIP #.** A Rim Identification Profile number (starting at 0001) was assigned to each of the Roaring Creek Red rims and bases that were collected in the caves. RIP numbers were also given to three badly eroded bases (RIP 0024-0026). Exact measurements could not be taken for all parts of the sherd, nor were they in good enough shape to be drawn, but they could be included in the statistical analysis.

**Cave, Component, Unit.** This provenience information locates the rim or base within a cave. The two caves from which Roaring Creek Red sherds were recovered are Actun Chanona and Glenwood Cave, both of which I discuss below. A component is a part of the cave (chamber or alcove) and a unit is the specific area in which the surface collection was conducted within the component.

**Form.** This describes the type of vessel from which the sherd originated, in this case a bowl or jar. Form was decided based upon the following criteria: (1) rim extension beyond the lower part of the sherd, demonstrating a bowl shape. A rim that was smaller in diameter than the body of the vessel would indicate a jar; (2) presence of a large, relatively flat base with or without a ring or pedestal appendage.

**Vessel Part.** This category includes rim, pedestal base, and ring base. A rim is characterized by a noticeably rounded edge that protrudes from the main body of the sherd. A base is the raised circular platform upon which a vessel rests. Pendergast (1974) distinguishes between a pedestal—which is a tall form of a base—and a ring that is intermediate in height. He observes, however, that no metric criteria have been set for these definitions. As neither archaeologists nor ceramists have yet defined the difference between pedestal and ring bases for Roaring Creek Red with exact measurement criteria, I have decided on a metric classification of my own for classifying a pedestal versus a ring base. For this analysis a pedestal base is classified as having a height greater than 16 mm and a ring base is 16 mm or less in height.

**Rim or Base Diameter (cm).** Using a rim diameter chart, I was able to ascertain the diameter of the entire vessel of which a rim sherd was once a part, using the angle of the outer edge of the rim. The same chart was used to determine the diameter of each base. Retrieving a correct diameter for the bases was difficult given their poor preservation, and the difficulty in reading the chart with the base covering it up, so I consider these measurements to be an approximation.

**Width of Rim or Height of Base (mm).** Using digital calipers, I measured the length of the lip of the rim from the inner to outer edge. The outside height of the pedestal/ring was taken from the bottom of the body of the bowl to the bottom of the pedestal/ring. This measurement was not taken for the two badly eroded bases as the original height of the pedestal could not be ascertained.

**Thickness of Rim or Base (mm).** This measurement indicates the thickness of the lip of the rim. For a base, the width of the base (inner to outer edges) was measured.

**Thickness of sherd (mm).** This measurement was taken at the farthest possible point from the rim or base where the value represents the average thickness of the vessel. In instances where the sherd was not much more than just the rim of the vessel, I took the measurement at whatever point seemed most representative of the thickness of the whole body of the vessel.

**Thickness of Rim Bend (mm).** This measurement was taken at the widest point where the rim sherd bends outward to create the lip of the bowl. This measurement was not taken for any of the bases.
Angle. Angle of the vessel walls was measured with a protractor on the drawings of the rim profiles in order to get an idea of the size of the body of the vessel without the rim. In the case of pedestal bases, I measured the angle of the base in relation to the surface upon which it sat. I did not take any angle measurements on ring bases.

Munsell Color. Using a Munsell Soil Color Chart, I was able to record an exact standard color for each sherd by choosing a sample area that was most representative of the overall color of the vessel. Only in one instance could a color not be chosen, as there was no slip to be found on one of the eroded bases (RIP 0025).

Provenience of Roaring Creek Red Sherds

Two Roaring Creek Red sherds were collected from Actun Chanona (Cave 21), which is the largest cave in the Hummingbird Karst area (Peterson 2003). The most important feature of this cave is the enormous platform found in its largest chamber, created by leveling huge boulders of rock fall. There is one altar on top of the platform. It was beneath a chimney entrance to the “catacombs” beneath the “great platform” that the two pottery sherds of were found. (P. Peterson, Field notes of the 2001 cave team). Glenwood Cave (Cave 12) is where the majority of the Roaring Creek Red ware was found. The cave is located in the Xibun Manatee Karst (Peterson 2001). There are at least two altars within the cave. The majority of the sherds were collected from a large scatter of broken vessels in front of an altar. Some of the sherds were found beneath rubble that seems to have been purposefully placed in the altar chamber, possibly indicating caching. Other sherds were found in the narrow passages leading to the altar room (P. Peterson, Field notes of the 1999 cave team). The presence of these sherds so close to a major ritual feature within the cave supports the notion that Roaring Creek Red was a vessel type that was well suited to religious observances within caves.

Observations and Trends

During the analysis, several facts about the Roaring Creek Red pottery became apparent. The most striking pattern is that all sherds had once been part of very large (40 cm diameter) bowls. There are no small Roaring Creek Red bowls. XARP members did not collect any jar fragments within caves, although they have been excavated from the settlements. Because this sample size is small, I hesitate to state that Roaring Creek Red jars were not placed in caves. This sample may not be representative of the actual ratio of bowls to jars that once existed in caves. Data on finds of Roaring Creek Red jars in caves of this region are scant, however Lopez Varela (2003:223) mentions that jars have been identified within caves. In this study, the presence of solely large bowls must be noted as a strong indicator that bowls of Roaring Creek Red played an important role, possibly as offertory vessels, within cave ceremonies.

Analysis of rim and base dimensions indicates that these vessels were standardized with only slight variation. For example, measurement of the rim sherds shows that they share similar dimensions (Figure 14.12). The thickness of the different parts of the bowl also does not vary greatly. The only large variation occurs in the width of the rims (a measurement taken from the inner to outer edge of the rim). The rims also show variation in the angle of the vessels of which they were once a part. Angle variation suggests that vessel size and shape varied slightly. This variation amongst vessel angles may well be attributable to change over time in fabrication styles for the Roaring Creek Red type. If so, then there is evidence that use of this type within the caves was accompanied by a variation in the size of the vessel, possibly over a long period...
Figure 14.12. Comparison of Rim Measurements among Roaring Creek Red Sherds.

of time. This finding is supported by another based on variation in rim diameters (Figure 14.14). Apparently, Maya potters were varying both the design of the rim and the overall size of the bowl, possibly over an extended period of time.

In contrast, bases show only slight differences in their dimensions (Figure 14.13). Several base measurements (height of base, thickness of base, and thickness of the overall sherd) suggest that there is more variation among bases. This false impression is caused by the fact that both ring and pedestal bases (which vary significantly in diameter, height, and width) have been grouped together in Figure 14.13 (note: RIP 0024 and 0026 are not included in this analysis as their heights were not measurable). When compared as two separate classes, there is not a great difference within the two classes. The height of the pedestals is the most variable, between 15 and 30 millimeters. The range of heights of ring bases is only 3.5 millimeters. When compared separately, ring and pedestal heights vary only slightly. Figure 14.13 also shows that the thickness of the bases varies between pedestal and ring bases. This could be due to the diameter of the bowl supported by the base. The thickness of the sherd is much more standardized in that again ring and pedestal base measurements vary little when compared separately. There is definite variation in the diameter of the bases, with an average of 14.7 cm but a standard deviation of at least 3 (Figure 14.15). These ranges could be demonstrative of slight design changes introduced over the years.

The angle of the bases is also standardized with only RIP 0001 from Actun Chanona displaying less than a 90 degree angle. Even with just one greatly varying angle, this shows that different styles of bases did occur, possibly accompanying a change in the size of the vessels.
Figure 14.13. Comparison of Base Measurements among Roaring Creek Red Sherds.

Figure 14.14. Rim Diameter of Roaring Creek Red Sherds.
Figure 14.15. Base Diameter of Roaring Creek Red Sherds.

Figure 14.16. Tall Pedestal Base, Roaring Creek Red Bowl.
Figure 14.17. Pedestal Base of Average Height, Roaring Creek Red Bowl.

sample and yet displays the thinnest walls and smallest diameter. A more typical base is shown in Figure 14.17, another complete base.

The most common rim form consists of a thick flat lip with a defined basal break, and a vessel body which angles outward at about a 35 to 40 degree angle (Figure 14.18). Variations in this shallow, open bowl form include a steeper angle of curve (about 50 degrees) which makes the side wall of the vessel more vertical, with a less pronounced basal break (Figure 14.19). This vertical wall can also be observed in Figure 14.20. The difference between the two is the shape of the vessel lip. In Figure 14.19, the lip is longer and flatter, and slightly thicker than the main part of the vessel whereas in Figure 14.20, the rim The common as well as the unique features of this sample are best discussed in tandem with illustrations. For example, Figure 14.16 shows a complete pedestal base which is the tallest within the follows the curve of the vessel, and does not outflare as the other rims do. The rim also has the same width as the body of the vessel, making the slope of the vessel much more dramatic.

Another distinction occurs in decoration—the main feature of Roaring Creek Red being the basal break which is present on all reasonable complete rim sherds except for one which featured a basal ridge instead (Figure 14.20). Another feature of note is a mend hole that occurs on RIP 0012 (Figure 14.19). The practice of mending this type of pottery could mean that its use was very important, or that it was being reused in the cave after being used for some other function.
Figure 14.18. Typical Rim Profile, Roaring Creek Red Bowl.

Figure 14.19. Profile of Roaring Creek Red Bowl with Steep-sided Wall and Rim.

Figure 14.20. Profile of Roaring Creek Red Bowl with Weakly Outflaring Rim and Basal Ridge.
This notion of standardization in the production of Roaring Creek Red bowls is supported by the uniformity in vessel color. The slip color was the same on most of the sherds (Munsell 10R 4/8 or 4/6), with only a couple of sherds varying slightly in their shade. Of the rims, only two varied from a red color. They were instead a dark red, whereas bases were only red (in the region of 10R). The vessels from Actun Chanona, although red in color, had a slightly different hue to them that placed them in a category of coloring that was more yellow (2.5 YR). This slight differentiation in color between the two sites illustrates that Roaring Creek Red was produced across a large region, but it was made in slightly different ways in each settlement. This overall color uniformity suggests that the process for making this slip in each area was either very well known or produced by one potter. Could these vessels represent only one age, or are they a collection that built up over many many years? With the current variation in mind, the sample appears to have built up over time as the result of the transport into caves of vessels created by specialized potters. Over time, the design changed slightly which means that extremely similar Roaring Creek Red vessels were left in the caves with only minor differences amongst them.

Conclusions

This analysis supports the idea that standardization existed within the sample of Roaring Creek Red pottery examined from two caves. Most of the measurements are very similar from sherd to sherd. On average, the large bowls measure 40 cm in diameter and bases on average 14 cm in diameter. They only differ in places where design could very well have caused changes in the measurements of the sherds, such as in the diameter of the vessels and bases, the width of the rim, and the height of the bases. The other areas that were measured varied in minuscule amounts. I believe this demonstrates that this type exhibits only subtle design change over time, but maintains a basic uniformity. A more extensive study could evaluate whether Roaring Creek Red varied by area both within the Sibun valley (caves and settlements) and between the Sibun valley and the Belize valley where the type was first identified. Although this sample consisted only of bowls, this does not mean that jars were not also present in the caves at some point. We cannot forget that this dataset may not be representative of all Roaring Creek Red sherds that were once present in the caves. Nonetheless, the large open bowl form of the Roaring Creek Red type does seem admirably suited to serving as a receptacle for offerings to the denizens of the Underworld. Although it cannot be said whether these bowls were made specifically to be part of cave ceremonies, they were ultimately left in proximity to important ritual features within both Actun Chanona and Glenwood Cave. A more extensive study of this pottery type—from both caves and settlements—is needed to reach a final judgment on the significance of Roaring Creek Red bowls in Late-Terminal Classic Maya society.

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Chapter 15
Chipped Stone Tools and Debitage from Selected Contexts

Lauren M. Bateman and Keith McIntosh

Part I: A Comparison of Lithic Production at Samuel Oshon and Cedar Bank

Lauren Bateman

The Sibun River Valley contains Maya archaeological sites spanning a temporal range from the Archaic-period—represented by a Lowe projectile point—to the Spanish Colonial period—represented by majolica ceramics and metal artifacts at Cedar Bank. Along with the variety of temporal periods there are many different types of sites from religious to residential and everything in between. The careful excavations and lab analyses of the 2003 Xibun Archaeological Research Project (XARP) have expanded our knowledge of the Xibun Maya. Through the analysis of ceramics, plant and animal remains, lithics, and other data, light has been shed on many aspects of Maya life.

Flaked stone tools were very important to the Xibun Maya as utilitarian objects and ritual offerings. These tools can tell us much about the occupants of a site and of the role that the site served within a greater region (e.g., for residential, ritual, or economic purposes). Stone tools move through a number of reduction phases and though a tool may be completed at one site it does not necessarily mean that its primary reduction phases also occurred at that site. From the analysis of debitage “it is possible to gain valuable insights into site-specific reduction/production strategies” (Yohe 2002:52). As Yohe (2002:52) notes, “until recently, debitage was not considered to be particularly significant to our understanding of human behavior and in some instances was not collected at all during archaeological excavations.” In contrast, XARP members have devoted much time and energy to the study of lithic remains, be they finely made bifacial tools or microdebitage.

This study is an analysis of debitage from two Sibun Valley sites—Samuel Oshon (SOS) and Cedar Bank (CB). Samuel Oshon was occupied during the Terminal Classic and Postclassic periods while Cedar Bank saw sporadic settlement from the Terminal Classic through British Colonial periods. The purpose of this study is to compare lithic production stages detectable in midden context at the two sites.

The Samples

This study included 325 pieces of debitage and four tools from the two sites. One hundred fifty-nine pieces of debitage and three tools were analyzed from Operation 25, Zone 4, Square B, a midden deposit from the Samuel Oshon site located near the northwest corner of Structure 424. One hundred sixty-six pieces of debitage and one tool were analyzed from Cedar Bank, Operation 40, Zone 2, Squares A, B, and C, a midden deposit located in front of a retaining wall at the base of Structure 351. All of the debitage from the Operation 25 Zone 4 midden deposit was analyzed while only a sample of the debitage from the Operation 40 Zone 2 midden was analyzed, specifically those pieces from the squares listed above.
Protocols for Lithics Analysis

This analysis was modeled after the “Protocol for Analyzing K’axob Lithics” developed by Polly A. Peterson and Patricia A. McAnany and was modified to suit the requirements of the Sibun Valley sites. The protocol for analyzing debitage began by recording provenience and then examining each piece of debitage for the following characteristics—debitage type, raw material, condition, attributes of cortex, number of dorsal scars, platform characteristics, analysis of use-wear through polish and marginal edge wear or retouch. Observations also included the measurement of maximum length, width, and thickness of each piece and a group weight by zone totals.

To determine debitage type, the following classifications were used: quarry blank, core (a piece from which flakes have been removed), core tool (a core utilized later as a tool), flake (having a bulb of percussion, platform, and smooth ventral surface; Figure 15.1), flake fragment (broken flake lacking flake features), fire shatter (burnt or cracked debris lacking flake features), angular debris (angular chunks instead of flakes), and flake tool (a flake later utilized as a tool).

![Figure 15.1. Flake features monitored in this analysis.](image)

Raw material identification was based solely on the color of the sample. The most challenging part of this analysis was the determination of chert type. Previous studies by Christa D. Cesario (2003) and M. Margaret Abercrombie (2003) had acknowledged the difficulty of determining the difference between Northern Belizean chert (also known as Colha chert) and chert found locally in the Lower Sibun Valley. Because of their close similarities, both McIntosh (see below) and I based our classification solely on color and presence of banding. The colors chosen were honey-colored chert (dark brown/caramel colored), banded honey-colored chert, tan chert (light brown), banded tan chert, gray chert, banded gray chert, and
tan/grey chert (equally tan and gray). Those pieces of chert unidentifiable due to alteration caused by patination or burning were classified as “unknown chert due to alteration.”

The present condition of each specimen was noted: i.e., whether the piece was unaltered, burnt, patinated, exhibited both burning and patination, or showed modern damage. Burnt pieces of debitage display a black, grayish, or red color, a uniform layer of polish, and may possess potlidding, which are cavities on the surface of a sample caused by heating. Patination is caused by prolonged chemical weathering making the surface of the chert looked frosted or speckled in white. Modern damage caused by plowing or from excavation is identifiable as sharps chunks removed from the surface of a sample.

After determining the condition of each lithic, different attributes of each piece were recorded. First, the amount of cortex present was determined. Cortex plays an important part in identifying the stage of reduction in tool-making. A piece with a large amount of cortex would indicate a primary phase of reduction while a piece lacking cortex would represent a later phase of reduction, such as retouch flaking. Second, the number of dorsal scars (or flake scars) was noted for each flake and flake fragment. Dorsal scars help in the identification of the type of reduction occurring at a certain site. A piece with few flake scars would represent a primary phase of reduction while a piece with numerous scars might indicate the resharp tooling a utilized tool. Finally, the platform of each flake and flake fragment (if present) was examined. The platform is the surface where a hammer was used to remove a flake from a tool or core. Platforms characteristic of biface resharping, or late-stage biface production, are two-sided and peaked and often possess use-wear polish.

Use-wear was determined by examining polish and marginal retouch or edge-wear. Polish is the result of the repeated use of a tool and could be present on the ridges, in the troughs, or both. Polish on a flake platform or dorsal surface is evidence of tool retouch. The more polish present on a surface, the more the tool was utilized before resharpening. Edge-wear on a flake indicates its use after its removal from a core or tool.

The protocol used for analyzing stone tools is very similar to that used for debitage and began by recording provenience and then examining each tool for the following characteristics: tool type, raw material, condition, attributes of cortex and completeness of sample, analysis of use-wear through polish and type of use-wear. Finally, the maximum length, width, thickness and weight of each tool were measured.

Tool type was divided into a number of categories including a non-diagnostic tool fragment, biface, blade, hammerstone, burin, side scraper, projectile point, end scraper, and wedge-shaped/ T-shaped uniface. The specimen was either complete, a proximal fragment, medial fragment, distal fragment, or a non-diagnostic fragment. Polish could be present in troughs, on ridges (usually signaling haft polish), present both in troughs and on ridges, or could be a type of polish resulting from a qualitatively different activity such as the preparation of a ground celt. The types of use-wear included categories of breakage such as a bend break, end-shock fracture, battering and/or crushing, step-flaking, edge rounding, microflaking, or none at all.

**Analysis of the Debitage**

**Debitage Types.** Flakes and flake fragments make up a majority of the debitage types from Cedar Bank and Samuel Oshon (Table 15.1). Seventy-seven percent of the debitage from Oshon was a flake or
flake fragment as compared to 78% of the debitage from Cedar Bank. Both sites have a small percentage of angular debris. Cedar Bank contains slightly more fire shatter than the Oshon site and that difference could be caused by modern burning since Zone 2 was located close to the surface. The high percentage of flake and flake fragments is clear evidence that stone tool production and maintenance of stone tools was taking place at both Cedar Bank and Oshon.

<table>
<thead>
<tr>
<th>Site</th>
<th>% Core Tool</th>
<th>% Flake Tool</th>
<th>% Flake Fragment</th>
<th>% Fire Shatter</th>
<th>% Angular Debris</th>
<th>% Flake Tool</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshon</td>
<td>1</td>
<td>47</td>
<td>30</td>
<td>6</td>
<td>14</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Cedar Bank</td>
<td>&lt;1</td>
<td>40</td>
<td>38</td>
<td>11</td>
<td>10</td>
<td>&lt;1</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 15.1. Debitage Types by Percentage for Each Site.

The Cedar Bank sample included one flake tool and no core tools while the Oshon sample contained two core tools and one flake tool. The flake tool at Cedar Bank likely was used as a blade since it was polished over its entire surface and retouched along both lateral margins. The flake tool from Oshon Site was also likely used as a blade (Figure 15.2). Cortex was present on almost half of its dorsal side and it retained its bulb of percussion though the platform was broken off. The distal end featured patterned retouch from resharpening of the tool.

![Figure 15.2. Flake tool with cortex on dorsal face (SOS, Op. 25, Zone 4).](image)

One of the core tools found at Oshon was a chunky biface with polish along the ridges and in the troughs accompanied by retouch around the edges. The other core tool had been used as a hammerstone or as a pecking stone (Figure 15.3). Multiple areas of cortex were present with concentrated crushing and battering.
Figure 15.3. Core utilized as a hammerstone (SOS, Op. 25, Zone 4).

Raw Material. While the inhabitants of Oshon used a wide variety of raw materials, over 50% of the chert could be classified as either tan chert or gray chert and almost 20% of the chert used as honey-colored chert (Table 15.2). Chert at Cedar Bank seems to be divided among tan and honey-colored chert with twenty-two percent of the chert being tan chert while fifteen percent was honey-colored chert. Although the source has yet to be located, there likely is a chert source proximate to the Oshon site and thus its residents had access to a greater variety of chert types than at Cedar Bank, which appears to lack a local quarry. However, it is hard to get a true understanding of the chert types used at Cedar Bank because 53% of the analyzed debitage was classified as unknown due to some type of alteration (Table 15.2).

<table>
<thead>
<tr>
<th>Site</th>
<th>% Unknown due to Alteration</th>
<th>% Honey-colored chert</th>
<th>% Honey-colored banded chert</th>
<th>% Tan chert</th>
<th>% Tan Banded chert</th>
<th>% Gray chert</th>
<th>% Gray banded chert</th>
<th>% Tan/Gray chert</th>
<th>Total</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshon</td>
<td>18</td>
<td>18</td>
<td>1</td>
<td>25</td>
<td>6</td>
<td>26</td>
<td>2</td>
<td>4</td>
<td>100</td>
<td>159</td>
</tr>
<tr>
<td>Cedar Bank</td>
<td>53</td>
<td>15</td>
<td>0</td>
<td>22</td>
<td>&lt;1</td>
<td>9</td>
<td>&lt;1</td>
<td>0</td>
<td>100</td>
<td>166</td>
</tr>
</tbody>
</table>

Table 15.2. Raw Material by Percentage for Each Site.

Debitage Condition. Almost two-thirds of the debitage at the Oshon site was not altered while only 16% was burned and 20% patinated (Table 15.3). In contrast, the debitage at Cedar Bank was profoundly altered with only 28% exhibiting no burning or patination. Fifty percent of the Cedar Bank sample was burned while another 22% was patinated from surface exposure. These alterations likely were caused by post-depositional weathering and burning. Because of the shallow depth of Zone 2, it is possible that modern burning episodes have affected the condition of the debitage at Cedar Bank more profoundly than the debitage collected from the deeper Zone 4 of the Oshon site. Also, one cannot assume that the same post depositional events occurred at each site and therefore we should not draw general conclusions from these results.
Debitage Cortex. As mentioned earlier, the amount of cortex present on debitage can indicate the stage of lithic reduction. Despite the fabled proximity to Oshon of a chert source, debitage from both Oshon and Cedar Bank sites show relatively similar percentages of cortex (Table 15.4). Only 17% of the total debitage at Oshon possessed any cortex at all and Cedar Bank debitage actually showed slightly more pieces with cortex present. During stone tool production the cortical layer surrounding a chert nodule would be removed. From the amount of cortex present at both sites we can assume that a moderate amount of primary reduction occurred at these sites. But with cortex absent on 83% of the Oshon debitage and on 74% of the Cedar Bank debitage, we can assume that not only was primary reduction occurring at these sites but also tool manufacture and maintenance.

Dorsal Scar Patterns. For both Cedar Bank and Oshon sites, most of the debitage consisted of flakes containing less than one to two dorsal scars per cubic cm (Table 15.5). For Oshon, 47% of flakes possess less than three dorsal scars per cubic cm while 50% Cedar Bank debitage contains less than three dorsal scars per cubic cm. Since about half of the flakes from both sites display less than three dorsal scars per cubic cm, it would seem that both sites employed primary phases of reduction. Tool shaping also may have taken place at both of these sites as well; about one fifth of the debitage from each site contains greater than three dorsal scars per cubic cm. Flakes possessing greater than five dorsal scars per cubic cm (5% at both sites) imply that tool production occurred relatively infrequently at both Cedar Bank and Samuel Oshon sites.
Table 15.5. Dorsal Scars (per cubic cm) for Flakes from Each Site.

<table>
<thead>
<tr>
<th>Site</th>
<th>% Non-flake debitage</th>
<th>% &lt;1</th>
<th>% 1-2</th>
<th>% 2-3</th>
<th>% 3-5</th>
<th>% &gt;5</th>
<th>% Total</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshon</td>
<td>23</td>
<td>24</td>
<td>18</td>
<td>14</td>
<td>16</td>
<td>5</td>
<td>100</td>
<td>159</td>
</tr>
<tr>
<td>Cedar Bank</td>
<td>22</td>
<td>23</td>
<td>27</td>
<td>9</td>
<td>14</td>
<td>5</td>
<td>100</td>
<td>166</td>
</tr>
</tbody>
</table>

Use Wear, Retouch, and Bifacial Platforms. Once again, both sites show similar patterns in terms of the percentage of flakes with polish, retouch, and a bifacial platform (Table 15.6). Since flakes with polish were removed from a tool that had been utilized, the presence of polish indicates that some type of tool maintenance took place at the site. Flakes from Samuel Oshon and Cedar Bank exhibit polish at frequencies of 19% and 17%, respectively, showing that a marginal amount of tool maintenance was taking place at both sites.

Table 15.6. Flakes with Polish, Marginal Retouch, or a Bifacial Platform by Percentage for Each Site.

<table>
<thead>
<tr>
<th>Site</th>
<th>% Polish</th>
<th>% Retouched Pieces</th>
<th>% Biface Platforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshon</td>
<td>19</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Cedar Bank</td>
<td>17</td>
<td>12</td>
<td>19</td>
</tr>
</tbody>
</table>

Few flakes from either site possessed marginal retouch—only 10% from Cedar Bank and 12% from Samuel Oshon. At both sites, 19% of the flakes with platforms exhibited bifacial platforms. Debitage with a characteristic bifacial platform, especially those with polish, come from a utilized tool that was resharpened. These relatively low percentages infer that some minor tool maintenance was taking place at both sites.

Debitage Dimensions. For the calculation of average measurements, the large Oshon site core tool was omitted from the sample because it greatly skewed the results. Even so, the weight for Oshon debitage is more than twice as much as that at Cedar Bank (Table 15.7). The debitage from the Oshon site is slightly larger than that of the Cedar Bank site and the Oshon sample contained more cores than Cedar Bank, which would increase the weight. The size range of debitage from both sites varied greatly from small to large flakes. More than two-thirds of the flakes are distributed between 9.83 and 32.37 mm (std. dev. = 11.27 mm) in length at Cedar bank and between 9.88 and 25.93 mm (std. dev. = 8.02 mm) at Samuel Oshon.
Table 15.7. Grouped Weight and Average Length, Width, and Thickness of Debitage by Site.

Analysis of the Stone Tools

The majority of tool types are bifaces—one oval biface, and two non-diagnostic biface fragments—all of which were found at Oshon. The other tool examined was a side-notched projectile point from Cedar Bank. None of the tools examined was complete and all were produced from either gray chert or tan chert. Specifically, all bifaces were made of gray chert while the projectile point was made of tan chert.

The oval biface fragment found at Oshon was 57.45 mm long, 48.94 mm wide, 12.12 mm thick, and weighed 42.60 g (Table 15.8). The tool was slightly patinated and incomplete due to a bend break fracture. A proximal fragment with polish present on the ridges (likely from hafting), the biface possessed marginal step-flaking, rounded edges, and some microflaking (Figure 15.4).

Table 15.8. Dimensions and Weight for Each Tool.

<table>
<thead>
<tr>
<th>Site</th>
<th>Weight (g) Per Zone</th>
<th>Average Length (mm)</th>
<th>Average Width (mm)</th>
<th>Average Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oshon</td>
<td>599</td>
<td>21.10</td>
<td>14.19</td>
<td>5.01</td>
</tr>
<tr>
<td>Cedar Bank</td>
<td>272.3</td>
<td>17.91</td>
<td>12.22</td>
<td>4.83</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Max. Length (mm)</th>
<th>Max. Width (mm)</th>
<th>Max. Thickness (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oval Biface Fragment</td>
<td>57.45</td>
<td>48.94</td>
<td>12.12</td>
<td>42.6</td>
</tr>
<tr>
<td>Medial Biface Fragment</td>
<td>58.72</td>
<td>22.4</td>
<td>11.23</td>
<td>16</td>
</tr>
<tr>
<td>Distal Biface Fragment</td>
<td>40.2</td>
<td>31.02</td>
<td>9.6</td>
<td>8.9</td>
</tr>
<tr>
<td>Projectile Point Fragment</td>
<td>14.37</td>
<td>11.23</td>
<td>3.49</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Table 15.8. Dimensions and Weight for Each Tool.
The other bifaces found at Oshon are nondiagnostic pieces, one being a medial fragment while the other is a distal fragment; both are broken from bend-break fractures (Figures 15.5 and 15.6). The surface of both pieces was slightly patinated. The distal biface fragment did not contain polish but the edges of the tool showed signs of retouch in the form of step-flaking and some microflaking. The medial biface fragment exhibited very high polish over the surface of the tool, indicating that this was a heavily utilized tool. After breakage, the fragment was later utilized, as flakes had been removed from the broken edge.
Figure 15.6. Medial biface fragment displaying bend break (SOS, Op. 25, Zone 4).

The Postclassic side-notched projectile point measured 14.37 mm in length, 11.23 mm in width, 3.49 mm in thickness, and weighed only 1.10g (Figure 15.7). There was slight patination on the surface of the tool. The projectile point seems to have been made by an experienced craftsman because of the very fine flakes removed to form the edges of the tool. Being a weapon it is assumed that this projectile point was probably used for hunting purposes; polish was present on both surfaces.

Figure 15.7. Side-notched projectile point (CB, Op. 40, Zone 2).
Conclusions

The comparative analysis of debitage from Oshon and Cedar Bank sites suggests that similar types of tool production were occurring at both sites. The lack of a large percentage of debitage with bifacial platforms, polish, and retouch suggests that primary reduction was a focus for these sites. The high percentage of low dorsal scar counts and presence of debitage with a substantial percentage of cortex also suggests that this is the case. A possible source near the Oshon site would explain the presence of cores and core tools at this site. The proximity of another chert source near the site of Cedar Bank—given the similarity of the lithic reduction signatures between the two sites—provides a question to be explored in the future.

The high number of flakes and flake fragments found at the site combined with the varying sizes of debitage and presence of a small sample of bifacial platforms with polish and retouch suggests that some tool production and maintenance was also occurring at these sites. Through the small sample of tools, we can see that Cedar Bank residents utilized bow and arrow technology. Margaret Abercrombie (2003) has shown that Oshon, also having a Postclassic element, possessed this type of stone tool technology as well.

Occupants of both Cedar Bank and Samuel Oshon engaged in tool production within the Sibun Valley. The evidence shows that even without a known local chert source, Cedar Bank residents were able to obtain chert for tool production, probably from sites like Samuel Oshon that had relatively large quantities at its disposal for tool production.

Part II: Analysis of Debitage from Residential Contexts at Augustine Obispo and Cedar Bank
Keith McIntosh

For the purposes of this study, debitage is defined as the “flakes, shatter, and other debris from the manufacture or maintenance of flaked stone tools” (Yohe 2002:52). The focus of this particular study is debitage from residential contexts. While XARP 2003 investigated six sites, this analysis focuses on material only from the Augustine Obispo site (AOS) in Transect 5 and the Cedar Bank site (CB) in Transect 4. Both sites are on the banks of the Sibun River, and the Obispo site is located approximately 10 km northeast of the Cedar Bank site.

Sampling Method

The sites were chosen both because of their proximity to each other and due to the presence of residential construction. The goal of this study was to discover similarities and differences in flaked tool production between these two sites. From the Cedar Bank Site, Operation 41—located on the top of a residential mound—was selected (see Chapter 5, this volume, for details of excavation). From the Obispo site, Operation 33—also located on top of a residential mound—was selected as a comparative sample (see Chapter 4, this volume, for details of excavation). From these two selected operations, the debitage sample was drawn strictly from deposit types described as “earthen layers.” These are deposits of both inorganic and organic materials often used to build up the elevation of a platform mound. Contexts explicitly labeled construction fill, wall, or floor were excluded in order to control for context. For a study of midden contexts from these two sites, see Bateman’s preceding analysis.
A total of 226 pieces of debitage were sampled from the two sites: 113 from each operation. In order to draw a sample, the Lab Classification Bag numbers from each operation were written on a sheet of paper and an identical number of debitage pieces selected from the earthen layers of each operation. The debitage from AOS was sampled from squares A, D, E, and F of Zone 2 while the debitage from CB was taken from squares A, B, C, D, and G of Zones 1, 3, 5, 6, and 10.

Protocols for Analysis

Identical protocols for lithic analysis were adapted by both authors. For a description of these procedures, please see the section entitled “Protocols of Lithics Analysis” in Part I of this chapter.

Analysis of the Debitage

Debitage Types. The majority of the debitage from both AOS and CB are either flakes (Figure 15.8) or flake fragments: 48% of AOS debitage are flakes, as are 41% of CB debitage (Table 15.9). Flake fragments comprise 19% of AOS debitage and 28% of CB debitage. Also significant is the amount of fire shatter and angular debris. Fire shatter (Figure 15.9) accounts for 17% of AOS debitage and 10% of CB debitage. Angular debris (Figure 15.10) is roughly equivalent, comprising 16% of AOS debitage and 15% of CB debitage. Totaling 3% or less for either site are cores, core tools, and flake tools. Similarities in the percentages of debitage types indicate that flint-knappers at both AOS and CB likely practiced similar reduction strategies. The abundance of flakes is probably due to the presence of primary reduction at both sites. Neither site seemed to suffer any shortage of chert and thus, many flakes and flake fragments were produced and discarded.

Figure 15.8. Typical flake from debitage sample (AOS, Op. 33, Zone2, Sq. F)

<table>
<thead>
<tr>
<th>Site</th>
<th>% Core</th>
<th>% Core Tool</th>
<th>% Flake</th>
<th>% Flake Fragment</th>
<th>% Fire Shatter</th>
<th>% Angular Debris</th>
<th>% Flake Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>0</td>
<td>0</td>
<td>48</td>
<td>19</td>
<td>17</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>2</td>
<td>1</td>
<td>41</td>
<td>28</td>
<td>10</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 15.9. Percentage of Different Debitage Types.
Raw Material. Much of the debitage recovered from both sites was of an undeterminable raw material due to alteration, be it burning or patination. Twenty seven percent of AOS debitage was undeterminable and 25% of CB debitage was undeterminable (Table 15.10). The next highest percentage for both sites was “honey-colored chert”, with 23% at AOS and 16% at CB. In general, the raw material assemblages from each site display very similar percentages, with honey, tan, and gray chert being the most commonly used chert at both sites. There does exist a higher proportion of the honey-colored chert at AOS; perhaps a honey-colored chert source was located in closer proximity to AOS than to CB.

Condition. At both sites, the most common condition for debitage was unaltered: 52% of AOS debitage and 50% of CB debitage (Table 15.11). Only one quarter of both the AOS and CB debitage showed signs of burning. Patination was less common at AOS with patination (13% of AOS debitage) while CB had 22% debitage with patination. Nine percent of AOS debitage was burned and patinated while 3% of CB debitage showed both burning and patination. The large amount of unaltered debitage and
conversely the lack of much patinated debitage is a sign of the quick burial of the debitage. The Sibun River is known to flood both sites, depositing alluvial material over the area. The debitage that shows signs of burning could be the result of natural fires, hearth fires, or fires for agricultural purposes.

*Cortex.* Tertiary flakes, those with no cortex, comprise 65% of AOS debitage and 50% of CB debitage (Table 15.12). Secondary flakes, those containing some cortex on their dorsal aspect, make up 16% of AOS debitage and 47% of CB debitage. Primary flakes, those with a dorsal aspect completely covered by cortex, comprise 19% of AOS debitage and only 3% of CB debitage. According to Yohe (2002:56), “a comparatively high incidence of primary flakes (usually >25%, based on experimental data)...would be indicative of quarrying activity involving early-stage raw material reduction.” While primary flakes do not account for 25% of the debitage at AOS, the 19% they do account for is very significant. As was postulated in earlier XARP field seasons, it is likely that there is a chert source in close proximity to AOS.

<table>
<thead>
<tr>
<th>Site</th>
<th>Cortex Absent</th>
<th>Less Than 50% Cortical</th>
<th>More Than 50% Cortical and Less Than 90% Cortical</th>
<th>More Than 90% Cortical</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>65</td>
<td>6</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>50</td>
<td>25</td>
<td>22</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 15.12. Cortex on Debitage by Percentage.

*Number of Dorsal Scars.* Most of the debitage analyzed from both AOS and CB have a relatively low dorsal scar counts (Table 15.13). The lack of numerous dorsal scars is an indication that the flakes were removed from a core in the early stage of production. The number of dorsal scars present on a flake indicates that at least that many flakes had been removed from the core or tool prior to the flake under study being removed. While some flakes with high dorsal scar counts are present, the majority fall under 5 dorsal scars per flake.

Table 15.10. Percentage of Each Raw Material Type.

Table 15.11. Condition of Debitage by Percentages.
Platform Characteristics. Much of the debitage in the sample does not contain a platform: 45% of AOS debitage and 52% of CB debitage (Table 15.14). Much of this debitage consists of distal flake fragments, fire shatter, and angular debris, all of which lack striking platforms. On the other hand, 7% of AOS flakes and 15% of CB flakes contained platforms with characteristics indicative of detachment from a biface. These flakes are the result of the resharpening of bifacial tools. Forty-eight percent of AOS flakes with platforms and 33% of CB platform-bearing flakes had not been detached from a biface. The large proportion of flakes or proximal flake fragments with platforms that are not diagnostic of biface reduction or resharpening are likely the result of primary reduction, reinforcing the idea of a quarry in close proximity.

<table>
<thead>
<tr>
<th>Site</th>
<th>0 Dorsal Scars</th>
<th>1 Dorsal Scar</th>
<th>2 Dorsal Scars</th>
<th>3 Dorsal Scars</th>
<th>4 Dorsal Scars</th>
<th>5 Dorsal Scars</th>
<th>6 Dorsal Scars</th>
<th>7 Dorsal Scars</th>
<th>8 Dorsal Scars</th>
<th>9 Dorsal Scars</th>
<th>10 Dorsal Scars</th>
<th>11 Dorsal Scars</th>
<th>12 Dorsal Scars</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>36</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>26</td>
<td>9</td>
<td>11</td>
<td>17</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 15.13. Number of Dorsal Scars on Debitage Grouped by Percentages.

Polish. Forty-three percent of AOS debitage and 51% of CB debitage lack polish (Table 15.15). Much of the observed polish occurred on flakes with bifacial platforms, indicating that a well used biface had been resharpened.

<table>
<thead>
<tr>
<th>Site</th>
<th>Polish Absent</th>
<th>Polish Present Only in Troughs</th>
<th>Polish Present Only on Ridges</th>
<th>Polish Present on Troughs and Ridges</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>43</td>
<td>12</td>
<td>17</td>
<td>28</td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>51</td>
<td>6</td>
<td>21</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 15.15. Types of Polish on Flakes by Percentage.

Marginal Edge-wear/Retouch. Eight percent of AOS debitage exhibited edge-wear or retouch, as did 6% of CB debitage (Table 15.16 and Figure 15.11). The lack of edge-wear/retouch is significant because it points toward primary production as opposed to reworking of tools.

<table>
<thead>
<tr>
<th>Site</th>
<th>Marginal Edge-wear/Retouch Absent</th>
<th>Marginal Edge-wear/Retouch Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>92</td>
<td>8</td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>94</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 15.16. Presence/Absence of Marginal Edge-Wear and Retouch.
Measurements. Debitage from the two sites exhibits very similar average dimensional measurements (Table 15.17). The similarities further lead me to assume that the modes of production at the two site were likely very similar. Relatively uncommon in the sampled debitage is microdebitage that would be indicative of resharpening and re-use activities. The lack of microdebitage could be due to simple lack of recovery (in general, 1/4” screen was used) or its absence in the analyzed deposits.

<table>
<thead>
<tr>
<th>Site</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOS (N=113)</td>
<td>19.351</td>
<td>17.076</td>
<td>6.274</td>
</tr>
<tr>
<td>CB (N=113)</td>
<td>19.928</td>
<td>14.816</td>
<td>5.957</td>
</tr>
</tbody>
</table>

Table 15.17. Average Dimensions (mm) of Debitage.

Conclusions

This comparison of AOS and CB debitage from residential contexts has shed some light on tool production of the lower Sibun Valley. This research reinforces the idea of a chert source located in proximity to AOS and highlights the possibility of another source near CB. The amount of cortex found at both sites, but especially at AOS provides the strongest evidence to support the presence of primary reduction. There was no shortage of chert as can be seen in the large number of flakes and flake fragments that were discarded without marginal edge-wear or retouch. Sufficient chert was readily available so that conservation measures did not need to be invoked. Despite the chronological differences in the period of occupation at the two sites, Cedar Bank and Augustine Obispo exhibit similar percentages of raw material types; most likely, they were acquiring chert from the same quarry. The majority of the chert utilized was of a good quality, tough not exceptional. There was no need to use inferior limestone or other raw materials.
Thanks to the repeated flooding of the Sibun River, much information has been buried and preserved. Unlike many other artifacts, debitage is not compromised by inundation and burial. As this report has shown, with proper analysis the once neglected study of debitage can tell us much about people, production, and lifeways that otherwise would be inaccessible.

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Obsidian, a form of volcanic glass, was a valuable commodity in ancient Mesoamerica. Notable for cutting edges sharper than a modern razor, obsidian blades and bifaces were used for a number of everyday as well as ritualistic functions. For the XARP project, the study of obsidian is the study of long-distance trade into the Sibun River Valley as there are no local sources of volcanic glass in the Maya Lowlands. The presence of obsidian in the Sibun River Valley is a physical record of commerce with distant regions of Guatemala and Mexico. The forms in which obsidian has been found in the Sibun area help to define how this obsidian was transported into the region and how much tool production occurred on site.

Obsidian recovered during the XARP 2003 season from the sites of Samuel Oshon, Augustine Obispo, and Cedar Bank was analyzed. Due to time constraints, obsidian recovered from the Hershey Site and Queso Blanco was excluded from this preliminary report and it is hoped that the pieces found at these sites will be included in further studies of obsidian from this field season. The numbers of obsidian fragments found at each site exhibit significant variability (Table 16.1).

Data obtained from each blade was entered individually into a database. In addition to the information gained through the study of the recovered obsidian pieces, various unique obsidian objects were found at each of the analyzed sites and their nature and implications will be addressed as well.

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Operation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar Bank</td>
<td>Surface Collection</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Shovel Test Pit</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>3</td>
</tr>
<tr>
<td>Oshon</td>
<td>Shovel Test Pit</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>62</td>
</tr>
<tr>
<td>Obispo</td>
<td>32</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>67</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>382</td>
</tr>
</tbody>
</table>

Table 16.1. Total Number of Obsidian Artifacts by Site.
Methods of Analysis

During the XARP 2003 field season, 382 pieces of obsidian were recovered from the Cedar Bank, Samuel Oshon, and Augustine Obispo sites. A Microsoft Excel database, initially created by Ben Thomas for obsidian from previous seasons, was used for data recording. A number of aspects of each obsidian piece were recorded in hopes that various comparisons can be made and trends can be detected in the obsidian found throughout the field season.

The first step in the analysis of XARP obsidian was the assignment of a unique obsidian number (OB#) to each individual piece. These numbers, which are written on the fragment’s bag, will stay with the obsidian piece to link it to the obsidian database. Numbers only indicate the order in which the pieces were analyzed and do not denote location or time of discovery. In this project, which started where the numbering from the previous previous season left off, obsidian pieces were numbered OB# 574 through OB# 957.

Provenience information was the next variable recorded, including operation and zone numbers as well as the square in which each obsidian piece was found. If the artifact was found in a shovel test pit, the test pit number as well as the site initials (CB for Cedar Bank, SOS the Samuel Oshon Site, and AOS for the Augustine Obispo Site) were recorded to prevent confusion from duplicate numbers. The deposit type in which the obsidian fragment was found was recorded as well.

Next, important physical characteristics of the obsidian fragments were recorded. Whether the piece was a blade, flake, core, or “other” was noted under Obsidian Type. A blade is defined as any obsidian piece that shows evidence of two parallel edges, a flat ventral side, at least one dorsal ridge, and is at least twice as long as it was wide (Hester et al. 1971). All of the identified blades are considered prismatic which means that they have one or more dorsal ridge making them triangular or trapezoidal in cross section (Crabtree 1968; Hester et al. 1971). A flake is defined as any piece of obsidian with flake scars and a length that is less than twice its width (Clark and Bryant 1997; see Figure 16.1a). A core is defined as a polyhedral piece of obsidian prepared with multiple faces for the purpose of prismatic blade removal (Hirth and Andrews 2002; see Figures 16.1b and 16.1c). Other unique and isolated obsidian shapes were individually noted.

If the piece was identified as a blade, the portion of the blade represented was recorded in the “segment” category. The blade was considered proximal if a bulb of percussion was present (Figure 16.2a) or, in the event that the bulb was damaged beyond recognition, if there was evidence of a ground or flaked prepared platform. The blade segment was labeled distal if it terminated naturally without a break (Figure 16.2b). Often the distal end was curved downward or slightly to the right or left. A blade segment was classified as medial if there was neither a natural termination nor a bulb of percussion but the piece obviously came from a blade at some point between the proximal and distal ends (Figure 16.2c). The blade was considered complete if all three segment types (proximal, medial, and distal) were present in a single piece (Figure 16.2d).

If the blade fragment was identified as distal, the form of blade termination was recorded. These distal tips were termed rounded, pointed, or flat with regards to end shape. If the blade was described as proximal then the type of platform preparation was recorded. A platform is defined as the surface of the initial obsidian core from which blades are removed by pressure or percussion (Shafer 1969). If the very end of the proximal edge was flattened and pitted with no evidence of flaking than the platform was
described as ground. This means that the end of the obsidian core from which the blade was produced had been ground down to produce a roughened but flat surface on which to manufacture blades with pressure flaking. If there is no evidence of a ground surface and the platform has an irregular shape, then it is described as flaked. This means that the end of the obsidian core was flaked into shape to produce a platform from which blades could be removed. A few proximal blade fragments showed evidence of a ground as well as flaked platform and were coded as such. If a blade was described as complete then both the distal end form and the proximal platform preparation were noted.
Another physical aspect of the obsidian blades that was noted was the shape of the blade itself in cross section. If the blade had one central ridge, the piece was described as triangular (Figure 16.3a). If the blade featured two parallel central ridges the blade was described as trapezoidal (Figure 16.3b). The manufacturer determined the shape of an obsidian blade. To produce a triangular blade a knapper would pressure flake a piece from the ridge of a prepared core. To produce a trapezoidal blade, a knapper would position the hammer over the depression between ridges.

![Figure 16.3](image)

**Figure 16.3. Variations in blade cross-sections: (a) triangular blade; (b) trapezoidal blade.**

The quantitative aspects of each obsidian piece were carefully measured and recorded. All measurements were taken in millimeters and weights in grams. For blades, the measurement in the direction of the central ridge is the length, the measurement between blade margins the width, and the measurement from dorsal to ventral sides the thickness. In the case of obsidian cores, the measurement parallel to the dorsal ridges is the length, the perpendicular measurement is the width, and the final measurement (a width perpendicular to the first width measurement) is thickness. For flakes and other obsidian shapes, the longest measurement (also perpendicular to the platform if one is observable) is the length, the perpendicular measurement is the width and the final measurement the thickness. A digital caliper was used for all measurements and a triple beam balance scale for all weights.

Visual characteristics of the obsidian pieces were noted in this database as well. The clarity of each obsidian artifact was recorded as clear, cloudy, or opaque. An obsidian fragment was considered clear if, when held up to light, one could see through the piece without image distortion. An obsidian piece was classified as cloudy if light could pass through the fragment but one could not see clearly through it. Finally, an obsidian piece was considered opaque if light could not pass through it. Distinguishing marks (or lack thereof) were recorded for each artifact. These marks are geological and chemical characteristics of obsidian flows and not indicative of production or use regimes. Possible distinguishing marks include dark patches, internal dark flecks, lines of various thickness and color, or internal planes of various colors. Finally, the color of the obsidian was noted as obsidian color sometimes can indicate origin or source.

Edge damage also was assessed and recorded in this database. First the nature of the damage was determined and described as either even or uneven. Even damage was defined as a similar amount of damage on both edges of the blade. Uneven damage was used to describe blades in which one edge was significantly more damaged than the other. After the nature of the damage was assessed, the intensity of damage was recorded as light, moderate, heavy, or none. Light damage was defined as minor indications of wear along the blade edges in the form of small notches with the majority of the blade edge undamaged and
intact. Moderate damage was defined as wear along the blade edges that left the majority of the margin damaged but the blade still retained its original shape. Heavy damage was defined as heavy notching into the blade edges often giving the blade a jagged or saw-like appearance. A category called “no damage” was employed if the edges lacked any indications whatsoever of damage or wear.

The final section of the obsidian database is perhaps the most important. The comment section was used to describe, in as many words as needed, information about each obsidian piece that could not be transmitted through other categories. Here the exact nature of damage was described, the presence of flake scars discussed, the curvature of distal tips noted, and any other possibly important characteristic of the obsidian. When examining this database, future analyzers should be able to generate a complete picture of each obsidian piece as well as the larger picture of obsidian use in the Sibun River Valley.

Analysis and Results

As a result of the creation of the obsidian database, various aspects of the obsidian can be analyzed and compared. The study of these aspects can lead to a greater understanding of obsidian use in the Sibun River valley. The context in which obsidian pieces are found can yield much information about their use (Figure 16.4). At the sites of Augustine Obispo, Samuel Oshon, and Cedar Bank, obsidian was found in a number of contexts: 47% (n=174) in earthen layers; 21% (n=82) in midden deposits; and 15% (n=57) in construction fill. This would seem to indicate that users discarded the majority of obsidian after the tools ceased to be of use. Obsidian blades that were no longer deemed useable by their owners were deposited like other trash in middens, construction fill, or just tossed onto the ground. Only 2% (n=9) were found in a burial context and because these fragments were not complete blades, it is most likely that they were deposited into the burial fill as a secondary context. No obsidian was found in a context that would indicate ritualistic use or caching.

Figure 16.4. Distribution of obsidian across deposit types.
With regards to obsidian fragment type, 48% (n=180) were medial segments, 27% (n=105) were proximal, 15% (n=58) were distal, 9% (n=35) were flakes, 1% (n=2) were cores, while the remaining two items included one complete blade, and one “other” (Figure 16.5). It is assumed that medial segments represent the largest number of piece types because as an obsidian blade breaks, multiple medial segments can be formed. The reason that proximal fragments out number distal fragments is unclear but the difference may be the result of the increased thickness and thus durability of proximal ends. Distal ends, which are the thinnest part of a blade, tend to fracture into small pieces that may not be retrieved from the 1/4” inch screens used during the XARP 2003 season, a variable noted in Trachman’s (2002) analysis from an obsidian assemblage from Dos Hombres, Belize. It is likely, however, that small distal tips will be found in the heavy fractions of the botanical samples taken from the sites once they are fully sorted and analyzed.

![Pie Chart: Obsidian Artifacts by Fragment Type](chart.png)

**Figure 16.5. Obsidian artifacts by fragment type.**

The lack of flakes would tend to indicate a lack of blade production at the site but the presence of two cores (the first ever found in the Sibun River Valley, to be discussed in the next section) shows that at least some blade manufacture may have taken place on site. The presence of only one complete blade from all three sites combined indicates that blades were used until they were broken and unusable. Hirth and Andrews (2002) have suggested that complete blades were actually snapped into smaller fragments by their owners to create multiple cutting tools, thus maximizing the use of the imported material. Obsidian, though common, was a valuable and necessary commodity that was transported a long distance to the Xibun settlements. Functional blades would have been utilized to the fullest extent and would not have been abandoned in non-ritual contexts.

Several aspects of blade manufacture were analyzed. These aspects represent decisions made by the blade producer and may indicate the intended function of the blade. The type of platform preparation on the proximal ends of blades yielded no significant pattern. Only slightly more blade platforms were
flaked (n=55) as opposed to ground (n=46) and the particular preparation types were not specific to particular sites or contexts. It seems as though platform preparation was a result of personal preference on the part of the craftsman and is not site or time-period specific. The shape of the distal end, however, tended to be rounded. Sixty-one percent (n=35) of blades were rounded, 22% (n=13) were flat, and 17% (n=10) were pointed. Finally, the cross sectional shape of the blade was studied. The majority of blades (76% or 262) were trapezoidal while the minority (24% or 83) bore a triangular shape. This finding is in agreement with Sheets and Muto’s (1972) obsidian blade production experiment that indicated that triangular blades are produced primarily when the core has become small and nearly exhausted. The pressure tool can no longer be placed midway between the longitudinal ridges left by prior blade detachment.

Edge damage, in many cases, is a product of use. With regard to symmetry of edge damage, the majority of blades (69%) were evenly damaged on both lateral margins. This would seem to indicate that both edges were used as functional cutting surfaces and that the blades were not hafted. This intensive usage was probably a result of the absence of local obsidian and the expense of obsidian import. Blades that were unevenly damaged (31%) may be so because of their particular function or how the owner held the blade but the true reason that they are uneven is unknown. Interestingly, when intensity of edge damage is assessed, the majority of blades (56%) show only light damage, 34% moderate damage, and 10% heavy damage. This may indicate that obsidian blades, as valued pieces, were reserved for fine cutting and slicing while tasks that would normally produce heavy notches and considerable edge damage were reserved for more durable and readily available materials such as chert. As precision cutting is obsidian’s most valuable feature, the maintenance of a sharp and undamaged cutting edge would be vital to an obsidian blade’s continued functionality to its owner.

Sibun Obsidian Cores and Distinctive Artifacts

In the previous XARP seasons, questions were raised about the form in which obsidian arrived in the Xibun region. It is known that there is no local source of obsidian and thus the volcanic glass was imported. Prior to this season, only extremely limited evidence of local manufacture of obsidian blades had been found and it was unclear whether obsidian was brought to the Sibun valley in the form of already finished blades or as polyhedral cores. The discovery of two obsidian core fragments during the 2003 season has improved our understanding of local obsidian trade and manufacture.

Specifically, a polyhedral core fragment was found on a prepared surface stratigraphically below the main circular structure at Operation 32 of the Obispo site (Figure 16.1b). As Payson Sheets (1972) notes, when the body of an obsidian core becomes too narrow to produce prismatic blades and the platform becomes too small to work, a core is discarded. This small core fragment is an excellent example of an exhausted core. It appears to have been worked until it was too small to produce functional blades and then thrown away. Another small polyhedral core fragment was found in an earthen layer at Operation 25 of the Oshon site (Figure 16.1c) is. The mound from which it was recovered was a non-elite residential structure overlooking the river. This core fragment also appears to have been worked until it was small to produce blades or until it broke. Along with this core, a number of other obsidian blade fragments and flakes were found though none appear to refit the core.

Dreiss and Brown (1989) have suggested that coastal trade routes of obsidian were present in the Belize Zone throughout the Maya sequence and that these routes extended up Belize’s river system. During
the Postclassic period, the coastal trade routes seemed to have gained in importance over the overland routes. The transportation cost of water routes would have been much less expensive than overland routes (Hassig 1985; Santley et al. 1989). The discovery of two polyhedral cores at locations close to the Sibun River provides support for the hypothesis that obsidian was traded up the river system from Late Classic through Postclassic times. It is probable that obsidian was transported from the coast into the Sibun area by river and at least those sites located along the riverbanks may have received some of their obsidian in the form of cores. It is curious that a core as well as multiple obsidian blade fragments was found at the small non-elite residential mound. Obsidian, though a needed utilitarian substance, is generally considered somewhat of a luxury item. The presence of so much obsidian as well as a core at such a humble residence at the edge of the Sibun River may indicate that the inhabitants were involved in the trade and subsequent core reduction of some of the obsidian traded upriver.

In addition to the two cores, two pieces of green Pachuca obsidian were discovered (Figures 16.1a and 16.6a). Both were retrieved from a midden context in Operation 40 at Cedar Bank. Nearly all obsidian found in the Xibun settlements is of a gray variety likely from Guatemalan sources. The distinctive olive-green Pachuca, one of the finest lithic media in all of Mesoamerica (Santley 1980), comes only from an outcrop in Hidalgo, México and is rare in the Belize zone. For the most part, Pachuca is only found in contexts that correspond to the influence of Teotihuacan in the Early Classic and the strengthening of Yucatán trade routes in the Postclassic (Dreiss and Brown 1989). The discovery of Pachuca obsidian at Cedar Bank in Postclassic context links the Sibun River valley to this very distant source through trade networks probably operating along the coast from Yucatán (Dreiss and Brown 1989).

![Image of distinctive obsidian artifacts]

**Figure 16.6.** Distinctive obsidian artifacts: (a) Pachuca obsidian blade segment from Cedar Bank; (b) heavily retouched blade fragment from Cedar Bank; (c) ground obsidian disk from Cedar Bank.

Also at Cedar Bank, in Operation 44, two curious obsidian pieces were found. The first is a heavily retouched distal blade tip with a sharply pointed distal end and a single worked cutting edge (Figure 16.6b). This piece is the only obsidian blade in this sample that shows pressure-flaked retouching. The final curious obsidian piece found at this operation is the size and shape of a small bingo chip, was ground around its circumference to produce a smooth edge and also was ground on one side leaving the dorsal side shiny and natural while the ventral side is dulled from grinding (Figure 16.6c). The function of this disc is unclear as it is not perforated like a pendant nor would it be sharp enough to serve as a cutting tool. It is possible that the disc was part of an inlay for a larger object or, more likely, simply a gaming piece.
Conclusions

This obsidian study has yielded information that has brought us closer to understanding patterns of importation and possible local blade production in the Sibun River Valley. Questions raised during previous seasons can now be further addressed. While local production is suggested by the presence of two exhausted cores, these artifacts alone do not provide indisputable proof of local blade production. For instance, Rovner (1974), in a study of a secondary obsidian workshop at Mayapan, has shown that cores themselves may have been functional tools used for shaving hardwoods or bone. As the lateral ridge wear of the Sibun cores has not been assessed, it cannot be determined whether the cores were imported for tool use or blade production. The presence of cores does represent a type of obsidian import that has not been seen in previous XARP excavations. It is unknown how much obsidian was imported in the form of cores or if local knappers produced blades from these cores. The discovery of Pachuca obsidian from Mexico elicits more questions about long-distance trade. What other goods were coming from Mexico to the Xibun Maya? What goods were local residents trading in return for their foreign obsidian? The presence of the visually recognizable Pachuca obsidian may indicate that other Mexican gray obsidian may be present in the XARP collection. Sourcing a sample of the obsidian would not only show if other Mexican obsidian (such as Otumba, Zaragosa, or Zinepecuaro) were present in the Sibun valley, it would add to the understanding of the regional and temporal distribution of the main Guatemalan varieties of obsidian in the Belize zone as well as aid current studies of obsidian trade route into Belize. Further analysis of the XARP obsidian database as a whole as well as further research and excavation will no doubt shed more light on the current questions associated with the obsidian of the Belize zone.

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Chapter 17

Groundstone Tools from Ritual and Residential Contexts

Alyson M. Thibodeau

All the groundstone artifacts encompassed within this analysis are defined by their method of manufacture and assumed function as a tool. All groundstone included in this analysis functioned as a tool rather than a luxury item or object of adornment. Groundstone artifacts such as jade beads were not included in this report because they were not considered to have had a utilitarian use. Almost every artifact in this study was fragmentary, though most of the fragments retain characteristics needed to deduce their original use. Artifacts from both ritual and non-ritual contexts were considered.

This study includes all groundstone artifacts recovered from excavations during the 2003 season of the Xibun Archeological Research Project (XARP). Both settlement and cave contexts are represented in the data set. Groundstone tools were recovered from the Augustine Obispo site (AOS), the Samuel Oshon site (SOS), Cedar Bank (CB), the Hershey site (HS), Queso Blanco (QB), Actun Chanona (C21), and Arch Cave (C24).

Methods

In total, thirty-seven groundstone tools were analyzed. Since the vast majority of archaeological investigations during the XARP 2003 season were carried out in settlements, only three artifacts come from cave contexts. I included these three in this report because the presence of groundstone tools in a definitive ritual context is an important source of comparative information. However, my treatment of groundstone tools from caves will be minimal since the three artifacts recovered do not comprise a sufficiently large sample to warrant extensive analysis.

Four types of groundstone tools were recovered during the 2003 season: mano, metate, celt, and celt blank. Each tool or tool fragment was categorized according to its morphological characteristics. The only non-fragmentary artifacts in this data set are the mano and metate recovered from Chanona Cave. Several pieces eluded definitive classification. They are listed simply as “groundstone.”

A metate is a quern against which one grinds a particular substance, usually a food product. The ventral face of a metate is the grinding surface and may be flat or assume a concave form from use-ware. Metates may or may not have feet and an unbroken metate is longer than it is wide. Different subtypes of metates have been identified including turtleback, rectangular block, and tripodal (McAnany and Ebersole 2004:320). Some fragments in my data set were classified as metate foot which indicates that the fragment was an appendage rather than a portion of the grinding surface.

A mano is “the handheld counterpart to a metate and is used to abrade the substance placed on the quern’s grinding surface” (McAnany and Ebersole 2004:320). Manos are morphologically variable, and these variations can often be seen in cross-sectional views of the tool (Figure 17.1). “The shape of a mano upon its archaeological deposition... depends upon the grinding behavior of the individual using the tool as well as the wear mechanics of the stone” (McAnany and Ebersole 2004:320).
Figure 17.1. Cross-sectional view of mano.

A *celt* is a general term used to refer to tools that have been flaked, ground, and polished. They were probably used for fine woodworking purposes (Patricia A. McAnany, personal communication, 2003). The two *celt blanks* in this data set represent tools that were either uncompleted or poorly fashioned *celts*.

Each artifact in my data set has been subjected to a series of measurements and classifications (Table 17.1). An artifact was first identified as groundstone and then classified by function into the categories described above. Each artifact was given an identification number (1-37). Next, artifacts were sorted by site, and then by provenience within sites. In the context of settlements, this information includes operation (Op), zone (Zn), and square (Sq) designations. For artifacts collected from the surface, “SC” was entered into the cell for zone in Table 17.1 and nothing was listed under square. For artifacts collected from caves, two numbers were used to record provenience: chamber and component. The chamber number was listed in the zone column, while the component was listed in the square column.

Length, width, and height measurements were collected for each artifact. Since almost all of the artifacts were fragments of tools, these measurements reflect the size of the fragment recovered rather than the overall dimensions of a complete tool. All measurements represent a maximum dimension. On all applicable metate fragments, an additional measurement was taken to determine the maximum height of the grinding surface (GS Height). Though the height can vary somewhat throughout the surface of the same metate, it can vary quite widely between different metates and provide a basis for comparison.
All measurements were recorded in millimeters. Measurements under 155 mm were taken with digital calipers that yield a reading to the nearest 0.01 millimeters. It should be noted that digital calipers are extremely sensitive and it was almost impossible to obtain the same reading twice from such a tool. Readings usually vary by several millimeters at the most, and consequently should be considered close approximations rather than absolute numbers. All measurements above 150 mm were taken with standard metric measuring tapes or rulers, and represent estimates to the nearest half-centimeter. “N/A” denotes that a measurement was not applicable to a particular artifact (Table 17.1).

<table>
<thead>
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**Table 17.1. Groundstone Tools from the XARP 2003 season.**

Every artifact also was weighed. When possible, artifacts were weighed using a triple-beam scale and weights are given to the nearest 0.1 grams. Artifacts too heavy to weigh using a triple beam balance.
were weighed using a hanging scale that is accurate to the nearest 500 grams.

Artifacts also were classified by the raw material from which they were fashioned. The classifications within this column are tentative because they are based only on examination with a hand lens and my knowledge of mineralogy and rock types. I received assistance from geologist Thomas F. Bullard of the Desert Research Institute when identifying rock types. Many fragments were not washed due to the possibility of residue analysis, making identification even more difficult. All artifacts identified as “basalt” fragments appeared to be comprised of the same material: vesicular basalt. It is possible these tools were fashioned from a single igneous rock source.

All other categories of raw materials represent a general identification, and one should not assume artifacts in these categories are fashioned from the same source material. For example, groundstone listed as “igneous,” indicates that the pieces could not be identified beyond a general recognition of an igneous origin. Rocks in this category did not display a fabric, and I could not identify any metamorphic minerals. Similarly, the classification of “granite” does not indicate that all these fragments are composed of the same type of granite, but only that the raw material displayed the general characteristics of granite. I could not confidently identify the raw material of some of the artifacts, and listed these artifacts as having an “unidentified” raw material. Expert examination of the raw materials used to fashion these tools would be a useful analysis in the future.

I also noted the context in which artifacts were found. Groundstone tools were collected from the following contexts: earthen layer, midden, plaza floor, tumble (collapsed stone construction), construction fill, surface collection, topzone, shovel test pit, and cave. Contextual information was derived from excavation records and personal communication with the excavators of each site. This information is considered in detail later in this study.

Data Analysis

In total, 37 groundstone tools were recovered during the 2003 field season. Metates or metate fragments were the most commonly encountered artifacts and represent 65% (24 of 37) of the groundstone tools in my data set. Manos or mano fragments were the second most common artifact, comprising 16% (6 of 37) of my data set. Eleven percent of the artifacts could only be classified as groundstone (4 of 37), and 8% (3 of 37) were identified as a celt or a celt blank.

The Augustine Obispo site produced the most groundstone tool fragments, 30% of the entire data set, or a total of 11 pieces. Ten of the 11 fragments came from Operation 32, while only one was found in outstanding feature of the Obispo groundstone tool fragments is that almost all the fragments from this site appear to be comprised of material derived from a single rock source.

Eight metate fragments fashioned from vesicular basalt were found in Operation 32 and one was found at Operation 33. Two of the fragments from Operation 32 (artifacts #10 and #13) were portions of metate feet. The other fragments all appeared to be part of metate surfaces. The one metate fragment not fashioned from vesicular basalt was found in Zone 4 (Square B) of Operation 32, and was the only metate fragment found in a clear midden context at this site. The fragment was badly eroded with only a small portion of a polished surface still visible. I could not identify the raw material.
I examined the three metate fragments found in Zone 3, Square A. Two of these fragments, a metate foot (artifact #10) and a metate surface (artifact #11), fit together (Figure 17.2). The third groundstone tool found in this provenience (artifact #12) was a curious piece. Artifact #12 is an example of a metate fragment that may have had a secondary use. The surface was worn differently from any of the other grinding surfaces found at AOS. It was grooved, almost undulating. There appears to have once been a foot connected to this fragment, but now there is only a rounded stub that seems to have been re-ground after the break. According to McAnany and Ebersole (2004:317), in areas where hard stone was not readily available, “significant conservation efforts were expended to prolong the use-life of stone tools, including the use of broken tool fragments for new purposes.” Though the secondary use of this fragment cannot be determined, it does show evidence of being re-worked (Figure 17.3). Due to its altered shape, I could connect this fragment with the other two within the same provenience. The one metate fragment found in Zone 3, Square B (artifact #13) was the largest groundstone tool piece found at Obispo, weighing 30,333 grams. It included a conical foot and a portion of the grinding surface (Figure 17.4).

Figure 17.2. Conjoinable metate foot and grinding surface, Augustine Obispo site, Op. 32, Zone 3.

Only one metate fragment (artifact #15) was found in Zone 6 of Operation 32. It was a portion of a grinding surface with a small section of a finished side. The grinding surface measured 25.97 mm in height. I could correlate this fragment with any of the other fragments discussed thus far. The only other fragment with a similar sized grinding surface was artifact #11, which has a very different wear pattern from the flat ventral surface of artifact #15. There were two metate fragments found in Zone 7 of Square E at Operation 32. One of these fragments (artifact #18), exhibited a rounded nub on one side, much like artifact #12 in Zone 3. It is possible this artifact was re-worked as well.

Operation 25 at the Samuel Oshon site yielded seven metate fragments, the second largest sample of any individual site or operation. All fragments were fashioned from vesicular basalt, and possibly share a
source with the vesicular basalt groundstone found at Operations 32 and 33. One piece (artifact # 8) is a metate foot, while the other fragments are pieces of grinding surfaces. The two metate fragments from Zone 2 (Square B) fit together, one of which (artifact #1) is shown in Figure 17.5. Three of the metate fragments from Zone 3 of the same square (artifacts #5 - #7) could be reconstructed as well (Figure 17.6). I could not connect artifact #4 from the Oshon site with any of the other recovered metate fragments from Operation 25.
Figure 17.5. Part of a conjoinable basalt metate fragment, Samuel Oshon site, Op. 25, Zone

Figure 17.6. Three conjoinable basalt metate fragments, Samuel Oshon site, Op. 25, Zone 3.
I would tentatively type the basalt metate fragments found in Operations 25, 32, and 33 as *tripodal* metate fragments. According to McAnany and Ebersole (2004:320), a *tripodal metate* is “recognizable by its three conical legs and often by the fact that its grinding surface (ventral face) exhibits no trough as the entire ventral side is utilized evenly during grinding.” SOS and AOS were the only sites where metate feet were found. These feet were conical in shape, and fragments from AOS included a portion of the grinding surface as well. Artifact #13 exhibited a conical foot and an extremely flat grinding surface (Figure 17.4). The entire piece was over 150 mm tall and included a grinding surface and a finished corner. The grinding surface itself measured 46.41 mm in height. Fragment #9 also exhibited a conical foot (Figure 17.7). Figure 17.2 shows fragments #10 (foot) and #11 (grinding surface) reconstructed. Again, the conical leg and the flat grinding surface were both visible features. None of the ventral surfaces on any of the basaltic metate fragments exhibited evidence of a clear basin.

Figure 17.7. Basalt metate fragment with conical foot, Augustine Obispo site, Op. 32, Zone 2.
The groundstone tools recovered from Cedar Bank were quite different from the groundstone tools recovered from the Obispo or Oshon sites. Cedar Bank yielded 5 metate fragments and 1 mano fragment, and the groundstone tool fragments from this site comprise 16% of my sample. Two metate fragments were recovered from Operation 40, and 3 metate fragments were recovered from Operation 41. The one mano fragment from Cedar Bank was recovered from Operation 43.

Rather than basalt, these metate fragments were composed of granite or unidentified materials that may be igneous or metamorphic in origin. None of the materials that comprise these artifacts appeared to match one another. Only artifacts #23 and #24 were fashioned from the same material, and these two metate fragments fit together to form the rounded rim of a metate surface.

Unlike the groundstone at the Obispo or Oshon sites, the ventral surfaces of some of the metate fragments recovered at Cedar Bank were curved, or appeared to have a trough running down the middle. The metate fragments recovered from Operation 40 are a clear example of this phenomenon (Figures 17.8 and 17.9). Artifact# 20, also from Operation 40 had a similar contour.

Figure 17.8. Curved cross-section of granite metate, Cedar Bank, Op. 40, Zone 7.
I believe it is likely that the metate fragments at Cedar Bank once had a different form from the tripodal metate fragments that predominate at Operations 25, 32, and 33. Tentatively, these fragments may have once been part of turtleback metates. McAnany and Ebersole (2004:320) define a turtleback metate as “manufactured with a smoothed dorsal surface that broadly resembles the convexity of a turtleshell.” This convex surface seemed to be present in several fragments. There was no evidence that these metates once had feet attached to them.

The Hershey site produced 16% (6 of 37) of the tools in the sample. Of these 6 artifacts, 4 are categorized simply as groundstone, for they are too fragmentary or eroded to be assigned a specific form or function. Three of the groundstone pieces come from a ballcourt (Operation 55), while one comes from a passageway (Operation 54). A granite mano fragment was recovered from both Operation 54 and Operation 55.

The three celts or celt blanks were recovered from Operation 25 and Operation 61. The celt blank (artifact #3) from Operation 25 was a poorly fashioned piece made from a material that could not be identified. The other celt blank was recovered from Shovel Test Pit 19 at Queso Blanco. It was not completely intact, but showed evidence of pecking. The material from which it was fashioned could not be identified. A beautifully fashioned celt was recovered from Zone 1, Square A of Operation 61 (Figure 17.10). Due to its excellent state of condition, it was probably lost rather than discarded (Patricia A. McAnany, personal communication, 2003).
Three artifacts were recovered from caves. A mano fragment was recovered from Arch Cave. An unbroken mano and metate were recovered from Actun Chanona. John Jones performed a pollen wash on the metate from Actun Chanona and the results of this analysis may shed some light on the use of groundstone tools in a ritual context.

**Contextual Data and Analysis**

Groundstone tools were found in both residential and ritual contexts throughout Maya sites of Mesoamerica. Even the limited data set encompassed by this study includes groundstone tools from both settlement and cave contexts where they were assumed to have had utilitarian and ritual functions, respectively.

The groundstone tools recovered from the Augustine Obispo site provide an interesting challenge with respect to the analysis of manos and metates in residential versus ritual contexts. At Operation 32, a circular shrine (Structure 479) was excavated. This building is believed to have been a ritual structure when
it was initially built, but due to evidence of multiple occupations and phases of construction, the purpose of
the building may have changed or been altered over time. The following discussion will attempt to delineate
whether the groundstone tools from Operation 32 are associated with the earlier or later phases of
construction and whether or not they were utilitarian or ritual in purpose.

As previously mentioned, the groundstone tools from Obispo are distinctive. Almost all of the
metate fragments were fashioned from the same non-local material, specifically, vesicular basalt. Metate
fragments made of vesicular basalt were recovered from several other operations during the 2001 and 2003
field seasons of XARP, and my discussion of the groundstone from Operation 32 will rely on information
obtained from these excavations as well. I will discuss the context of one metate fragment from Operation
33, an elite residential mound also located at the Obispo site. I will also discuss Operations 24 (2001) and
25 (2003) from the Samuel Oshon site, a settlement located about 5 km from Obispo on the north side of
the Sibun River. Excavations at Operation 24 revealed a circular structure (Structure 409) much like the
one found at Obispo. Operation 25 was located adjacent to a residential structure at the Oshon site. All
these operations yielded metate fragments made of vesicular basalt.

Structures 479 (Operation 32) and 409 (Operation 25), both show evidence of multiple
construction phases. At each structure, the phases have been designated as phase 1A, phase 1B, and
phase 2. Phases of construction at Structure 479 may or may not have been contemporaneous with the
phases of construction at Structure 409, and further study will be needed to make any definitive temporal
correlations between the two structures. However, both structures show components dating from the Late
Classic to the Postclassic period, and it is likely that these two sites were occupied at similar times.

At Operation 32, Phase 1A of construction included the erection of a circular building with an
interior room. During Phase 1B, an outer step was constructed around the circular structure. During Phase
2, the room was completely in-filled and the structure became a platform rather than a room (Eleanor
Harrison Buck, personal communication, 2003).

At Operation 32, one metate fragment was found in Zone 2, a layer of tumble/debris excavated in
front of the outer step on the western side of Structure 479. The location of this fragment suggests that it
was deposited at least after Phase 1B of construction, and possibly after Phase 2. In Zone 3 of Square A,
three metate fragments were found on the plaza floor. The location of these groundstone artifacts upon the
Plaza floor also suggests they are associated with the terminal occupation of the site. In Square B of Zone
3, a metate foot was recovered. Since Zone 3 was not a sealed context, it was unclear whether or not this
artifact was part of an overlying layer of collapsed construction or part of the midden interface at the bottom
of Zone 3. It was found at a depth of 66 cm, well above the actual documented elevation of the midden.
Since it was located over the center of the midden, and the midden itself actually appeared to be heaped
above the cut of the pit, it is possible that the foot actually was part of this deposit despite its position
(Eleanor Harrison Buck, personal communication, 2003). However, there is no solid evidence linking this
artifact to the midden, and I do not believe it should be associated with that deposit.

Only one metate fragment (artifact #14) was found in a clear midden context at Structure 479.
Importantly, this was the only metate fragment recovered from Operation 32 that is not made of vesicular
basalt. I could not identify the material, but it was clearly different from all other groundstone tools
associated with this circular structure. In preliminary ceramic analysis, both Belize Red and Garbutt Creek
pottery sherds were found in the midden as well, tentatively dating it to the Late Classic period (Eleanor
Harrison Buck, personal communication, 2003). Since the single groundstone tool fragment associated with
the midden is clearly different from the rest of the groundstone recovered from the site, I have further reason
to believe that the metate foot found above the midden is probably not associated with it.

The three groundstone tool fragments from Zone 3, Square A appeared to be lying on the plaza
floor of Structure 479. They were found with four conch shells and several large ceramic sherd. Since the
conch shells are likely remnants of ritual activity, it is important to note that were found in the same context
as utilitarian artifacts like groundstone tools. Analysis of the ceramics found alongside these fragments will
be instrumental in dating this deposit.

The other three groundstone tools recovered from Operation 32 were found in Zones 6 and 7,
which are both associated with Phase 2 construction at the site. Both zones are part of the construction fill
of the interior room. The ceramics associated with this fill phase include the preliminary identification of a
pedestal base of a Roaring Creek Red vessel. This evidence suggests a Terminal Classic date for the fill,
and associates the groundstone tools found in this context with that time period (Eleanor Harrison Buck,
personal communication, 2003).

The circular structure at Operation 24 of the Oshon Site also yielded fragments of groundstone tools
in contexts that associate them with later phases of occupation. Zone 1, Square B, of Operation 24
produced a heavy density of artifacts including some with a clearly ritual function such as ladle censor
fragments. Several metate fragments made of vesicular basalt were recovered from this area. In Zone 1,
Square D, groundstone tools of this nature were also found with incensario fragments as well as several
obsidian blades. The heavy density of such artifacts in Zone 1 indicates that Structure 409 was an
important ritual locale until the terminal occupation of the site (Eleanor Harrison Buck, personal
communication, 2003). Although groundstone tools are found in association with the terminal occupation
of the structure, they are absent from earlier contexts associated with Structure 409. At both Structures 479
and 409, almost no groundstone tools are found in association with earlier construction phases. However,
at both structures, groundstone tools appear in association with later construction phases or in contexts that
associate them with the terminal occupation of the site. Did the function of the structures change over time?
Harrison addresses this question when talking about the circular structure at Operation 24:

Arguably, the function of circular structures in all areas of the lowlands may not have
remained static, but changed as political, economic, and religious transformations took place
throughout the lowlands during the Terminal Classic and Early Postclassic periods (AD 800
-1100). Bey et al. (1997:250) argue that changes in architecture and in the use of space
were the result of a variety of socio-cultural transformations that took place throughout
many centers during the Terminal Classic and indicate “the canons covering the traditional
use of space were breaking down” during this time. Areas of a site that were once used
strictly for administrative or religious purposes were sometimes later transformed into a
residential space and therefore a mixture of ritual material and utilitarian deposits should be

Harrison goes on to describe the debris found around the outside of the circular structure (Structure
409) at Oshon. She sites the presence of both ritual and utilitarian materials as evidence that the function of
the structure was no longer just ritual in purpose. According to Harrison, “the traditional use of space was
breaking down at the Oshon site by the final episode of occupation” (2001:179).
It is difficult to know precisely the context of the groundstone tools found at Structures 479 and 409. Archaeologically, they seem to be associated with the terminal occupation of both structures, and if “the traditional use of space” was indeed breaking down by this time, their presence in a conventionally ritual space suggests they were deposited there during the final phases of occupation. Also, if these groundstone tools are evidence of a change in function of ritual structures, then it follows that these groundstone tools, unlike those recovered from caves, were not ritual in purpose. Additional study is necessary to further validate or invalidate these conclusions and to assign a specific function to the groundstone tools found at these circular structures.

Operation 33 at Obispo and Operation 25 at Oshon both produced groundstone tool fragments made of vesicular basalt, but in a non-ritual context. Both operations explored house mounds. The one groundstone tool fragment recovered from Operation 33, located several meters to the northwest of Structure 479, was found in Zone 2, Square C of the excavation. Though this layer has not been dated, its high elevation suggests that the artifacts in it are probably associated with a later rather than earlier occupation of the site. At Operation 25, all metate fragments were recovered from Zones 2 and 3. Zone 3 is a midden deposit that, according to excavation records, may represent terminal occupation debris. Zone 2, above the midden, is considered an earthen layer, and its position above the midden suggests that it too represents debris associated with the site’s terminal occupation.

The groundstone from these two operations reaffirmed the association between vesicular basalt groundstone tools and the later occupations of the Obispo and Oshon sites. They did not indicate, however, whether or not the groundstone at the circular structures was utilitarian in purpose. They only indicated that some groundstone tools made of vesicular basalt were used in non-ritual contexts.

The contexts of the other groundstone tools recovered from the 2003 field season are not treated in detail in this report, but will briefly be mentioned here. The groundstone tools from Cedar Bank were found in scattered contexts. At Operation 41, three fragments were recovered as surface collections west of Square D, near the top of Structure 351. Operation 40 yielded one groundstone tool in a midden context, and another as part of construction fill. The mano fragment recovered from Operation 43 came from an earthen layer.

At the passageway excavation at the Hershey site (Operation 54), all groundstone was found in Zones 1 and 2 of Square A. The fact that one groundstone appeared only close to the surface suggests that it was re-deposited from its original provenience, and therefore is probably not associated with the passageway. Possibly, these fragments are related to Structure 503 or Structure 504, both elite residential mounds located nearby. It is likely they are part of the construction fill or tumble associated with these structures.

All groundstone found in Operation 55 was located in Zone 1, a sign that the artifacts were probably secondary deposits as well. Since a looter’s pit was identified in Structure 508, on the western side of the ballcourt, it is possible that the recovered groundstone fragments were unearthed when the mound was looted and were once part of the construction fill of Structure 508 (Jessica King, personal communication 2003).
Conclusions

Every site excavated during the 2003 season of the Xibun Archaeological Research Project yielded some form of a groundstone tool, either complete or fragmentary. By far, metate fragments were the most common groundstone tool found in 2003. Metate fragments were collected from Operations 25, 32, 33, 40, 41, and 54. Manos were the second most common fragment, and a small portion of the sample was composed of celt or celt blanks.

Both tripodal metate fragments and turtleback metate fragments were tentatively identified. These types were associated with different raw materials. The metate fragments made of vesicular basalt seemed to have the characteristics of tripodal metates, while the metate fragments composed of granitic or igneous materials seemed to have the characteristics of turtleback metates. It is interesting to note that the basaltic tripodal metates were found exclusively at the Obispo and Oshon sites, while the turtleback metates composed of less distinct materials came exclusively from Cedar Bank. Since vesicular basalt is not found in the region surrounding the Obispo and Oshon sites, the fact these site are located close to the coast is relevant. Sites nearer to the shoreline would have probably had greater access to the ocean, and therefore greater access to coastal trading routes that could be responsible for bringing imported tools into the region (Patricia A. McAnany, personal communication, 2003).

Groundstone tools were found in both residential and ritual contexts during the 2003 season. It is possible that metates used for ritual purposes were found in a settlement context, specifically the groundstone associated with the circular structure at Operation 32.

More analysis of the artifacts associated with the groundstone tools may help determine the time periods during which these tools were deposited. Residue analysis and pollen washes on metate surfaces will be instrumental in determining the substances ground by these tools. Extensive analysis of groundstone tools found in caves or definitive ritual contexts could supplement the contextual analysis presented here.

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McAnany, Patrician A. and Justin P. Ebersole, Justin P.
Chapter 18

Baked Clay Material: Its Origin and Purpose

Keri Demonaco Lopez

Baked clay material (BCM) has been found in excavations conducted by the Xibun Archaeological Research Project (XARP) during all of its previous field seasons. However this study is the first to focus on it. The purpose of this paper is to discover the original purpose of BCM by identifying the context of excavated samples and certain characteristics common to most BCM, and detecting patterns in this relationship. A combined 1,304 BCM samples from the Augustine Obispo and Cedar Bank sites were studied. All of the samples were excavated during the Spring 2003 field season.

Site Descriptions

Augustine Obispo Site

The Augustine Obispo site (AOS) is located on the southern side of the Sibun River. Named for its current landowner, the site is located on open and semi-forested pastures where cattle currently graze. A number of fruit trees are planted on the property. Two operations were undertaken during the Spring 2003 field season: Operation 32 and Operation 33.

Operation 32. This excavation unit involved the partial excavation of Structure (Str.) 479, a circular stone building. Operation 32 is a cardinally oriented unit measuring 9 m (east-west) by 6 m (north-south) that extends over half of the northern side of Str. 479. It is divided into six squares (A-F), each of which measures 3 x 3 m (however the size of squares B and C was reduced due to an intrusive avocado tree, and squares C and F were not excavated).

Operation 33. Operation 33 included the excavation of Structure 475, a platform. It is a cardinally oriented unit on the mound’s center and extends to the southern, plaza-facing slope of the mound. Initially, this operation was laid out as a 4 m (north-south) by 3 m (east-west) unit and subdivided into four 2 x 1.5 m squares (A-D). Later, Op. 33 was expanded to the west (by means of a 3 x 2 m, grid Square E) and to the south (with a 1 by 1.5 m square F and G). Square E was never excavated.

Research Methods

Collection of BCM Samples

As no project member had previously studied BCM, at the start of the field season only a few sizeable samples had been collected. Also, any specimens smaller than the general size of a thumbnail were discarded. After I expressed an interest in studying BCM, excavators began saving larger quantities of it, specifically the excavators at AOS as that was where I spent most of my time excavating and the directors
were more familiar with my desire to study it. Therefore, the sampling was somewhat biased; I do not have as many BCM samples from the earliest excavations as I do from the later excavations. Also, excavators at CB began saving more samples, but these were still very large in size, so I do not have a sample from CB that is as complete as the sample from AOS. Due to this fact, I will focus only on BCM samples from AOS, as the sampling is more thorough and my conclusions from the sample, therefore, more robust.

Lab Processing of BCM Samples

Initially, BCM samples were cleaned with a wet toothbrush. However, this destroyed the softer, more eroded specimens, as it scrubbed away the original impressions and left behind parallel lines from the toothbrush bristles.

After the problem concerning wet toothbrushes was identified, the cleaning method was altered to dry brushing with toothbrushes. It proved to be much more effective in removing dirt and did not affect impressions on the BCM at all. Later, when I began analyzing specific pieces of BCM, I discovered that it is possible to clean BCM with a dental pick by identifying the color difference between the BCM sample and the dirt upon it. Using a dental tool, one gently—and very carefully—flicks away the dirt, revealing perfect impressions on the BCM surface.

Protocol for Analysis

I analyzed the BCM samples after they had been separated from other artifacts in the field collection bags (FCB’s), weighed, and placed into lab collection bags (LCB’s). As I inspected the specimens in each LCB, I recorded provenience information, weight, and a number of characteristics using the following categories:

Provenience. To record this information, I used the categories of “Site,” “Op” (for operation), “Zone,” and “Square.”

LCB. I then recorded the “weight” (in grams) of each lab classification bag (LCB) and subtracted the weight of the bag and the metal tag. Some LCBs were not weighed during lab processing, so this field is incomplete. Next I recorded the number of specimens in each LCB under “No. in Bag.”

Characteristics. Each piece of BCM was then evaluated in terms of the following seven variables (these characteristics could and did co-occur on an artifact and do not represent mutually exclusive states). The first variable recorded was “Plant Impressions.” The majority exhibited some type of plant impression, usually of grass. The next category was “Large Circular Impressions.” These impressions were generally larger than 4 mm across and appear to have been made with anything from a small twig to a finger. “Stick Furrows” describes impressions that appear to have been made by sticks of varying sizes. The category “Small Circular Impressions” refers to very small impressions, the size of a pinhead or two pinheads and generally produced by rootlets, either modern or ancient. “Voids” are gaps found in BCM samples and, generally measured about 4 mm wide and 3 mm deep. The voids could have been produced by sticks that had been stuck into the clay and later burnt away or, if the clay had been used to make pottery, the voids could be air bubbles. I noted the presence of charcoal if specimens contained black, burnt plant material that could possibly indicate the burning of a perishable structure, a hearth, or clay scraps that had been fired near a pottery kiln. Next, I recorded how many pieces of BCM exhibited at least one “Flat Surface.” The number of flat sides per piece varied between 0 and 2. Initially, I planned to collect data on general
categories of color that are common to BCM samples, as this could indicate different intensities of firing or different types of clay and inclusions, but time did not allow for this coding. After recording the above information, I produced a series of bar graphs (Figures 18.1-18.3) so that it would be easier to visualize relationships between the characteristics of BCM.

Results of BCM Analysis from the Augustine Obispo Site

Operation 32

A large amount of BCM was collected from Operation 32, second only to the amount collected from Operation 33. Zones 1-3 (Z1-3) in Squares A and B and Z3 in Square D were humic layers consisting of topsoil and fallen tumble. The majority of BCM samples from this provenience contained both stick furrows and large circular impressions (Figure 18.1), leading me to believe that they are the remains of a perishable structure that may have existed on top of the circular stone structure. In Zone 2 of Square A, a piece of white daub was found and collected (Figure 18.4). I believe this shows the appearance of BCM before it was burned.

Zones 4, 8, and 9 in Square B consisted of two floors and a midden deposit. The BCM found in this provenience was exceptionally hard, indicating that it had been fired, perhaps for a long period of time. This may suggest that it had been part of a hearth where garbage had been burnt, and was then deposited in the midden with the garbage itself. A variation of colors on individual pieces of BCM further support this, as heat intensity is not uniform in a fire. Finally, seven samples from these three zones each exhibited two flat surfaces, indicating that some of this BCM may have been used in floor construction as an inexpensive alternative to plaster (Figure 18.5).

Zones 10, 11, and 12 in Square B were layers of construction fill. Again the presence of stick furrows and large circular impressions, along with the large quantity of charcoal baked into these pieces, indicates that this BCM was most likely from a perishable structure that had burned down. Zones 6 and 15 in Square D, as well as Zone 15 in Square E, consisted of a mixture of collapsed stone and intact construction fill. It makes sense that the quantity of BCM found in each of these zones is minimal, as dirt and limestone were used to fill the circular structure in ancient times. The BCM that was present was probably residual from the perishable structure that had burned.

BCM found in Zone 19 in Square D was wedge-shaped, indicating that originally it may have had an architectural purpose. For example, it may have been wedged between two sticks to bond them together. BCM found in Zone 22 in Square D was exceptionally hard, featured stick furrows, and possessed flat surfaces and may have been used as part of a floor. Zones 16 and 17 in Square E represent two separate floors constructed at different times. The pieces of BCM found in these zones were small in quantity and probably remnant debris from a perishable structure. Finally, Zone 18 in Square E was a fill layer covering the earliest floor, Floor 3. The sample of BCM from this zone was most likely architectural as indicated by the large quantity of material, the majority of which contained plant impressions, flat surfaces, large circular impressions, and stick furrows (Figures 18.1 and 18.6).

Operation 33

Zones 1-14 and 18-20 in Square A-D, F, and G were a combination of earthen layers, construction fill, and retaining walls. As the mound was most likely residential, it makes sense that a large quantity of
Figure 18.1. Characteristics of Baked Clay Material from Operation 32, Augustine Obsipo site.
Figure 18.2. Characteristics of Baked Clay Material from Operation 33, Zones 1-17, Augustine Obispo site.
Figure 18.3. Characteristics of Baked Clay Material from Operation 33, Zones 19-21, Augustine Obispo site.
Figure 18.4. White daub representing the appearance of BCM before it was fired (AOS, Op. 32, Z2, Sq. A).

Figure 18.5. Flattened BCM, possibly part of a floor (AOS, Op. 32, Z4, 8, and 9).

Figure 18.6. Two specimens of architectural BCM. Both artifacts contain flat surfaces; the specimen to the right is a pristine example of wedge-shaped BCM (AOS, Op. 32, Z18).
BCM was found at this locale (Figures 18.2 and 18.3). Much of it was probably from perishable structures that existed at different times and had burnt down. Also, a large portion of the BCM could be from hearth features, which might have existed on a residential mound.

Zone 3 of Square A yielded BCM with a number of rootlet impressions that could be remnants of a hearth feature, where twigs or weeds were burnt to fuel a fire, leaving impressions of their roots (Figure 18.7). The high quantity of BCM found in this area with plant impressions further supporting this idea (Figures 18.2 and 18.8).

Figure 18.7. Baked clay specimen with clear circular impressions from roots (both ancient and modern) as well as plant impressions (AOS, Op. 33, Z3, Sq. A).

Figure 18.8. An exceptional example of BCM with a leaf impression (AOS, Op. 33, Z1, Sq. B).

Throughout Operation 33, there were several specimens of BCM that exhibited a rounded, half-spherical shape (Figure 18.9). I am not sure how these pieces were created; perhaps they had been part of
a hearth. A number of BCM samples contained charcoal. The majority of these had no structured shape, being more or less amorphous (Figure 18.10). Therefore, I believe that many of these specimens were part of a hearth feature. Figure 18.2 provides support for this notion due to the large amount of BCM with plant impressions.

Figure 18.9. Rounded half-spherical specimen of BCM (AOS, Op. 33, Z2 Sq. B).

Figure 18.10. Amorphous, charcoal-containing BCM. These specimens exhibit a larger quantity of charcoal than most (AOS, Op. 33, Z9, Sq. C).

At Operation 33, many samples of BCM exhibited stick furrows (Figure 18.11). These were most likely used in constructing perishable structures and bonding sticks together. Most of the BCM found in
Zone 2 of Square B had stick furrows (Figure 18.2), making the possibility of a perishable structure here a strong one. On the other hand, BCM that contains very large stick furrows may have been used to fill gaps between the upright posts (Figure 18.12) of perishable structures.

Figure 18.11. Specimen of BCM with an obvious stick furrow running through the middle of it (most specimens were not preserved this well; AOS, Op. 33, Z2, Sq. B).

Figure 18.12. Four high-quality specimens of BCM most likely used as architectural daub (AOS, Op. 33, Z13, Sq. C).
Other specimens appear to preserve the impression of fingertips—a suggestion originally made by project ceramicist Sandra López Varela (Figure 18.13). If this is the case, they may be remnants from clay used in making ancient pottery.

Figure 18.13. Two specimens of BCM with possible finger impressions (AOS, Op. 33, Z12, Sq. C).

Finally, BCM samples were retrieved from Zones 15, 16, and 17 in Square C, notable because this provenience is a burial deposit (Figure 18.2). A substantial quantity of BCM was found in Zone 16, specifically. This may have been related to a perishable structure that existed at the time of burial, or it may be related to ritual burning at the time of the burial. Alternately and as Sandra López Varela has suggested, this deposit, as well as other BCM, may represent unused and (accidentally fired?) clay that had been stored for pottery production.

Conclusions

From this study of baked clay material, it seems likely that most of it was used as an architectural material, with specific usages as wall daub, as a substitute for plaster floors, and as hearth material. The suggestion that the BCM may be the residue of local pottery production is worth additional examination and the development of diagnostic recognition criteria such as those provided here for architectural BCM.
Part VI: Biological and Geomorphological Analyses
Chapter 19

The Burial Interments of Pakal Na

Rebecca Storey

Editors’ note: Although the massive mortuary pit cut into Structure 130 of Pakal Na was excavated during the 1999 and 2001 seasons, an in-depth osteological analysis was not undertaken until 2002. Since the deposit is significantly large and complex—and the identity of the individuals interred within of considerable importance for understanding the Terminal Classic period within the Sibun Valley—the results of Rebecca Storey’s osteological and paleopathological analysis are reported upon here. For additional details relating to the burial feature, stratigraphic relationships, and the construction history of Structure 130, please consult Harrison (2002) and Harrison and Acone (2003).

As has recently become apparent, Maya interments can be characterized by prolonged and elaborate treatment of bodies and revisitation of corpses some time after death. While such treatment seems widespread during the Preclassic, at K’axob for example (McAnany et al. 1999), it is apparently more restricted, as well as much more elaborate, during the Classic period at such sites as Copan (Storey n.d.), Piedras Negras (Fitzsimmons 1998), and Caracol (Chase and Chase 1996). At these sites, only high-ranking individuals or members of royal families were recipients of extended mortuary rituals and processing of bodies, however, and this exclusive pattern seems to represent a departure from the more widespread Preclassic pattern of complex mortuary practices. For example, the sample of Late Classic high-ranking individuals from the Bacab’s Palace of Copan is overwhelmingly primary interments that were not disturbed or later reinterred. In general, males seem to have been accorded more elaborate burials during the Classic Period (Haviland 1997).

The Pakal Na Structure 130 Burials

The characteristics of the burials discussed here indicate high rank by both the quality and nature of the grave offerings coupled with evidence of an extended period over which the mortuary ritual occurred. All of the identifiable individuals in this sample are males and all were interred within Structure 130, the largest platform structure of Pakal Na, which occupies the western side of an open plaza arrangement and exhibits a pronounced north-side orientation. The mortuary features were encountered during the excavation of an axial trench that originated on the eastern side of the structure. The most conspicuous characteristic of the mortuary activities at Structure 130 is the presence of a large pit that contained multiples individuals grouped around a focal male (Burial 1 deposit). Construction of this pit disturbed the earlier interment of Burial 2 who had been placed within the construction fill. The large burial pit is 3 m in length with a maximum width of 130 cm. The remains of probably four individuals plus a skull mask were found within this large facility (see Figure 19.1). In my opinion, there are at least three separate interment episodes present. Only two of the individuals are true interments while the other two individuals, and certainly the skull mask, are probably best interpreted as accompaniments or furnishings for one of the primary interments. Below, each of the skeletal individuals is discussed separately—beginning with the basal interment of Burial 2—and then the whole mortuary sequence is tentatively reconstructed. Further analysis will make it possible to confirm some of the interpretations suggested below.
Figure 19.1. Plan of Burial 1 interment (drawing by S. Morandi and inking by K. Acone).
Burial 2. This individual was placed in an earlier earthen structure that predated expansion of the platform into the present surface manifestation of Structure 130. Burial 2 was possibly a dedicatory interment for this structure. This primary interment was placed as an articulated skeleton on his back with feet crossed and head to the south. Accompaniments included a drilled fish vertebra bead and possibly a cylindrical pottery vessel. The individual was later disturbed by the preparation of the large burial pit; thus, only the left humerus and the body from the pelvis to the feet were found in situ. A smashed ceramic vessel was found just to the west of where the head would have rested. Preservation of bone and skeletal elements is only fair, as the ends of long bones and many delicate bones are missing. Parts of the skull and upper torso were found in the fill of the large, intrusive burial pit. These formed a clear but somewhat scattered deposit and some care was taken to collect the scattered bones during excavation of the pit.

Because of the state of preservation, only two morphological indicators of sex were present, while the pelvis—the preferred bone for sexing a skeleton—was ambiguous. A cranial trait indicated male and so an estimation of male was made preliminarily and later confirmed by comparing the robusticity of the femur and humerus to other Maya populations. These comparisons are accomplished through the calculation of discriminant functions (DF) based on individuals whose sex has been securely established on morphological grounds. I compared Burial 2 to the Copan rural sample from the Late Classic period, because of similarity of measurements taken. In all measures, Burial 2 was classified as strongly male (over 95% probability given the DF) and comparable to Burial 1A/1C (see below). Wrobel et al. (2002) have calculated discriminant functions to use for Maya samples. These are based on Tipu but also tested on other Belize skeletal samples, so these would be very appropriate for the Pakal Na skeletons. For Burial 2, only one DF could be employed—that based upon the robusticity of the humerus. Results also indicated a strong male classification; thus, this individual is probably a male.

Aging is more problematic. The best adult age estimators are located on the pelvis, but these were not preserved in Burial 2. Teeth wear, from four teeth, and a few sutures of the cranium are available, but these are not particularly accurate indicators. The sutures are fully closed, which indicates an older individual. The teeth are only moderately worn; this condition might agree with the suture estimation if this individual had lost many of his teeth already and the four teeth present were all that were left. However, no mandible or maxilla was preserved to verify antemortem tooth loss. Also, the head of the skeleton was not in its original position, so one cannot be sure that some teeth had not been lost in repositioning the skeletal elements. Thus, at best, this individual is middle to older in age, probably older than 40 at time of death.

Other indications of health and lifestyle from the skeleton point to ill health during childhood that, nevertheless, the individual did survive. There is a clear systemic linear enamel hypoplasia on canines and one premolar. This condition indicates a period of growth arrest as a very young child in response to a serious disease or disease/malnutrition interaction. A more definite diagnosis of cause for this health indicator is not possible. He also exhibits healed cribra orbitalia in at least one orbit, which is usually an indicator of significant anemia during childhood (Goodman and Martin 2002), although it may be reflective of other conditions as well. For indications of health closer to the time of death, there is a carie in one of the four teeth and evidence of an extensive healed infection on lower legs and cranium. The cranial infection is both on the ectocranial and endocranial surfaces. Although healed, the infection most likely occurred during the final ten years of his life because the bone has not been remodeled. There is moderate arthritis of the hip and knee (more so than observed within the Burial 1 sample of individuals) which, coupled with pronounced muscle markings, indicate an active life. His phalanges bear the marks of habitual gripping, not unlike those of scribes. The teeth also have moderate amounts of calculus, which is considered an indicator of an acidic diet with a good proportion of protein (Hillson 1996).
The cranium was too fragmentary to judge whether there had been any modification, but the upper canine was drilled for an inlay, which is missing. There were no other upper anterior teeth, so the pattern of modification cannot be determined. The modified tooth further reinforces the impression that this individual enjoyed high status during his lifetime.

Interments of the Burial 1 Mortuary Pit

Burial 1A/1C. This primary interment is a focal individual who was placed at the base of the large burial pit located immediately to the east of Burial 2. Burial 1A was placed extended on his back with feet crossed and hands folded over pelvis. The top of the skeleton was placed to the north—the opposite orientation of Burial 2. All of the other individuals and the evidence of extended mortuary ritual are linked to this initial primary interment. Sometime after burial, parts of both arms and the head were removed, and ceramic vessel no. 5 placed where the head should have been. To the east and northeast of this individual, there were three other bone clusters. The easternmost cluster (Burial 1C) contained missing elements of Burial 1A: specifically cranial and arm fragments. This was verified by matching the left humerus of Burial 1C to the right humerus of Burial 1A, which had not been disturbed. As the skeletal elements did not overlap with any of the in situ bones, they are considered to belong to the 1A individual. Three ceramic vessels were placed on top of the body of 1A, along the N-S centerline of the mortuary pit. A portion of a smashed vessel was positioned under the area of the lower leg bones. There was also a vessel in a niche on west side of burial pit near the right shoulder. The bone cluster of 1C reveals a scatter of skeletal elements rather than a bundle, although some of the cranial fragments were stacked. A conch shell core, four perforated dog canines, and an elaborately carved skull mask accompanied this cluster.

Burial 1A/1C was relatively complete and well preserved. The pelvis and cranium both proclaimed that he was a male. Age indicators suggest that he was a fairly old individual at time of death, probably over 60 years. A very robust individual, slightly more so than Burial 2, Burial 1A/1C exhibited pronounced muscle markings on the shoulder girdle and a prominent linea aspera of the femur. An active lifestyle is indicated. There was no skull modification, but both upper anterior teeth present had been drilled for inlays, now missing (see Figure 19.2).

For health indicators, there were two clearly from childhood. Like Burial 2, this individual had one systemic linear enamel hypoplasia episode as a young child and evidence of slight, but healed, porotic hyperostosis on the vault. This also indicates an episode of anemia. He has no caries, but had already lost at least three teeth. Interestingly, this individual also bears scars of infection on both his legs and cranium, especially the endocranial surface (this is comparable to Burial 2). The difference is that this infection is only partially healed, and thus was active at time of death. There is only slight arthritic involvement in major joints of the shoulder, knee, and thoracic vertebrae, although the other vertebrae are poorly preserved and may have shown more involvement. Interestingly, the posterior right humerus and proximal ulna seem to show the effects of a dislocation, which happened some time before death (see Figure 19.3). The distal articulation of the humerus is partially obliterated on the posterior surface and replaced with a roughened, porous surface (pseudo-articulation?), while the ulna has a depression in the inferior semilunar notch with a facet on the coronoid process that is not normally there. Unfortunately, the proximal radius and the olecranon process of the proximal ulna are not preserved, so it is not possible to reconstruct accurately all changes to the joint. It appears as though the individual was probably able to retain movement in the elbow.
Burial 1B. Placed just east of the 1A body, this deposit included a bundled head with atlas vertebrae and pieces of the left shoulder. Drilled jaguar teeth and a deposit of cinnabar (20 cm across by 5-10 cm thick) were arrayed next to this bundle. The morphological features of the skull indicate male but this is only an estimate. Cranial measurements indicate that Burial 1B was gracile compared to the Copan rural male sample and the other two individuals already discussed. No comparable measures or discriminant functions are available from Wrobel et al. (2002). Teeth wear and closure of some sutures point towards an older adult, probably the oldest in this sample.

The individual bears a few indicators of pathology, including some healed porosis from anemia and enamel hypoplasia during childhood. There is also evidence of healed infection on the shoulder bones, so Burial 1B also suffered from a systemic infection, although there are no indications on the cranium. The shape of the cranium had not been modified but one canine was drilled for an inlay, which is absent here as well. This individual shows heavy calculus on many teeth, which indicates a very acidic diet.

Burial 1D. Consisting mostly of arm and leg long bones with few other skeletal elements, this individual appears to have been scattered rather than bundled. Located north of Burial 1B, these remains probably were placed in the pit at the same time as was Burial 1B. In fact, these subcranial skeletal elements could comprise the missing part of Burial 1B although there is a clear spatial separation between the two clusters. On the other hand, no age indicators on the bones of Burial 1D indicate an older individual as is Burial 1B. At this point, Burial 1D is treated as a probable different individual. No obvious offerings
accompanied this interment, although a large smashed serving bowl (Vessel 1) had been positioned above part of this bone cluster. From the size of the bones, this individual is a male. Most of the long bones bear traces of a healed infection, so he also survived a systemic infection.

**Burial 1E.** Identified only by teeth found within the Burial 1C cluster, these remains included no identifiable cranium fragments and may consist of only a deposit of teeth. The teeth indicate a probable middle to older individual and sex cannot be determined. No enamel hypoplasias were noted, but the most susceptible teeth for this health indicator during childhood were not present. There were no caries, but again many of the teeth were practically encased in calculus.

**Skull Mask.** Within the Burial 1C bone cluster were pieces of a skull mask that had been cut so that only the frontal and face bones were present (not all elements of the face were present in the deposit). Based on the morphology of the forehead and mandible, this modified trophy had been a male. The only age indicator is tooth wear, which indicates young to middle-aged, probably younger than the 1A/1C individual. One cannot score for porotic hyperostosis on the elements present, but there is definite reactive, healed bone mass in the maxilla sinuses, possibly indicating some chronic sinusitis for this individual during his life. A couple of teeth contain cavities from caries and, as is common in these individuals, the lower anterior teeth are covered in calculus. Defleshing marks from creation of the mask are very clear; these are the only such marks in this sample (see Figure 19.4). The clarity of the marks indicates that the skull was processed soon after death, likely for a trophy mask. The incision work is quite elaborate with a mat design and drilled holes on the central frontal section and fragmentary cartouches with probable zoomorphic designs were around the edges of the mat design. The hieroglyph for smoke or fire (\(k'ak'\)) is carved into the glabella (between the brow ridges). The mandible (in two pieces) contains carved cartouches of bird and feline/
canine designs (see Figure 19.5). Incisions also are present on the infraorbital area, so all of face probably was decorated. The mandible was drilled in several places along the inferior margin, probably so that feathers or other decorative elements could be attached to the mask. The bone literally is “smoked”; i.e., there are areas of scorching mainly on the interior surface but some on exterior surfaces as well. The style and content of the animal cartouches bear similarities to those of northern Yucatán/Chichén Itzá (see Harrison and Acone 2003 for more detail).
Summary of Individuals

There are at least three, and probably four, individuals in this sample. All are clearly adults, and probably older than 35 years at time of death. All are clearly male, except for the individual who is only represented by teeth, which is presently undetermined. (In my experience, teeth are not strongly dimorphic in Maya samples.) Three individuals had teeth drilled for inlay although the inlays are missing (perhaps all were jade). None bears clear evidence of cranial modification. All remains exhibit clear evidence of health
problems and some had occurred during childhood; the commonality of systemic infections among these adults is notable. Such infections are indicative of poor hygiene and perhaps also poor nutritional status in the years preceding death although, in two cases, the infections had healed. Health indicators such as these are common among Late/Terminal Classic Maya skeletons at Copan. Three of the individuals have significant calculus deposits on their teeth, an indicator not only of poor dental hygiene but also of a very acidic diet, which could be reflective of high protein intake (Hillson 1996). In summary, indicators of sex, age, dental modification, and diet suggest that these individuals were of high rank. Evidence of childhood stress does not preclude an ascribed high status, but these individuals also could have achieved high status as adults.

Reconstruction of the Mortuary Ritual

While Structure 130 was either under initial construction or undergoing an early stage of renovation, Burial 2, plus another ritual cache, was placed in the fill. The male likely was intended to be a dedicatory burial for this structure. Placed in an articulated position with a cylindrical vessel near the head, the individual’s death may have provided the impetus to construct the earthen phase of this mound. While careful wrapping or shrouding of a corpse can preserve proper articulation for some time after death, this individual probably was not curated for long because the bones were well articulated when discovered. After a century or so had passed, this individual was disturbed when a large burial pit was excavated to inter Burial 1A/1C. This activity disturbed Burial 2 from his pelvis to his cranium. It is not clear whether the smashed vessel to the west of the head of Burial 2 was moved at this time. The disturbed parts of Burial 2 were scattered within the fill of the large burial pit above the inhumation of Burial 1A. It makes sense that disturbed skeletal elements would be re-interred in the burial fill just above the original elevation of Burial 2. Burial 1A was placed with a series of vessels, but the only one sure to have been present at the initial interment is the large jar that was broken and placed under the legs. Burning occurred at this time, as evidenced by the copious charcoal, a layer 10-15 cm thick lens under the legs and above the sherds of the broken vessel. The bones bear evidence of smudging and scorching from smoke, although the good condition of the bones—smoked rather than charred—indicates that the intent of the ritual was not cremation.

The body of Burial 1A could have remained at the base of the open mortuary pit for some time before the left arm and cranium were removed. There are no cutmarks, so this was probably done after the body was skeletonized. It could also be that the burning and smoking served to reduce the body to a more skeletonized condition. In that case, the time between initial placement of the body and the removal of skeletal elements may not have been very long. After the head was removed, a vessel was placed in its position and it is possible that the line of vessels on the centerline of body were placed at the same time. Further evidence of the manipulation of a skeletonized body is provided by traces of red and yellow ochre paint on the bones, some in places that could only be accessed if bones were exposed, such as the promontory of the sacrum. Eleanor Harrison-Buck who excavated the mortuary pit suggests that the individual may have been placed already dismembered and decapitated. If so, those conducting the interment ritual were able to preserve very good articulation from the right torso to the feet.

The depth of the Individual 1A body is about 40-50 cm below the other bone clusters in this pit. Thus, I think that the pit around this body was excavated first, and the extension of the pit to the east and placement of the other bone clusters came later, as part of the termination of this burial pit. This is somewhat controversial as the excavators reconstruct the whole pit as one episode, an interpretation
bolstered by the fact that the fill of the pit is similar throughout, both texturally and compositionally. Thus, a later excavation/expansion of the pit is not easily proven, although it is possible. It seems most logical that the deeper pit was dug for the body and then covered up after the skeletal elements were removed. Because the original body was no longer easily accessible, the pit was extended, and Burial IC and the other burial clusters placed as the final termination ritual.

These three other individuals had been curated in some way and placed to the northeast and east of the Burial 1A body. Most were scattered within a delimited area although the cranial fragments of Burial 1C and the head of Burial 1A appear to have been stacked and might have been bundled. Excavators indicate that the Burial 1B cranium was smashed. The skull mask also appears to have been broken, and in fact, much of the face is missing (and probably not placed in the pit or preserved). Thus, the mortuary rite involved deliberate breakage of crania in addition to deliberate breakage of ceramics. Such breakage was probably important to the ritual. In the end, the broken bones were primarily scattered within a bounded area (rather than closely bundled). They were placed with offerings and a deposit of cinnabar. Above the main interment and between Burials 1B and 1D, a large vessel was smashed. At the very top of the burial pit there was a fire pit, which could represent a final burning of the deposit. Then the top of the pit was roughly capped with a cobbles and pebble surface, so that the building could still be used. It is most probable that the final re-terracing of the structure occurred soon after the capping. The structure then functioned for some time after this event.

**Importance of the Pakal Na Burials**

From early on, this structure was intended partly as the burial place of important individuals/ancestors for the probable leading family of a place now called Pakal Na. The first interment, Burial 2, was fairly simple and this simplicity may reflect the modest position of the family at that time. By the time of the Burial 1 interment, however, the structure had been fashioned into a large and impressive platform with several terraces. Burial 1A/1C is definitely the focus of the mortuary ritual and wealth disposal within the large pit; his interment indicates a protracted rite. The identity of this individual is therefore of some interest. There are indications from the ceramic offerings and markings on the skull mask of connections with northern Yucatán, perhaps from Chichén Itzá itself. The possible migration of this individual from the north will be tested by isotope analysis of the bone.

The presence of a skull mask (probably worn as a pectoral in life), a second cranium, and the symbolism of the animal cartouches on the mask seem to indicate a militaristic theme, as if the individual was a successful warrior. Possibly, he was interred with the remains of various war trophies, although it is not clear exactly what the relation of the Individuals 1B, 1D, and 1E are to the main interment. None carries any marks of perimortem violence and they are just as likely to be honored relatives curated and allowed to accompany the main interment. Skeletal robusticity supports the notion that Burial 1A/1C was a warrior; he bore strong muscle markings on the arms and legs. However, he and the other individuals had clear evidence of systemic infection. This could be a reflection of the pursuits of these individuals, as infection might very well be the result of non-lethal cuts received in warfare—an occupational hazard perhaps. It is probably a tribute to the generally good lifestyle and prestige accorded warriors that these individuals generally survived the infection. The main individual also appears to have suffered a probable dislocation of his right elbow during life, which healed fairly well. It is tempting to designate this a battle injury. Perhaps he was recovering from a battle—living with the probable attendant prestige plus the infection as one might expect within Terminal Classic Maya society—when he died. After all, he was not a young man.
With the evidence of foreign connections and military honors, it is no surprise that this individual was treated very elaborately at death. Mortuary ritual involved the removal of some elements when the individual had probably been mostly skeletonized, perhaps for use in other rituals or just for more immediate commemoration of this individual. A ceramic vessel was substituted for the head. After some time, however, the elements were placed back in the pit along with offerings and the skull mask pectoral in a separate cluster of bones, along with the remains of probably three other individuals. Termination involved breakage, perhaps to blunt the power of these bones and vessels, and final burning, as the original interment of Burial 1A also involved burning. The closure of the pit and rebuilding of the structure removed the skeletons from any more manipulation or active use in rituals for the living, but I’ll bet Structure 130 served as a monument to this individual or individuals for the rest of the occupation of the site.

This particular burial context is evidence of the elaborate rituals involved in the interment of important ancestors during the Late/Terminal Classic period and not just in the larger, well-known Maya centers. To place this burial in the wider context of Maya mortuary practices, such treatment generally was reserved only for very few individuals of the highest rank. For example, at the House of the Bacabs (Compound 9N-8) in Copan, none of the elite individuals in this prominent residence had evidence of such treatment, rather it is present only among members of the ruling family. The Burial 1A/1C individual at Pakal Na was very important indeed.

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Chapter 20
Mollusca from Midden and Ritual Contexts

Katherine Belzowski

Within Maya society, some shells were symbols of the gods and of elite status, while others were used in architectural construction, as food, and as personal adornment. During the 2003 XARP season, a large sample of shell was recovered from excavations at the sites of Hershey (HS), Augustine Obispo (AOS), and Cedar Bank (CB). All of these sites represent different time periods in Maya history: the Late-Terminal Classic, Terminal-Postclassic, and the Postclassic-Colonial periods, respectively. In addition, each of these sites is located at a different point along the Sibun River, with AOS being closest to the coast, CB upriver at the entrance to the karstic region, and Hershey at the top of the valley near the base of the Sibun Gorge. Each site contained a distinctive sample of shell. Through the examination of shell from each site, a more complete picture of Maya life in the Sibun River Valley emerges.

According to Hammond (1975:384), “Shells may be classified and archaeological significance assessed on the basis of the habitat of their former occupants”. The Xibun Maya utilized both freshwater shells from the Sibun River and marine shells from various sources. The use of marine shells at inland sites illustrates the effort put in to their acquisition—the ancient Maya would have acquired them through trade between the inland sites and coastal regions or by traveling to the coast to gather it. On the other hand, not every shell in the archaeological record is the result of human activity. In addition to marine and freshwater shell, terrestrial snail shells also were collected from the sites. Such molluscs were frequently encountered inhabitants of the soils of ruined buildings.

The types of shell recovered and their respective archaeological contexts reveal not only their use in a technological sense but also may help to determine their ideological significance. For example, shells have been found in caves and as grave goods, building ornaments, and instruments. As Harrigan (2004:399) notes in reference to the shells from the site of K’axob in northern Belize: “Comparison of the various amounts and types of species found in the varied deposits around K’axob allows for an understanding of how Maya incorporated mollusca into subsistence, ritual, and architecture.” Thus, by comparing the different archaeological deposits of shells one can determine the significance of different species in the Maya world.

In Maya society, shells were seen as symbols of water, life, and fertility (Isaza 2004:335). They could serve as religious symbols, often associated with certain gods. One of the most interesting examples of the architectural use of shell occurred at San Gervasio on Cozumel Island where marine shells were used to decorate a circular structure (Taube 2000). The Maya god of rain Chak was known to be associated with conch shells. Shells are also very prominent as jewelry items and were fabricated into necklaces, tinklers, and earrings. The use of large conch shells as trumpets is well noted. All of these items can be considered illustrative of a person’s status and often were associated with elites.

Shells also could serve secular functions as well. Jute, which is still eaten today, was a common source of food for the ancient Maya. The shells of this species often are found with their spires lopped off from the processing used to remove the snails. Crushed shell was used as temper for pottery, as seen in countless thin-sections from archaeological samples. Furthermore, shells could be used as construction
materials as well. In reference to the Stann Creek District, Elizabeth Graham (1994:254) notes that “shells are found everywhere, probably because they were used as [construction] fill.”

**Shell Types**

Due to its particular location and period of occupation, each site yielded a slightly different collection of shells. However, there were certain types of shells that were commonly found within excavations. These shell types can be divided into three categories based on habitat: marine, freshwater, and terrestrial.

Most of the shells came from the class *gastropoda*. This class includes snails and slugs and is the largest class of mollusks. There are about 30,000 existing species of gastropods, most of which have an asymmetrical spiral shell which functions as a portable retreat (Oliver 1975). There were fragments of shells from the class *bivalvia* but I was unable to positively identify the specimens down to genus, but it is certain that more than one genus is present.

Eight different genera of gastropods were identified: *Pomacea, Orthalicus, Euglandina, Melongena, Strombus, Pachylichis, Oliva*, and *Jenneria* (Table 20.1). In addition, unknown land snails were also found and recorded. For some genera, individual species could be positively identified. Of the three habitats represented, the marine category includes *Strombus pugilis* (West Indian Fighting Conch), *Strombus gigas* (Queen Conch), *Melongena melongena* (Indian Crown Conch), *Oliva*, and *Jenneria pustulata*. The freshwater invertebrates include *Pomacea flagellata* (apple snail) and *Pachylichis sp.* (jute). Finally, the terrestrial invertebrates include *Orthalicus princeps* (Florida tree snail), *Euglandina cylindracea* (a land snail), and other unidentified land snails. Below each type of gastropod is discussed by its habitat characteristics.

<table>
<thead>
<tr>
<th>Gastropoda</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pomacea flagellata</em></td>
<td>Applesnail</td>
</tr>
<tr>
<td><em>Orthalicus princeps</em></td>
<td>Florida Tree Snail</td>
</tr>
<tr>
<td><em>Euglandina cylindracea</em></td>
<td>Landsnail</td>
</tr>
<tr>
<td><em>Melongena Melongena</em></td>
<td>Indian Crown Conch</td>
</tr>
<tr>
<td><em>Strombus sp.</em></td>
<td>Conch</td>
</tr>
<tr>
<td><em>Strombus gigas</em></td>
<td>Queen Conch</td>
</tr>
<tr>
<td><em>Strombus pugilis</em></td>
<td>West Indian Fighting Conch</td>
</tr>
<tr>
<td><em>Oliva sp.</em></td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Jenneria pustulata</em></td>
<td>Unknown</td>
</tr>
<tr>
<td><em>Pachylichis sp.</em></td>
<td>Jute</td>
</tr>
<tr>
<td><strong>Bivalvia</strong></td>
<td></td>
</tr>
<tr>
<td>Unknown Bivalve</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Table 20.1. Gastropods and Bivalves within the XARP 2003 Sample.

*Marine gastropods*
**Strombus.** *Strombus* was the most common species of marine gastropod found at the three sites. The *Strombus* genus, more commonly known as conch shells, is found throughout the tropics. Its members vary in size, but are characterized by “an expanded body whorl, narrow aperture, thickened outer lip, and short siphonal canal” (Oliver 1975:65). A particularly distinctive characteristic of *Strombus* shells is the ‘stromboid notch’, an indentation near the bottom of the outer lip. *Strombus* shells generally are solidly constructed and typically live in shallow water marine habitats on sand or sandy-mud.

Two different *Strombus* species were identified, *S. pugilis* (West Indian Fighting Conch; see Figure 20.1) and *S. gigas* (Queen Conch; see Figure 20.2). *S. pugilis* can be found in estuarine conditions although it often occurs in waters of oceanic salinity. It prefers oceanic waters with a touch of freshwater influence and slightly muddy bottoms in waters that are not crystal clear. “Therefore it is very likely that *S. pugilis* was found not far from the shore in ancient times” (Graham 1994:253-254). *S. gigas*, conversely, is commonly found in reefs and in true coral waters. Conch beds are usually found in the Barrier Reef off the coast of Belize. This likely made conch collection relatively easy for coastal Maya.

![Figure 20.1. Conch shell: top row is *Strombus pugilis*; bottom row is *Melongena melongena*.](image-url)
Among the species that were identified, another that is often mistaken for a conch is *Melongena melongena* (Figure 20.1). *M. melongena* displays physical characteristics of either two spiral rows of short sharp spines or none at all. “It has a short spire and a channeled suture, an inflated body whorl and short open siphonal” (Oliver 1975:58). *M. melongena* is a marine species, found in archaeological deposits, shallow lagoons, and some creeks. It is commonly known as the Indian Crown Conch, mud conch or the fiber conch, even though it is not in the same order as other conchs. Because of its similar appearance, it can be confused with the genus *Strombus*.

*Oliva*. The *Oliva* genus, part of the *Olividae* family, is generally cylindrical, with short spire, a siphonal notch, a columella that folds away from the apex, and a fasciole. They dwell in the sand in tropical and warm seas. The shells are usually very hard, shiny, brightly colored and variously-patterned with
numerous fine wrinkles. The *Oliva* sp. was commonly worked and used for decorations, ornaments, and pendants (Oliver 1975).

**Ovulidae.** The family *Ovulidae* was represented by a single specimen in the deposits excavated during the 2003 field season, but it was very significant, as is discussed below. *Ovulidae* are strikingly colorful, with a patterned mantle. The mantle is normally drawn entirely over the shell, preserving the shell’s highly polished appearance. *Ovulas* live in tropical waters. The highly-colored mantle and sharply contrasting spots result from accumulation of otherwise noxious chemicals that are retained in the mantle. *Jenneria pustulata* is the only recovered species from the *Ovulidae* family. A marine species from west Central America, the base of *J. pustulata* has coarse ribs from aperture to margin and bright orange pustules ringed with dark brown (Oliver 1975).

*Freshwater gastropods*

Freshwater shells were represented by either *Pomacea flagellata* or *Pachychilus* sp., the latter is commonly called *jute*. While *Pachychilus* is common to the swift-flowing waters of the Sibun River, *Pomacea* prefers the still or slow-moving waters of oxbows and wetlands. *P. flagellata* features a pinkish round shell with a single spiral apex while *Pachychilus* species are long with a pointed spire, many whorls, a simple lip, and a surface that is either smooth or ribbed. *Pachychilus* sp. (Figure 20.3) was the most prevalent shell found during the 2003 field season.

![Figure 20.3. Freshwater shells identified from left to right as unknown black/white and two jute shells.](image-url)
Terrestrial gastropods

Terrestrial shells *Orthalicus princeps*, *Euglandina cylindracea*, and unidentified land snails were also collected from the sites (Figure 20.4). *O. princeps* is considered an arboreal species that inhabits the forests of South and Central America (Harrigan 2004:402) and features a short spiraled, swirled shell with purple and orange strips running lengthwise. Though similar in color to *O. princeps*, *E. cylindracea* (Figure 20.4) has a longer, tubular shell. An unknown land snail species (Figure 20.4) was found primarily at CB. Its shell was small, circular and brown and it was also found living in the soil. Live examples of these snails were found during excavation.

![Figure 20.4. Land snails identified from left to right as unknown, *Euglandia cylindracea*, and *Orthalicus princeps*.](image)

Terrestrial shells are hard to interpret due to the ambiguity that surrounds their significance. As Graham (2002:252) notes: “Aquatic faunal sample shows that exploitation of marine and estuarine resources was clearly related in some way to the choice and utilization of sites, whereas the presence of terrestrial fauna is only indirectly related to the utilization of the site”. Terrestrial shells may hold information regarding current and past ecological conditions in the immediate environs of a site.
Protocol for Analysis

The project protocol included examination of each bag of shell collected from AOS, CB, and HS and selection of all identifiable pieces. Pieces were considered identifiable if the genus could be determined and if the fragment could not be considered part of another individual. For bivalves, when only one half was recovered, then that half was considered an individual. All individuals of the same species were grouped together. The first thing that was recorded was the number of the field collection bag (FCB). In some cases there were several different species of shell in one FCB.

Next, each shell’s archeological context was recorded, which included the following provenience information: site, operation, zone, and square. Within each site there were different operations (excavation units) that were subdivided into squares. In a square, cultural layers were identified by zone number, typically beginning with the surface as Zone 1. After these data were recorded, they were reorganized hierarchically by site, operation and zone.

Once provenience was noted, the shells were identified. Similar shells were placed into the same group. In each group the class, genus, and species of shell were identified when possible. The shells could be from one of two classes: bivalve or gastropod. Next, each identified genus was given a number and the shells were given a number corresponding to their genus. Within the genus, the species name along with the common name was recorded. Most of time the pieces collected were not large enough for an accurate identification of genus or species. In these cases, they were labeled as miscellaneous pieces. All of these pieces were weighed and recorded. In this way, the quantity of shell from each zone was determined even if every piece could not be identified.

The habitat of each species was then recorded. Shells could be from a freshwater, marine, or terrestrial habitat. To determine how many shells were present in a species group, the Minimal Number of Individuals (MNI) of each species was recorded. The MNI calculation reveals how the distribution of species varied among zones. Each species group was then weighed. Afterwards, comments about the specimens were recorded to identify any distinctive characteristics.

Data Analysis

In this section, patterns in the distribution of shell types are presented and discussed on a site-by-site basis. For tallies of unworked shell by site, see Table 20.2.

Augustine Obispo Site

AOS contained two different operations, Operation 32 and Operation 33. Operation 32 investigated a circular structure on the eastern side of a plaza while Operation 33 was placed on the top of a nearby residential mound situated on the northern side of the plaza (see Chapters 3 and 4 of this volume). Operation 33 contained a burial within the mound. It was near this burial that the few shells from Operation 33 were found.
Table 20.2. Identification of Unworked Shell (Genus and Species) by Site.

<table>
<thead>
<tr>
<th>Identification</th>
<th>Augustine Obispo</th>
<th>Cedar Bank</th>
<th>Hershey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melongena melongena</td>
<td>21</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Strombus pugilis</td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Orthalicus princeps</td>
<td>4</td>
<td>miscellaneous pieces</td>
<td>5</td>
</tr>
<tr>
<td>Pachychilus sp.</td>
<td>43</td>
<td>73</td>
<td>1548</td>
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<tr>
<td>Unknown Conch</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Oliva sp.</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Euglandina cylindracea</td>
<td>2</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Pomacea flagellata</td>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Strombus gigas</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Strombus sp.</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unknown land snail</td>
<td>1</td>
<td>221</td>
<td>9</td>
</tr>
<tr>
<td>Unknown bivalve</td>
<td>17</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Mother of pearl</td>
<td>miscellaneous pieces</td>
<td>0</td>
<td>miscellaneous pieces</td>
</tr>
<tr>
<td>Black/white shell</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Operation 32 contained more marine shell than any other operation. The presence of several types of conch shells is notable, especially in the uppermost zones. The three different species of conch included *M. melongena*, *S. pugilis*, and *S. gigas*. Most of the conch remains were evenly balanced between *M. melongena* and *S. pugilis* (Figure 20.1). *S. pugilis* today is a major food source, which may be a reflection of the ancient Maya use of the shell. Only one example of *S. gigas* was found. The shell was a lip fragment that had broken off from the rest of the shell (Figure 20.2). Most often, *S. gigas* is not recovered in one piece, which may be because of “use of [S. gigas] shell in a variety of ways, as trade items or in jewelry manufacture, [which] reduces the likelihood of finding whole Queen Conch shells in the archaeological deposits” (Graham 1994: 254).

Conch remains were consistent throughout the zones with a high concentration of conch as deep as Zone 7. Most of the conch was concentrated near the doorway to the circular structure and also on a floor inside the structure. The close proximity of the conch shells to the doorway may indicate that they were used in the architectural façade of the building. This is highly probable given that almost all the lips were broken off. This finding is consistent with those at sites in the Northern Yucatan such as San Gervasio where conch shells were used for architectural decoration of a circular structure (Taube 2000). The close proximity of this site to the sea would have facilitated the procurement of marine shells such as conch in large numbers.
Operation 32 also yielded one example of an unworked *Oliva sp.* from Zone 3 as well as freshwater and terrestrial shell from several zones. Operation 32 also was the only operation in which a small black and white shell was found (Figure 20.3). The shell was white with black wavy lines running from the center. It is unknown whether the shell is marine or freshwater. A significant number of unidentifiable bivalves found (Figure 20.5). Finally, one piece of worked marine shell was recovered from Operation 32 (Figure 20.6)

![Figure 20.6. Worked Marine Shell: top center artifact from AOS, bottom four from HS.](image)

Operation 33 did not yield nearly as many shells as did Operation 32. Shells were present only between Zones 14 and 19. Two fragments of conch shell were found: *Strombus sp.* and *S. pugilis.* The rest were miscellaneous pieces.

*Cedar Bank*

Several operations were placed on or near the mounds at Cedar Bank (see Chapter 5 in this volume). Operation 40 was located at the base of Structure 351, a large mound located on the north side of the southern plaza. Operation 41 was positioned on top of the same mound. Operations 42 and 43 were placed in a structure that is located on the north side of the north plaza. Operation 42 extended north
to south across the east part of the mound, while Operation 43 also ran north to south but was located several meters to the west, toward the middle section of the mound.

Operation 40 yielded mostly unidentified land snails and jute. Large numbers of unidentified land snails were collected in Zones 1 and 2 but were absent from Zone 3. Jute is considered to be a Maya food source and was eaten by breaking off the spire and sucking out the mollusca inside. All recovered jute were missing their spires.

Four conchs were found in Operation 40, all in the upper Zones 2 and 3. The two conch from Zone 2 were so deteriorated that genus could not be identified. The third “conch” in Zone 2 was identified as M. melongena, while the fourth conch (from Zone 3) was S. pugilis. All of the conchs were found near the wall of the unit in between long stones that appeared to be part of the structure. Their proximity to these stones is indicative of a midden context. It is also possible, however, that these conch shells were used for architectural decoration as at AOS. Unlike the conch at AOS, the conchs at CB were highly deteriorated. This difference could attributed to soil differences between CB and AOS, or exposure to the elements for a longer period of time than the conchs at AOS. The AOS conch shells were found in a doorway feature while the shells at CB were outside of the building. There also were fewer conch shells found at CB, which could be due to its location farther upriver; in short, conch may not have been as accessible. Also, conch samples could have deteriorated due to intense flooding that CB experiences during the rainy season.

Operation 41 produced only terrestrial shells. The majority of the recovered shells were unidentified land snails that also were present in Operation 40. Over one hundred such shells were found in Zones 1 through 4. Operations 42 and 43 followed the Operation 41 example with shells occupying the top zones. There was only one example of shell below Zone 1. All shells were terrestrial snails or miscellaneous pieces.

Hersheyl

At HS, only two of the operations reported any shell remains. Both operations were located in Group A. Operation 54 was positioned over a passageway between Structures 504 and 503 (see Chapter 9 of this volume). Operation 55 was an axial trench placed across the ballcourt that is located on the southeastern side of Group A (see Chapter 10 of this volume).

The Hershey site, particularly Operation 54, was characterized by large amounts of jute shell (Table 20.2). This is consistent with the large quantity of jute found at the site during an earlier excavations. Norbert Stanchly (2003) identified two species of jute from Hershey, the majority of which are Pachyhilus indiorum. I was not able to identify the jute species but could determine that there are two types of jute present at Operation 54. One, which was also found at AOS and CB, was smooth, while the other features longitudinal ridges. The jute vary greatly in size and were found in every zone in all squares of Operation 54. In Zone 6 of Square A there were 383 jute shells and in Zone 9 (Square A) there were 639 specimens. Most were missing a spire, and, due to the context, it is possible that the consumption of jute was ceremonially linked.

Operation 54 also yielded much higher frequencies of E. cylindracea than AOS and CB and far fewer unidentified land snails than Cedar Bank. Significantly, no conch remains were found at HS which may have to do with the fact that it is significantly farther from the sea than either AOS or CB. This may
have made conch a more precious shell due to the cost of transport. Conch is also noted as only being used in Maya architecture to decorate circular structures, none of which are present at HS.

On the other hand, Operation 54 contained the most pieces of worked marine shell (Figure 20.6). Most of the shell was so heavily worked that it was impossible to identify the species beyond that of a marine *gastropoda*. The uppermost worked shell came from Zone 3 and was a tubular bead about 1.5 cm long (Figure 20.6). Two shell pendants also came from Zone 3. One was only a fragment of what seemed to be a larger example of a second smaller complete pendant (Figure 20.6). Worked shell also came from Zone 5—a very thin circular piece of shell with a drill hole through the middle (Figure 20.6). The other three pieces of worked shell came from identifiable shells. Two examples from the *Oliva* genus were worked into tinklers. There was also one example of a worked *Jenneria pustulata*. The sole specimen of *Jenneria pustulata* is very significant because it is only found on the Pacific coast of Central America. This signifies that HS was involved in long distance trade and that goods were being traded across the Maya region from the Pacific to the Caribbean coast. Access to such trade routes would have brought exotic shell to powerful elites.

Operation 55 contained shells only in the first two zones and all were either *E. cylindracea* or *jute*. Zone 1 yielded a significant amount of *jute* (n=46), though it was small relative to the Operation 54 numbers. It also did not appear to have been found in the construction fill.

**Conclusions**

Based on findings from XARP excavations, shell appears to have played a variety of purposes in Maya societies of the Sibun River Valley. First of all, shell seems to have been a traded commodity. At HS, the tinklers were exactly like those found at Northern Belize sites. “The shells are either of the genus *Oliva* or *Olivella*, and are cut medially to exhibit a perforation in the body whorl near the aperture. They served as ornaments, perhaps pendants” (Sidrys 1983:348). The present of tinklers made from *Oliva* indicates that HS residents maintained connections to the coast and were importing and trading shells over long distances. The presence of *Jenneria pustulata*, furthermore, indicates trade links that stretched as far away as the Pacific coast, possibly via the southern highlands.

It also appears that Maya living along the Sibun River gathered shells that were within a short distance of their communities. AOS contained a number of conch shells, which reflects its close proximity to the coast. CB also yielded a few conch shells that could have been either gathered from the coast or acquired through trade. The interior site of HS, on the other hand, likely would have traded for marine shell with other sites located near the coast. Interestingly, HS does not contain a lot of marine shell besides those that were worked. “In sum, the three modes of mollusk-gathering—reef, coastal and inland—suggest a pattern of conservative exploitation in which gathers of mollusks, and perhaps fishermen in general, stayed close to resource zones near their own villages” (Sidrys 1983: 346).

HS did contain a lot of *jute* shell, which is easily gathered in large quantities from the nearby Sibun River. The two varieties of *jute* are present in the hundreds of *jute* collected during the XARP 03 field season. Such large collections are not rare to Maya sites. In reference to Lubaantun, Hammond (1975:384) reports the presence of thousands of *jute*, “many whole except for the tip of the spire, found in all levels of the 1970 excavation, though mainly in midden or mixed fill deposits and rarely in quarried construction fill.” These large numbers indicate their importance to Maya subsistence. Hammond
(1975:385) goes on to suggest that the “constancy and immobility [of jute] may have been a factor in the location of the settlement.” In contrast, marine shell was more likely to be imported for reasons other than subsistence.

In summary, shells were found in a variety of contexts at the three site examined. At AOS and possibly CB, conch shell appears to have been used for architectural embellishment while worked marine shell at HS comprised artifacts of high status personal adornment for elites. These contrasting examples illustrate the many functions of shell in Maya society and the social symbolism of different shells.

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Chapter 21  
Archaeoethnobotany in the Sibun River Valley  

Kirsten Tripplett

Field Stay and Goals

Struever’s (1971) crucial treatise on flotation techniques in archaeological excavations opened up a new avenue to interpretation of material plant remains. Today, separation of floral, faunal, and other types of artifacts from soils for identification and analysis is increasingly employed in archaeological excavations. In the Americas, systematic collection methods and rigorous analyses by archaeobotanists have yielded exciting results, including the identification of cultivation, crop processing, production, and consumption trends (Hastorf 1988), of fuel wood use (Piqué 1999), of particular plant taxa as environmental indicators (e.g., Smart and Hoffman 1988; Minnis 1978), of important economic plant species in environments generally considered inhospitable to preservation (e.g., Crane 1996; Lentz 1991; Miksicek 1983), of plant taxa in cave rituals (Morehart 2002), of trade (McKillop 1994), and of the origins of agriculture in the Neotropics (e.g., McClung de Tapia 1992; Piperno and Pearsall 1998; Pope et al. 2001). Numerous other accomplishments exist but are beyond the scope of this paper. In light of the potential contribution of plant remains to the study and interpretation of subsistence, ritual use, and ancient life ways, archaeobotanical study of sediments from the Xibun Archaeological Research Project is underway.

A primary goal of the XARP Archaeoethnobotany Research Project is determining whether cacao (Theobroma cacao, Sterculiaceae) cultivation and/or production played an integral part in the local Sibun economy during the Late Terminal Classic or the Spanish Colonial period. As part of a broader project exploring the political economy of the lowland Maya in Belize, we want to determine if cacao was a prestige good produced in the Sibun Valley, and exchanged to other areas of the Maya lowlands. Political control of such a resource could have lent social distinction to the Sibun Maya communities. The earliest evidence of cacao consumption in Mesoamerica is from Colha (Powis et al. 2002) and cacao pods are depicted on Classic Period polychrome drinking vessels from Belize. Clearly, cacao was important to ritual and social events. Furthermore, good ethnohistoric evidence (Jones 1989) exists that river valleys in Belize were zones of intensive cacao cultivation. Early Colonial records that a small Spanish colonial mission or visita and Spanish-owned encomiendas were located on the Sibun River. It is very likely that cacao was planted and managed, and a critical crop for the local economy, prior to the arrival of Spaniards; cacao cultivation and production in the valley may extend far back into time. The Sibun Valley, particularly the mid- to upper reaches, certainly meets the ecological and edaphic requirements of cacao cultivation. In addition, the excellent transport routes supplied by the river, access to numerous habitats and, presumably, varied economic products, as well as the presence of an early Spanish-Colonial archaeological component (Morandi 2003), make it very likely that the Sibun Valley provided tribute in the form of cacao to Spanish overlords. Given the documentary and archaeological evidence, as well as the ecological conditions, we feel that if cacao is to be located and preserved in Belize, the Sibun is a promising and productive site to investigate. A recent proposal to the National Science Foundation (see Hastorf et al. 2004), proposes to identify and analyze possible cacao remains in the XARP archaeoethnobotanical flotation collections. The project’s larger goal is to investigate cacao cultivation, exchange, and consumption in Belize and Honduras.

Tripplett conducted botanical surveys in 2001 (see Tripplett 2003). In addition to survey of the botanical resources in the Sibun Valley study area, Tripplett initiated a project enumerating and documenting
current cacao varieties planted and managed in the Sibun, collecting modern cacao materials for plant voucher specimens, recording and documenting morphological variability, cultivation and production techniques, and traditional uses of cacao whenever possible. Such data have several applications and are crucial for understanding how ancient Maya may have managed cacao populations within the Sibun landscape and achieved levels of production that could have permitted trade or tribute of cacao. In addition, it is important to determine if native Maya cacao populations still exist in the Sibun today and, if so, to record their morphologies and variability, in order to enhance our identification of cacao in the archaeological record. Tripplett aimed to continue the project in 2003.

Methods

In February, 2003, sediment sample collections for flotation, pollen, and phytolith analysis were initiated in the XARP study area. Flotation continued until late April. Tripplett had the pleasure of training Roderick Burns, a Belizean, in flotation techniques. He was an avid and enthusiastic assistant. Sediment samples were collected from archaeological excavations at the Cedar Bank, Augustine Obispo, Samuel Oshon, and Hershey sites during this period and floated for archaeobotanical remains. A blanket sampling strategy (cf. Lennstrom and Hastorf 1992) was conducted at each of the excavation sites, including the collection of both macro- and microbotanical sediments from identified contexts (Pearsall 2000; Hastorf and Popper 1988). Collections were made from both features and areas not recognized as features to ensure that samples can be compared evenly across and within sites (Hastorf 1999; Lennstrom and Hastorf 1992, 1995; Pearsall 2000; Toll 1988; van der Veen 1985). Phytolith and pollen sediment samples were extracted from samples prior to flotation for later analysis by Ellie Harrison-Buck and Steven Morandi. Sediment samples were then submitted for flotation after being labeled and recorded in a flotation log.

The flotation system was designed to conserve water; the light fraction was captured by the overflow of water from the surface, or by decanting, thus reducing potential damage to carbonized remains through handling and increasing recovery rates (Wagner 1988:20). Trained floaters carefully hand-mixed, or gently agitated, the sediment matrix in the tank and extracted large heavy fraction items in order to reduce breakdown of more delicate materials. The mesh used to capture the light fraction was very fine, close-meshed chiffon, likely to recover tiny seeds from archaeological sediments. The material was securely wrapped around a light-fraction outflow pipe. The heavy fraction mesh was 1/8” screen supported by 1/4” mesh. After flotation of the light fraction was complete, the heavy fraction was popped out to completely expel the heavy fraction remains, and allowed to dry in the shade on 1/8” screen. Light fractions were hung in their chiffon recovery bags on a shaded line and allowed to dry. All labels were rechecked and assigned to their respective fractions. The tank was effective for approximately 4 samples, and then an outflow pipe was opened to allow fine sediments to drain from the bottom of the tank. Once emptied and cleaned, the tank was refilled and the process began anew.

In general, recovery rates for botanical remains are low in tropical soils (Miksicek 1983; Pearsall 1993). Initial flotation samples were therefore 30 liters in volume. Heavy fractions were processed with the same fine chiffon material noted above (resting on a 1/8” screen, which rested, in turn, on 1/4” screening), in order to capture any tiny seeds caught in the soil matrix. This technique proved laborious and impractical: flotation samples required up to two and a half hours per sample because of heavy clay loads. After demonstrating the impracticality of using chiffon for the heavy fraction, 1/8” screening was used. Sample volumes were also reduced because of time and resource constraints. As mentioned, soils in the excavation sites were often heavy with clay; an average flotation period for a 15-liter sample was 45 minutes.
Results

A total of 121 sediment samples were collected from a range of contexts: tumble, midden, construction fill, burials, enigmatic features, earthen layers, pits, and steps/staircases, as well as some comparative surface samples. Numerous samples of carbonized wood were also collected by excavators and catalogued separately from archaeobotanical sediment samples. A subsample of 34 flotation samples has been selected and a full-sorting analysis commenced in the spring of 2004. Future analysis of additional archaeobotanical flotation and charred wood samples will be conducted as resources become available.

A preliminary glance at the light fraction samples indicates that recovery of archaeobotanical artifacts is low, as predicted by preservation conditions in a tropical, moist environment. Wood charcoal represents the bulk of the remains but small, unidentified objects are also present. Heavy fraction contents include turtle carapace fragments, obsidian microdebitage, parrot-fish teeth, ceramic sherds, carbonized wood fragments, baked clay material, fish vertebrae, bone fragments, chert fragments, jute shell, limestone gravel, and cohune palm fragments. In the laboratory, floated light fraction samples are screened through graduated geological screens and separated according to size classes. Each sample is then sorted according to material classes (e.g., wood charcoal, seeds, nutshells, parenchymous lumps, bones, other faunal artifacts). Whenever possible, remains are identified to plant family or genus.

In concert with Tripplett’s dual role as field botanist for XARP and in order to continue the botanical survey of the study area, an application for renewal of our 2001 Scientific Research and Collection Permit, issued by the Forestry Department, Ministry of Natural Resources, Environment and Industry (Ref. No. CD/72/1/01A8) was submitted. The permit allowed Tripplett to assemble numerous leaf, fruit, flowers, and wood collections of local plant taxa for study and preservation in conjunction with botanical survey. Resulting voucher specimens were placed on deposit at the Herbarium of the Forest Department at the end of her work season. Field collections of cacao were also a component of the 2001-2003 field period.

Due, however, to increasingly complex political tensions concerning biopiracy of botanical germplasm in Belize, no extension of the research permit was granted and further collection of cacao in the Sibun during the course of the 2003 field study period was prohibited. Access to a known population of feral cacao in the Maya Mountains of southern Belize (the site of T. cacao and/or T. bicolor populations, Hector Mai, personal communication to Kirsten Tripplett, 2001; Tripplett, personal observation) was therefore barred, as was collection of cacao specimens from Q’eqchi’ and Mopan Maya communities in the Toledo District. Today, the Toledo District is the foremost producer of cacao in Belize. Despite the current situation, the collections of cacao fruit from the 2001 study period, temporarily deposited in the Herbarium of the Forestry Department in Belmopan, were recovered in 2003 and charred in the field. Botanical surveys of 2001 that were conducted on and near the old Hershey Plantation (also the locale of the archaeological site of Hershey) yielded no evidence of wild or feral populations of cacao; Theobroma cultivated on plantations has been replaced with numerous hybrids between T. cacao and South American varieties (Tripplett 2003). Recent evidence of possible feral populations in the Sibun provides a promising opportunity for field study in the summer of 2004 (Patricia McAnany, personal communication, 2004). A series of interviews with landowners and residents of nearby Mennonite and Maya communities demonstrated that local knowledge of wild or feral cacao was limited, indicating that such populations may be very rare in the Sibun River watershed. Only a single wild Theobroma was encountered in the course of fieldwork in the Sibun, at the very edge of the watershed.
From the view of population genetics, and given the exceedingly low numbers and genetic diversity of “wild” and feral populations (see Motamayor et al. 2003) of cacao encountered in Mexico, the status of observed Maya criollo cacao populations in Belize supports the hypothesis that the ancient species of Mesoamerican *Theobroma cacao* is threatened or endangered, perhaps even on the verge of extinction. An examination of *Theobroma* voucher specimens at the Herbarium in Belmopan, yielded only five sterile specimen sheets, without flowers or fruit. The genus is underrepresented, given its role in Belizean culture and economy. Further efforts to collect material for the Herbarium, Forestry Department, Belize, and for the archaeobotanical reference collections of the present project, are necessary and proposed. Tripplett is scheduled to return to Belize in the summer of 2004 for continued study with the Xibun Archaeological Research Project. New dialogues with government officials about the cacao archaeobotany research will be initiated then.

**Concluding Remarks**

The tropics provide limited conditions for botanical preservation (Miksicek 1983; Pearsall 1993) and recognition of potentially differential preservation is a serious issue for any archaeobotanical analysis. Although initial examinations of XARP flotation samples appear to reflect such reality, a pessimistic view is obstructive to constructive analysis and interpretation. Detailed investigation of charred wood, seeds, and other materials are likely to yield valuable data related to subsistence, fuel, and ritual use of plant taxa in the study area. Comparison to findings elsewhere in Belize and the lowland Maya environs will add to our understanding of resource utilization, crop cultivation and consumption, and ritual plant use in Terminal Postclassic sites in the Sibun. Analysis of the early Spanish Colonial contexts may provide new and unique data as well. Archaeobotanical sorting techniques will be utilized in order to identify charred plant taxa and to provide information on presence/absence, ubiquity, a sense of relative density, and degree of preservation. A table will also present raw data. Trends in plant use as food, in ritual, and in trade will be identified when possible. Insights into issues and influence of taphonomy and site formation processes (Miksicek 1987; Schiffer 1983) as represented by botanical remains will be explored and discussed in the final findings report. Concurrent analysis of phytolith and pollen samples obtained from sediment samples prior to flotation will be the subject of future analysis by Harris on-Buck and Morandi. Comparison of macro- and microbotanicals to other Mesoamerican archaeological sites will contribute to a better understanding of paleoenvironmental conditions (Dunning et al. 1998; Jones 2003; Leyden 2002; Rue 1989; Rue et al. 1998), cultivation, production, consumption, and trade of economically important crops (cf. Crane 1996; Jones 1994; Lentz 1991; McKillop 1994; Miksicek 1979, 1983, 1990, 1991; Wiseman 1983), and cultural and natural transformation processes at the time of deposit (Dunning et al. 1998; Jones 2003; Miksicek 1987; Schiffer 1983; Rue 1989).

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In terms of paleo-environmental data, Belize has been fairly well studied in the northern portion of the nation, but studies in the south and central portions of the country are still largely lacking. Archaeological endeavors along the Sibun drainage, however, provide a unique opportunity to address this lack of information; slowly, but surely, we are beginning to amass some paleo-environmental data. Though the results are currently incomplete, what we do see is compelling and significantly different from the pattern known for the northern half of the country.

A large number of paleo-environmental studies have been conducted in northern Belize, and pollen records are known from Cobweb Swamp, Kob Swamp, Douglas, Pulltrouser Swamp, Pat Swamp, Chan Chen, Burrell Boom, Honey Camp Lagoon, Sarteneja, Chetumal Bay and Santa Rosa. While variations occur in all cores based on local cultural events and irregularly distributed plant communities, the general pattern of human activity throughout the region has been similar. The oldest pollen sequence we have for Belize is from Cobweb Swamp, a well-studied lagoon associated with the site of Colha. A vegetative sequence extending back at least to 8000 BP, the core contains a record of a grassland savannah with scattered freshwater ponds and wetlands filled with sedges and cattails in its most basal portion.

Around 6500 BP, the forests begin to develop around Cobweb Swamp, only to be abruptly cut off by the earliest farmers, documented around 2400 BC, but known to have been farming elsewhere in Belize (the Kob Site) at least by 3000 BC. The identity of these early farmers is not fully understood but, based on the type of maize being grown, they may have been affiliated with the Olmec who are known to have been farming in the Gulf lowlands during this period. From Cobweb Swamp, only two crops are documented from this period: maize and manioc.

By 1500 BC, the character of environment surrounding Cobweb Swamp changes again, and we begin to see a more intensive type of agriculture, with raised or ditched fields and a greater variety of crops, including maize, manioc, chili pepper, squash and cotton. These are the cultigens of the earliest recognizable Maya, and the maize that is being grown at this point is identical to modern maize. At this time, forests were further reduced and this trend continues as Maya population levels increase.

Curiously, breadnut appears to have been unimportant to ancient Maya farmers of northern Belize, as these trees are removed along with all other non-economic types. Trees that are favored by Preclassic farmers—including hogplum, sapote and some palms—were clearly spared. With the Postclassic reduction in Maya populations throughout northern Belize, there is some reforestation, but nowhere do the forests return to what they had been before agricultural times.

These data are new and exciting and help to place northern Belize Maya in context. But these events appear to have been specific to the northern wetlands; additional data are needed to understand patterns of colonization and agriculture among central and southern Belizean Maya.
The Xibun Pollen Project

The ancient vegetation communities of central Belize have yet to be established, but we now have collected data suggestive of a distinctively different trajectory for this part of the country. To provide background paleo-environmental data for the Xibun archaeological program, we began an energetic coring project. Initially, we were hoping to collect paleo-environmental records from several portions of the drainage, thereby establishing the past conditions in which Maya farmers had lived. We were also interested in identifying crops grown in the area during the peak period of settlement growth within the valley—the Late-to-Terminal Classic.

Unlike the low-energy hydrology of northern Belize—where marshes, lagoons and wetlands are abundant—permanent, sediment-filled bodies of water are lacking in the Sibun drainage. The upper reaches of the Sibun are dominated by high-energy fluvial events; locations that fill with sediments are periodically scoured clean, leaving no traces for the palynologists to study. Closer to the coast, hurricane events are the dominant landform process. Oxbows are abundant but, generally, are filled with massive deposits of recently derived sediments; material likely to have been introduced to the basins by very recent hurricane events. In the face of this situation, efforts to collect a palynological record focused on the middle portion of the Sibun drainage.

Coring Operations

Areal surveys identified a number of potential coring locations, including a sinkhole-like feature near Pakal Na, a series of oxbows near the end of the Churchyard Road, and another oxbow at Pechtun Ha. The basins at Pechtun Ha and Pakal Na were especially intriguing as they were both located adjacent to significant archaeological sites, and offered potential information on prehistoric human activity in those areas.

Coring was performed at all of the basins. Due to the nature of the sediments—sticky anaerobic clay—conventional coring apparatus was not effective at recovering a sediment record; an alternative, low-tech approach was our only real option. We drove a 2-inch diameter steel pipe into the sediments. After a meter or so of sediment had been collected, the pipe was sealed and extracted and additional drives were made in the same hole in order to complete the record. In 2001, we collected a total of 200 linear centimeters of sediment from the Churchyard oxbow, 127 cm from Pakal Na and 268 cm of deposits from the oxbow at Pechtun Ha.

The sediments from the Churchyard oxbow were unconsolidated and considered to represent a single recent flood event—thus, the core was not analyzed. The sediments from both Pakal Na and Pechtun Ha, however, were composed of dense organic-rich clay. These sediments can best be described as “nightmarish”, as they were foul-smelling, sticky and difficult to extract. In short, they were a palynologist’s dream and contained a plethora of perfectly preserved fossil pollen grains. The abundance of organic traces—including wood, leaves and seeds—provided abundant material for dating purposes.

The sediments at Pechtun Ha were particularly interesting, but the core was abbreviated because we encountered a deeply buried tree at 268 cm below “surface” (BS). The large sample of wood collected at this depth, however, did provide an excellent radiocarbon sample.

In 2003, we returned to these locations and collected additional sediments, this time concentrating on obtaining the deepest sediments. At Pakal Na, we were able to core the entire sedimentary sequence,
collecting sediments to a total of 420 cm BS. At Pechtun Ha, we again cored the oxbow, this time fortunately missing the deeply buried log and collected a total of 288 cm of sediments. At both locations, the sediments “bottomed-out” in coarse gleyed sands that appear to be basal river deposits. Thus, these sequences provide a complete record for each basin.

The Quest for Cacao

A significant component of the Xibun pollen project is the identification of ancient cacao production or cultivation. Currently, cacao is widely cultivated in the project environment, as the environmental conditions for its growth are favorably met. It seems likely that this region would have provided favorable conditions for the growth of cacao in the past, as well. Cacao is notoriously difficult to identify in the fossil record as it does not produce phytoliths and, unless fortuitously carbonized, its macro-remains do not preserve well and have not been documented, thus far, in archaeological contexts. Cacao pollen is diagnostic, but is probably not to be expected in most contexts. The trees produce large numbers of flowers, but each flower produces very few grains, and these grains are poorly dispersed and would not be expected to occur any distance from the source. Even sampling the modern ground surface in a cacao orchard may not produce any cacao pollen.

Modern cacao production takes place in shaded orchards, where emergent trees are allowed to grow producing an ample supply of shade favored by cacao trees. In the past, Maya cacao farmers probably used similar cultivation techniques. Thus, it may be possible to suggest prehistoric cacao production based on the presence of pollen from normally rare emergent or economically significant shade trees coinciding with the absence of medium to small non-economic arboreal types.

The Pollen Record

*Pakal Na.* To date, Pakal Na sediments collected in 2001 have been analyzed, but not the basal sections collected in 2003. When the sediments from Pakal Na were initially collected, the uppermost portions appeared to have been heavily oxidized and were reddish in color. However, during pollen extraction, it became obvious that pollen was not only present in the sediments, but was both abundant and perfectly preserved.

The coring location was somewhat atypical for the region, occurring some distance from the river, and was more typical of a sinkhole rather than an oxbow and its geomorphic origin is still unclear. Pollen-bearing sediments were sampled throughout the core and identification of the pollen clearly indicates that changes occurring in the local forests (Figure 22.1). From the base, recently dated at 770 ± 35 BP, the core shows that the basin itself was open as reflected by the high percentage of aerobic pollen types in the samples, including *Pinus, Podocarpus, Quercus* and *Salix* grains. Relatively high percentages or normally scarce forest types, however, indicate that the area surrounding the basin was heavily forested. Towards the base (130 cm BS), these forest types are somewhat reduced, but by 120 cm BS had become well established. Quite probably, this core shows reforestation following Maya abandonment of the area.

Towards the top of the core, there is an increase in some disturbance indicators—mostly *Typha*, Brassicaceae, Poaceae, Asteraceae and *Mimosa* and a corresponding decrease in forest types. This change likely marks the introduction of historic farming activities earlier in the 20th century. Currently, a large complex of orange groves surrounds the basin. Orange pollen is rare and might not be expected to occur in the samples, but the weeds associated with its cultivation are abundant. Curiously, there is no evidence of
Figure 22.1. Pollen profile from core at Pakal Na, Belize.
Figure 22.2. Pollen profile from core at Pechtun Ha, Belize.
human activity in this record and it is possible that Postclassic populations did not take advantage of this water source.

While evidence of Maya activity is almost invisible in this core, the composition of the post-Maya forest at the base of the sediment section is curious, and shows elevated percentages of an unknown Salix-like grain, *Coccoloba*, breadnut, and several other forest types, and especially Unknown A. Several of these types are currently used to provide shade for cacao fields. Although cacao pollen has not been found in our cores, the relative abundance of shade trees such as Acacia-types and breadnut, as well as economically significant species like *Coccoloba* hint at evidence of ancient Maya forest management.

**Pechtun Ha.** The core samples collected in 2001 have been analyzed to a maximum depth of 267 cm BS and the basal sediments have been dated to 647 ± 32 BP. Pollen preservation was excellent in this core, and a comprehensive record of local vegetation was obtained (Figure 22.2). As in the Pakal Na core, the Pechtun Ha record shows that the lagoon has remained open, but was surrounded by ever-changing forests. The basal section of the core records a heavily forested environment surrounding the oxbow, but slight hints of human activity are present in the lowermost sample where the charcoal concentration is somewhat elevated. All subsequent samples, however, contain very low concentrations of charcoal suggesting that human activity in this area has been minimal in the last 650 years. Through time, it is clear that the species composition of the local forests changed with the addition and loss of various tree species. Arboreal species that at one time or another were common in the vicinity of the oxbow include *Alchornea*, *Orbignya* (cohune), *Coccoloba*, *Cassia*, *Gymnopodium*, *Mimosa*, *Pilocarpus* and others. As all of these taxa represent distinct episodes, it is likely that we are recording actual individual trees or clusters of these plants.

At 200 cm BS, there is a single *Zea mays* pollen grain. While it is possible that small-scale milpa operations were carried out in the oxbow area, the absence of notable quantities of charcoal argues against this. Rather, it is more likely that this single grain washed into the oxbow from upstream, and was introduced into the sediments from some past flood. However, very slight increases in Cheno-Ams, a disturbance indicator, might suggest that small-scale milpas were present not too far from the oxbow.

As in the case of the Pakal Na core, any evidence of local human activity is most likely to be found in the deepest, as yet unanalyzed sediments. An estimated 40-50 cm of additional sediments were retrieved in 2003; thus, it seems unlikely—although not impossible—that the unanalyzed material will extend back to the Late Classic period.

At the base of the 2001 core, there is an increase in several arboreal species, including the same Salix-like grain noted in the Pakal Na core, as well as Sapotaceae and *Spondias*. Percentages of non-economic emergent tree pollen also are elevated slightly at the base of the core, and include *Acacia*, *Alchornea* and *Cassia*-type Fabaceae. Interestingly, it is this type of pollen signature that may be indicative of prehistoric cacao orchards.

**Pollen Washes**

A series of pollen washes was performed in the field on two separate manos and metates collected from cave contexts. The grinding surfaces of the artifacts were washed with dilute acetic acid and distilled water; the liquid fraction that contained pollen was collected. An effort was made to collect pollen only from the cracks and crevices on the grinding surface, and not from soil or other material adhering to the
artifacts. The ground stone from Actun Chanona was particularly interesting as the metate had been found inverted, thus reducing the chance of contamination. In both caves, the mano and metate had been found together and are thought to have been associated.

Pollen was present in all samples, but in very low concentrations. Full counts were not obtained for these samples; however, the pollen taxa that were present, along with their approximate concentrations, provide a notion of which plants may have been processed with these tools. It is important to remember that these tools contain no context beyond the fact that they were made by humans and come from a cave. Conceivably, they could date to any time period although the bulk of temporally diagnostic artifacts from caves in the Sibun region date to the Late-to-Terminal Classic period.

Metate Cave. Pollen was present in low concentrations on the metate sample and was almost absent from the mano. Cultigens were wholly lacking in the assemblages. Curiously, nearly all pollen identified in the metate sample came from insect-pollinated plants, suggesting that the few grains present in this sample actually may be contaminants from either frugivorous bats or pollen that was present in or on insects consumed by bats. Still, several pollen types stand out and, in fact, may represent ancient foods of the Maya. Economic pollen types identified include Coccoloba, a plant in the Polygonaceae family related to sea grape, a single grain from the Sapotaceae family, and several grains from ramon or breadnut. This latter type was the most commonly encountered grain in the assemblage representing 22% of the abbreviated assemblage.

Actun Chanona. The pollen assemblages found on ground stone from Actun Chanona were much more informative. Here, well-preserved fossil pollen was identified in both the mano and metate samples. The fact that the metate was found inverted inspires a higher level of confidence that the pollen assemblages represent human activity rather than contamination from bat feces. The presence of a Trichuris (whipworm) egg—presumably from a bat—in the metate sample, however, suggests that some contamination might still be an issue. Overall, the Actun Chanona samples are consonant with a human-derived assemblage and contain low frequencies of pollen consistent with bat foraging. In short, the pollen probably came from plants that were processed with the ground stone either during the course of a ritual within the cave or prior to the transport of the ground stone into the cave chamber.

The mano and metate pollen assemblages are similar suggesting that these two tools truly did “belong together.” The metate contained only a few grains that likely represent economic taxa, and include a single Solanaceae (nightshade family) grain and two grains from Chrysophyllum (star apple). The mano, however, contained many more well-preserved pollen grains, and the assemblage was dominated by economic types, including Chrysophyllum, Coccoloba, ramon, and most surprising — five pollen grains (9.4%) from what is almost certainly Capsicum (chili peppers). While the identification of this genus from pollen is difficult, to my knowledge there are no other members of this family in Belize that produce pollen consistent with this type. The finding of Capsicum pollen is rare under the best of circumstances, and the presence of such a significant quantity of chili pepper pollen surely represents the economic usage of this plant. This genus is the likely source of the single Solanaceae grain identified on the metate sample.

Finally, a single grain of what may be cacao pollen was noted on this mano sample, although it is also possible that this grain may represent Guazuma — a common disturbance tree. The introduction of cacao pollen into the grinding stone sample would not be expected through the preparation of cacao beans, however, if this grain does represent cacao, it might offer the first real evidence that this plant was grown in
the immediate area. For now, this problematic grain must remain a tantalizing hint of insights to come as this study unfolds.

Summary

The fact that pollen is present in this part of Belize is good news but, of course, the search for older core sediments continues. Regardless, this study has shown that pollen can be recovered from oxbow sediments. Upcoming analysis of the basal sediments of the Pakal Na and Pechtun Ha cores will add time depth to the sequences and, hopefully, verify whether or not the pattern of tree species noted above signals selective emergent and economic tree cultivation by Maya farmers.

Another significant finding of this project is that pollen can be recovered from grinding stone surfaces, even in the humid tropics. These pollen analyses are the first ever conducted in Belize on ground stone from cave contexts, and future efforts will expand this database. The fact that significant quantities of unexpected economic pollen types were recovered hints that further efforts along these lines will be most illuminating.
Chapter 23
Fluvial Geomorphology of the Upper Sibun Drainage

Thomas F. Bullard

For the past three millennia, Maya farmers and traders are known to have inhabited riverine environments and utilized rivers for transport and as trade routes. The Xibun Maya of Classic through Colonial times provide a textbook example of the advantages and risks of a riverine lifestyle (McAnany 2002). Questions persist as to the causes of the decline in Xibun Maya settlements during the Postclassic period (after A.D. 1000) and answers continue to retain a certain amount of speculation. But recognition that village sites were located on the banks of abandoned meanders far from the current river channel, coupled with the discovery of Terminal Classic structures buried beneath flood deposits, raise the possibility that changes in the behavior of this dynamic river system could have contributed to the abandonment and possible relocation of many Sibun Valley settlements.

Humans have always maintained a close relationship with water, whether lakes, oceans, rivers, springs, or isolated catchments. More often than not those inhabiting areas adjacent to fluvial systems have contended with the consequences associated with the natural behavior, or misbehavior, of rivers. Rivers can be viewed from a variety of perspectives and commonly engender conflicting images and emotions of beauty, tranquility, resource, danger, fear, and ultimately respect. In a sense, man’s attraction to rivers has been, and continues to be a love-hate relationship.

Given our understanding of fluvial system behavior, principally discharge, we know that every few years most rivers can be expected to overflow their banks and benignly inundate the surrounding floodplain. We are also familiar with the extreme fluvial events known as the hundred and five hundred year floods, which have phenomenal discharges, are commonly damaging to agriculture and habitation sites, and tend to leave a lasting impression on the landscape. In the Americas, the historic flood record reaches back a few hundred years, at best, but in the past few decades the discipline of paleoflood hydrology has emerged and extended the flood record thousands of years (Baker et al. 1983, 1987; O’Connor et al. 1988). This ability to assess the hydrology of rivers deep into the past provides important insight to climate and river behavior over long periods. In parts of Mexico the coastal sedimentary record is yielding paleoclimate data through evidence of hurricane activity extending several thousand years into the past (Goman et al. 2003). Surely, the Xibun Maya who inhabited settlements along the banks of the Sibun and other rivers of the region were accustomed to the periodic ravages of wet season floods and the infrequent extreme event capable of settlement destruction and dramatic reshaping of the river channel and low-lying areas. Thus, we can be assured that the Xibun Maya who lived along the river coped to some degree with the capriciousness of their riverine environment.

The population reduction in the Maya Lowlands at the close of the Classic period is the subject of much debate. Reduction of vegetation through human consumption and agricultural practices is one factor that has received much attention (Goman and Byrne 1998). Climate change has received equal attention (e.g., Leyden 1984; Hodell et al. 1995, 2001; Rosenmeier et al. 2002a; Haug et al. 2003). Recently, Rosenmeier et al. (2002b) have proposed that hydrologic and vegetation responses to change in moisture levels must be factored into an analysis of oxygen isotope content of inland lakes, specifically in Guatemala and Mexico. Ironically, isotope values suggestive of drying periods may be produced by changes in vegetation cover during moister periods with concomitant adjustments in the isotope concentration. Rosenmeier et al. (2002b) demonstrated the presence of pollen from tall canopy forest taxa during times
when the isotope record indicates a dry period. This type of information has great implications for land use, vegetation, hydrologic relationships, and geomorphic responses of the landscape.

This chapter focuses on the final implication noted above—geomorphic responses of a landscape. Based on field activities during the 2003 field season, this chapter addresses the fluvial geomorphic history of the upper Sibun River over the past few thousand years, spanning the time prior to widespread Classic-period occupation in the Sibun Valley to the present. Geomorphic history is developed on the basis of field investigations and mapping of geomorphic and Quaternary geologic units, description and analysis of fluvial stratigraphy, and soil-geomorphic investigations. Changes in the geomorphic system through time, particularly during the Late-Terminal Classic period, are placed in the context of natural system behavior, climate change, and land use. How the Xibun Maya adjusted to the changing geomorphic environment is left to the archaeologists.

Methods

The study included field mapping of Quaternary geologic units, primarily fluvial terraces along the Sibun River. Unit stratigraphy was described in natural exposures and shallow hand-excavated pits, commonly on riverbanks. Bedding, sedimentary structure, grain size, and lithology were described. Topographic profiles were made using tape and level to determine the spatial relationship between terraces along the Sibun River and variation in terrace sequences throughout the system. Soils provide excellent stratigraphic marker horizons and are indispensable correlation tools. Soil chronosequences developed in the tropics (Bullard 1995, 2002) are useful for establishing relative ages and providing age estimates for fluvial terraces. Soil developed on the fluvial deposits in the Sibun River drainage were described following standard pedologic field methods described by the Soil Survey Staff (1999) and Birkeland (1999). Samples of soil horizons were collected and returned to the Desert Research Institute for analysis in the Quaternary Soil Characterization and Pedology Laboratory.

Fluvial geomorphology refers to processes and landforms associated with streams and rivers (Ritter et al. 1995; Knighton 1998). Understanding fluvial processes, such as sediment entrainment, erosion, and deposition allows interpretation of stratigraphy contained in stream deposits. Materials that can be dated by conventional radiometric methods and other indirect indicators of relative time, for example the degree of soil development (e.g., Birkeland 1990, 1999), help to correlate units and provide constraints on temporal and spatial variations in fluvial activity. Crosscutting relationships between fluvial landforms, such as terraces, and cultural features also provide constraints on the timing of changes in fluvial processes. Paleobotanical evidence contained in sediments deposited in abandoned meanders often yield valuable information regarding not only the vegetation of the nearby area, but also important climatic and paleoflood information.

Setting

The Sibun River drainage is situated on the northern flank of the Maya Mountains in southern Belize (Figure 23.1). Precipitation ranges from about 1500 mm near the coast to nearly 3000 mm in the mountainous region. The drainage basin is approximately 1,170 km², most of which is contained in the headwaters area (Boles 1998). About 47% of the area lies between 80 m and 960 m elevation and 40% of the basin is below 40 m (Figure 23.1). The drainage is conveniently divided into four sections: headwaters section, the mid-reaches section, the lower reaches section, and the coastal zone. The principal distinguishing features of these sections are relief, geology, and slope.
Figure 23.1. Components of the Sibun River watershed showing distribution of geologic units and characteristics of the fluvial geomorphology.

**Characteristics of the Sibun River**

The Sibun River heads in the Maya Mountains, which are comprised of a variety of metasedimentary and igneous rocks. Highest elevations within the watershed are about 960 m. Within about 22 km of the drainage divide, elevations fall below about 100 m for the remaining 65 km of drainage. Streams in the headwaters are steep and have characteristic falls, cascades, and channel morphology that Montgomery and Buffington (1997) refer to as step pool.
North of the headwaters the gradient of the river decreases as it crosses limestone in the mid-reaches section and Tertiary marine and terrestrial rock units. Where the river traverses the limestone units, the channel is generally wide and shallow and has regularly spaced pools and riffles. This is a channel type commonly referred to as plane bed (Montgomery and Buffington, 1997). Sinuosity of the river is low (~1.2). The low sinuosity and high width to depth ratio is typical of rivers having plane bed channel morphology. These channels commonly have high bed shear stress and are capable of transporting large grain-sizes during high discharge events. In the area near Hershey, the focus of most of the geomorphic fieldwork in 2003, large boulder bars are common (Figure 23.2). Some of the boulder bars (lower photo of Figure 23.2) were formed during recent large magnitude discharge associated with hurricanes. These boulder bars create local base level conditions and constrict the flow such that during rising river stage, water is more likely to leave the confines of the channel. Abandoned meanders (oxbows) and meander scrolls (Figure 23.3) are apparent in parts of the mid- and upper reaches sections, although they are shallow and poorly defined. Attempts to retrieve cores of sediment have met with disappointing results. The floors of the oxbows are commonly armored with boulders and coarse gravel. This suggests that high-energy stream conditions in the upper and mid-reaches sections are not conducive to deposition and preservation of fine-grained fluvial sediments. The non-cohesive bank materials and broad valley allow the river channel to migrate with relative ease, particularly under higher discharge and sediment load conditions.

In the lower reaches section of the Sibun, the width to depth ratio of the river decreases and a meandering pattern is dominant. River depths exceed 3 m, channel form is parabolic, and bed shear stress is probably lower than in the upper reach section. The sinuosity of the meandering lower reach section is about 1.8. Abandoned meanders are common in this area (Figure 23.3) and many are filled with sediment during flooding. Based on radiocarbon AMS dates from sediment cores in oxbows, the pollen recovered from the cores in the mid to lower reaches section is thought to record vegetation recovery during the Postclassic period (see Chapter 22, this volume). The radiocarbon dates also indicate that meander cut off and abandonment probably occurred prior to that time, perhaps during the Terminal Classic period.

**Fluvial Geomorphology at the Hershey Site**

At the Hershey site, the distribution of fluvial terraces was mapped on stereographic aerial photograph pairs obtained during the field season. Map units were distinguished on the aerial photographs primarily on the basis of topographic relationships between terrace remnants and the relative degree of post-depositional erosion. Map units were confirmed in the field by observing and describing the fluvial stratigraphy and soils on each terrace unit and by measuring topographic profiles utilizing a level, stadia rod, and tape. Figure 23.4 shows the surficial geology mapped for the Hershey site and Figure 23.5 is a composite topographic profile of the Hershey site area showing the topographic relationships and stratigraphy of the fluvial terraces.

The Hershey site is situated on a terrace that ranges in height from about 4 to 6 m (T3) above the river. Above this terrace there are two higher terrace remnants situated at about 8 m (T2) and 20 m (T1) above the river. Below the terrace at the Hershey site, there are two additional terraces at about 3 m (T5) and 4 to 5 m (T4) above the river. Each terrace has characteristic geomorphology and each possesses a soil that is distinct from soils on adjacent terraces. The sediment comprising all terraces is predominantly upward fining sequences of fine sand and mud, typically with a basal cobble and boulder unit. With the exception of the highest terraces, sedimentology alone is of limited use in distinguishing the terrace sequence. Evidence of base level and landscape stability is provided by the development of soils. Truncated soils and
Figure 23.2. Boulder deposits in the Sibun River near the Hershey site (top). The recent boulder bar in the lower photo has prograded across and older deposit. The thickness of the recent boulder deposit is about 1 m.

gravel lenses at erosional contacts observed in deposits of T3, T4, and T5 indicate episodes of fluvial activity sufficient to erode and bury previously stable terrace surfaces.

Terrace Soils and Estimated Ages

The morphology of soils formed on terraces was described in road cuts and natural exposures along river cut banks. The exposures were cleared of vegetation and cleaned prior to making field descriptions. Soil morphologic descriptions follow standard techniques and nomenclature of Birkeland (1999) and the
Figure 23.3. Characteristic meanders of the mid and lower reaches of the Sibun near Churchyard and Pechtun Ha. Traces of meander bends are shown with dashed white lines.

<table>
<thead>
<tr>
<th>Terrace</th>
<th>Height above Base Level (m)</th>
<th>Diagnostic Horizon</th>
<th>Horizon Thickness (cm)</th>
<th>Maximum Reddening (hue)</th>
<th>Maximum Soil Structure</th>
<th>Clay Films</th>
</tr>
</thead>
<tbody>
<tr>
<td>T5</td>
<td>0-3</td>
<td>C</td>
<td>120+</td>
<td>10YR</td>
<td>sg</td>
<td>1-2n sil</td>
</tr>
<tr>
<td>Ballcourt</td>
<td>4.0</td>
<td>Bw</td>
<td>60</td>
<td>10YR</td>
<td>1-2msbk</td>
<td>1-2n sil</td>
</tr>
<tr>
<td>T4</td>
<td>4-5</td>
<td>Bt</td>
<td>170+</td>
<td>7.5 – 10YR</td>
<td>2-3msbk</td>
<td>2-3mk</td>
</tr>
<tr>
<td>T3</td>
<td>4-6</td>
<td>Bt</td>
<td>190+</td>
<td>7.5 – 10YR</td>
<td>2-3 msbk</td>
<td>2-3mk</td>
</tr>
<tr>
<td>T2</td>
<td>8</td>
<td>Bt</td>
<td>195+</td>
<td>5YR</td>
<td>3csbk – 2-3mpr</td>
<td>3k</td>
</tr>
<tr>
<td>T1</td>
<td>20</td>
<td>Bt</td>
<td>210+</td>
<td>2.5-5YR</td>
<td>3msbk</td>
<td>3-4k</td>
</tr>
</tbody>
</table>

Notes: Diagnostic horizons and maximum reddening follow nomenclature of the Soil Survey Staff (1999). Colors are from Munsell Soil Color Company. Maximum soil structure refers to naturally occurring structure found in soils. Numerals describe degree of development (1 is weak, 2 is moderate, 3 is strong); m and c refer to the size (medium and coarse), and sbk, pr, and sg denote type of structure: sbk is subangular blocky, pr is prismatic, sg is single grain. Clay films describe the thickness and extent of clay films found in the horizon: numerals refer to the frequency (1 is few, 2 is common, 3 is many, 4 is continuous) and letters refer to thickness (n is thin, mk is moderately thick, k is thick); sil indicates that silt coatings are observed, but no clay films. Structure and clay film nomenclature follows Birkeland (1999).

Table 23.1. Characteristics of Soils in the Hershey Site Area.
Soil Survey Staff (1999). Morphologic characteristics included horizon thickness, color, texture, clay films, roots, pores, and horizon boundaries. Characteristics of soils found on fluvial terraces in the Hershey site area are shown in Table 23.1. Field descriptions are summarized in Table 23.2 and the particle size data are shown in Table 23.3. The soil horizons are identified on the stratigraphic columns shown on Figure 23.5.

**T1 and T2 soils.** In general the stratigraphy of terraces T1 and T2 consists of deeply weathered deposits of fine, silty sand. Both terraces have a thin surface soil overlying thick, buried soils in the subsurface that extend to depths exceeding 2 m. Soils developed on T1 and T2 are the best developed of all soils described in the region. They have extremely well developed Bt horizons, common, thick clay films, clay texture, and are reddened to 2.5YR hues. Red (5YR) and yellow (10YR) mottles consistent with redoxymorphic features characteristic of plinthite are observed in both the T1 and T2 soils. Dark staining, possibly manganese oxide, is also observed on ped faces. The soil on the T1 terrace is more strongly developed and likely much older than T2 soil. Relative to similar soils studied in the tropics of Costa Rica (Bullard 1995, 2002), these soils are mid-to late Pleistocene in age.

**T3 soil.** Two distinct units of upward fining sequences of gravel, rounded pebbles, and coarse sand separated by an erosional contact and evidence of soil development is observed in the T3 deposits. A buried soil is formed on a depositional unit having a basal gravel unit (2 to 5 cm) overlain by sand that fines upward. The top of the buried soil is eroded and overlain by a surface soil formed in about 75 cm of upward fining gravel and sand. The surface soil developed on T3 consists of a thin (~60 cm) profile that has a slightly reddened Bt horizon that overlies the 3 m thick buried soil, which possesses a well-developed Bt horizon. The development of the T3 buried soil relative to soils observed in Costa Rica indicates that it is probably on the order of 7 to 10 thousand years (ky) old. The surface soil has characteristics (Bt horizon, clay films, structure) similar to a tropical soil in the range of 4 to 6 ky old. This indicates that the T3 surface (formerly a floodplain) was probably formed in the latest Pleistocene but received a substantial amount of sediment during the mid Holocene sufficient to bury the original soil formed on T3.

**T4 soil.** Terrace T4 deposits are inset into the T3 terrace and contain a buried soil formed in an upward fining unit consisting of a basal cobble (mean diameter 15 cm, range 5 to 40 cm) at least 2 m thick and rounded gravel, pebbles, and sand. The profile thickness, clay films, structure, and color of the buried soil indicate that it is younger than the soil formed on terrace T3. The uppermost, moderately developed Bt horizon of the buried soil is eroded and overlain by about 60 cm of fine to very fine lithic rich sand that has a weakly developed soil. The relative degree of soil profile development for the buried and surface soils associated with terrace T4 suggest that T4 is likely mid-Holocene in age.

About 60 cm of fine sand and silt is deposited on T3 and buries the ballcourt at the Hershey site (see Chapter 10, this volume, for archaeological description of the ballcourt excavations). The deposits likely represent overbank deposition associated with the formation of T4 and as well as the incorporation of recently deposited flood sediments during large magnitude discharge events. A weak soil with a slightly oxidized and reddened Bw (structural B) horizon has formed in the deposits overlying the ballcourt (Figure 23.6). Because the ballcourt is considered to have been constructed slightly over a thousand years ago (about A.D.830-950), this cultural feature provides an estimate of how rapidly soils form in this environment.

**T5 soil.** Terrace T5 deposits consist of a basal cobble unit (up to 35 cm diameter) and at least 150 cm of alternating graded sand and silty sand beds and. Irregular contacts between T5 depositional units
Table 23.2: Summary of Field Descriptions of Soils in the Hershey Site Area.
<table>
<thead>
<tr>
<th>ID #</th>
<th>Date</th>
<th>Terrace</th>
<th>Horizon</th>
<th>Depth (cm)</th>
<th>Physical Separation</th>
<th>Sieve + Laser</th>
<th>TOTAL</th>
<th>CLAY</th>
<th>SILT</th>
<th>SAND</th>
<th>&gt;62.5 um</th>
<th>&gt;2 mm</th>
<th>Coarse 15 um</th>
<th>Fine 3 um</th>
<th>&lt;3 um</th>
<th>Σ fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-184</td>
<td>1</td>
<td>8/1/03</td>
<td>T1</td>
<td>BtA1</td>
<td>0-4</td>
<td>0.0</td>
<td>12.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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Table 23.3. Summary of Particle Size Data for Sibun River Terrace Soils near Hershey.
Figure 23.4. Preliminary surficial geologic map of the Hershey site area showing the distribution of fluvial terraces and estimates for the age of terraces.
Figure 23.5. Composite topographic profile of the Hershey site area in the upper reaches of the Sibun River. Wavy vertical lines represent soil development. The longer, thicker lines indicate well developed soils. Terraces T1 (oldest) to T5 (youngest) are shown. Dashed lines indicate that units T3, T4, and T5 are likely inset fluvial terraces. Stratigraphic sections are shown for each terrace and soil horizon designations are shown within each section.
coupled with evidence of bioturbation indicate brief periods of surface stability and incipient soil formation separated by discrete depositional events. The lowest buried depositional unit of T5 preserves a weak soil that is slightly oxidized, has massive structure, and displays evidence for the translocation of silt and clay, which contrasts with the overlying deposits, which are comprised of loose sand. At the erosional contacts between the depositional units, there is evidence of bioturbation suggesting that the buried soils had been stable at the surface for brief periods of time prior to burial. Characteristics of the soil on T5 suggest an age of less than 1000 years to the present and that the unit represents multiple recent depositional and erosional phases.
Fluvial Geomorphic History

The terrace sequence, stratigraphy, and presence of multiple buried soils indicate a complex geomorphic history for the Hershey site area. Because the oldest terraces (T1 and T2) are considered to be Pleistocene in age and beyond the age range of archaeological interest, they will not be discussed. Terrace T3 represents the longest period of stability within the inner valley of the Sibun since the Pleistocene. The buried soils found on T3 indicate periods of relative stasis in this part of the fluvial system during which soils formed over a period of several thousand years followed by renewed flooding during the early to mid Holocene. At some time during the mid-Holocene, T3 was buried by perhaps as much as a meter of sediment. It is possible that the Sibun River channel aggraded during the mid Holocene to bury the T3 soil, although the burial of the T3 soil could also occur as a result of repeated inundation and overbank deposition or just a few overbank events. Regardless of the exact nature of the burial, it is clear that final fluvial abandonment of the T3 surface occurred prior to the middle Holocene.

During mid-to-latter part of the Holocene, the T4 terrace was formed either by incision of the T3 surface or by channel aggradation and rapid incision. The T4 terrace was periodically flooded as evidenced by the weakly developed surface soil that buries a moderately developed soil. The surface soil may be less than 2 to 3 thousand years of age. Sediments associated with terrace T5 were deposited within the last several hundred to a thousand years.

Implications of Boulder Deposits

The presence of large deposits of boulders (with b-axis diameters of 20 cm and greater) bears two-fold significance. First, the transport of such large material requires high velocity flow associated with large magnitude discharge, such as is common with hurricanes or other large tropical storms. Currently, the Sibun transports large grain sizes only during intensive storm events. During periods of high discharge, most of the fine-grained material is transported through the system. The implication is that the largest particles (boulders) are transported and deposited only during the infrequent, high-magnitude storm events, whereas the fine-grained deposits that bury the boulders at the base of the T3 and T4 terraces represent smaller, more frequent low-magnitude discharge events. Second, the presence of the boulder deposits, especially notable in the Hershey site area, has the effect of constricting the channel and raising the local base level. The net result is that there may be a greater frequency of local overbank flooding when the mid-channel boulder deposits remain stationary for long periods. That is to say that the presence of the boulder bars may exacerbate the magnitude of flooding of the more frequent small and moderate flood events.

The presence of a recognizable soil on flood deposits overlying the ballcourt at the Hershey Site raises the possibility that despite the relatively high elevation of T3 at the Hershey Site (4 to 6 m), overbank events were common in the last 1000 years or so and may have contributed to abandonment of this site and possibly others along the Sibun. Such overbank events could have resulted from increased frequency of high magnitude flood events, the presence of boulder bars that affect local base level and promote overbank flooding, or both. The cause and timing of changes in flood magnitude and frequency are as yet unknown. There is paleoclimatic evidence (Hodell et al. 1995; Goman et al. 2003; Haug et al. 2003) that could indicate changes in storm type and frequency, which could have affected the Sibun during the latter parts of the Holocene. There is also the suggestion that widespread deforestation could have dramatically altered watershed hydrology (e.g., Goman and Byrne 1998; Rosenmeier et al. 2002a), which also could have had an effect on the behavior of the Sibun River. Currently, we have insufficient data to knit together the
connections among climate, Maya land use practices, and the fluvial behavior of the Sibun River. Radiocarbon dates from oxbows in the middle and lower parts of the Sibun River suggest a loose relation between settlement abandonment and oxbow formation. Future research will be designed to explore the vital connections between the Xibun Maya and their volatile fluvial environment.

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Soil Survey Staff