In three seasons of fieldwork (1997, 1999, 2001), the Xibun Archaeological Research Project (XARP) located and recorded nineteen ancient Maya sites in the Sibun River Valley. These settlements range in size and complexity from single isolated mounds to collections of plaza groups. Buildings at these sites vary from small house platforms to large pyramids. The one factor common to all sites is their proximity to the Sibun River itself. Sites are located either adjacent to the river or to the many feeder streams that flow into it. Because of this connection between the settlements and the river, the Sibun River Valley can be studied as a geographically distinct archaeological region. Within this region sites stretch along the entire length of the river, with the densest concentration of settlements in the middle reaches. While most sites are located on high banks above the flood water line, the largest site, Hershey, is located directly on the flood plain.

In 2001, field research focused on sites in both the upper and lower reaches of the valley. Survey and mapping revealed that despite being part of the same region, sites differed from each other significantly in layout, architecture, and size. These differences are worth a closer examination and this paper hopes to highlight some of these variations as they relate to the two largest sites in the valley and the smaller settlements proximate to them.

The two largest sites along the Sibun River are the Hershey site in the upper reaches and the Samuel Oshon site in the lower reaches. These settlements dominate their respective regions in size and complexity. Scattered around each of these sites are smaller secondary settlements. We have termed the combination of a large site and the smaller sites associated with it an archaeological district. This paper will specifically discuss the Hershey District and the Oshon District.

**The Hershey District**

The Hershey District includes the following sites: Hershey, Echo Valley, Sleeping Giant, Silver Creek, Finca Buenos Aires, and a large cave system called Actun Chanona (Map Sheet 2). The district lies in an area of deep alluvial deposits at the base of the Sibun Gorge. These alluvial flats form the first pocket of flat land encountered when descending from the Maya Mountains. In this area, the early settlers established the largest site we have found in the valley. The location of the site must have been affected by these critical factors: proximity to the gorge and sources of granite, access to a transport route, proximity to deep alluvial soils that would have been fertile in the past and continue to be fertile today, and proximity to Actun Chanona, a cave that was used and modified extensively by the locals and maybe even by outsiders to the region (see Peterson, Chapter 3).

While the Sibun is the primary water source, the Hershey district is traversed by tributaries of the Sibun River. Additionally, there are other numerous water-bearing features such as sinkholes and springs in the area. Vegetation in the area includes broadleaf plants, such as cedar, cohune, breadnut, sapodilla, and *ceiba* (King et al. 1992: 90-91). Economic species currently cultivated in the area include citrus and cacao, the last being of special significance to our project.
The Hershey site is located in a cacao orchard. The site contains 39 structures of various sizes and is dominated by Plaza A. Plaza A is a large rectilinear plaza group with an orientation of N33°E. This orientation dominates the architectural plan of the entire site. The focus of Plaza A is an 11 m high pyramid located on the SW corner of the plaza. The plaza is closed off to the north, west, and east by long rectangular platforms (Structures 503-507); smaller structures are attached to and built on top of these larger platforms, including a ball court that is connected to the SE corner of the pyramidal structure (Figure 1.2).

At the southeastern end of the site is the second largest Plaza Group, Group B, a cluster of three structures atop a triangular platform. The buildings themselves are rather small in comparison to the structures found in Plaza A but the plaza of B is situated atop a high basal platform on the edge of the river. The height of the plaza may be directly related to the severity of the flooding regime. There is a smaller plaza between Groups A and B: Group C, a rectilinear plaza group composed of four primary mounds on the four sides of the plaza and three smaller associated structures. The nature of this group appears to be elite residential. The recovery of relatively high numbers of obsidian blades from a small excavation on the western side of the plaza (see Acone, Chapter 7) seems to confirm the idea that this was a higher status group.

Two smaller plaza groups round out the site. Group D is situated in the shadow of Group A and may have housed support staff for the larger group. Group T, about 100 m north of Group A, is a small residential group. There are a few other isolated mounds on the site but overall, the site gives the impression of having been laid out along strict architectural plans. Architectural orientation is consistent internally, as well as across groups suggesting a planned program of construction conceived and carried out within a relatively short period of time.

The Hershey site is the largest in the area and the only site in the district that had monumental architecture including a pyramid. It appears from the size and complexity of the site that it was the most prominent in the region. Sites mentioned below are clusters of mounds arranged in informal configurations with no defined plaza groups and no pyramids or buildings that would appear to have had a civic-ceremonial function.

Echo Valley is comprised of a group of structures that stretch in a linear arrangement along an unnamed stream that flows into the Sibun River. The site is distanced approximately 5 km from the Hershey site. Echo Valley is located on a high bank with the unnamed tributary to the west and the karst hills to the east. The karst separates the valley from the rest of the region and also creates a distinct auditory phenomenon by which sound is carried across the mounds with very little effort. It is this property of the valley led to its name Echo Valley. The 15 structures in the valley all appear to be house mounds. There are no formal plaza groups. A number of the mounds have been partially destroyed by land clearing activities undertaken while converting the area into a citrus orchard. There is no consistent orientation by which the structures were laid out. These casual arrangements suggest that there was no single construction plan like that exhibited at Hershey. In contrast, Echo Valley developed in a more organic manner; families expanded and settled in different parts of the valley as the need arose and geography permitted. There is no evidence for significant alterations to the terrain to fulfill some central plan. The site was dependent on the waters of the tributary for its day-to-day needs. But the fact that the stream flows into the Sibun means that they were still connected to the economy of the larger river. The location of Hershey downriver may indicate that control of the movement of goods and/or people along the river was a significant concern.

Between Echo Valley and the Sibun is a small community of about four mounds termed Sleeping Giant (named for the nearby farm owned by Johnny Zander). This area has been substantially modified for citrus cultivation, which may explain why we found only four mounds. Of the four we located two that had
been badly damaged. The mounds appear to be residential in nature but do not form any sort of formal arrangement. Situated proximate to the river, Sleeping Giant residents must have used the river as their primary source of water, taking advantage of their strategic location relative to river traffic at the base of the gorge. Both these communities are located above Hershey; river traffic would have floated down towards Hershey.

The Silver Creek group is a cluster of three mounds. They are near a tributary of the Sibun and are also close to a natural spring. The small mounds were probably residential in nature; they do not exhibit any formal arrangement. Finca Buenos Aires, a small plaza group, is a neighbor of the Silver Creek group (see Morandi et al., Chapter 2).

Echo Valley spreads across the greatest area. This dispersed settlement would be consistent with an agricultural community in which individual houses are surrounded by farms and gardens. The structures of Silver Creek also lie at a distance from each other, but the distances between the mounds is smaller than the distances between the mounds in Echo Valley. This could be an indication that the settlers of Echo Valley had the means necessary to maintain larger farms and gardens than their cohorts in Silver Creek. The mounds themselves are smaller at Silver Creek than those found in Echo Valley. This could be a further indication that the settlers of Echo Valley were not as well off as their neighbors.

While the main architectural center of Hershey covers a smaller area than Echo Valley, it is clearly the largest and most prominent site in the district. It is most likely that Hershey had a major influence on the traffic that moved along the river. The site itself appears to have had a strong central planning organization that was able to direct the building program. The largest and presumably most important buildings at the site were centralized. Also, variation among the structures at the site may indicate differences in status within the site. The Hershey site also is the only settlement in the area that has a civic-ceremonial area.

Within the sites of Echo Valley, Sleeping Giant, and Silver Creek there is less differentiation between the structures. All mounds within Echo Valley have strikingly similar dimensions. The exceptions are two double-mound structures that have a single platform supporting two structures. These may indicate slightly different access to resources or may simply be a factor of different functions. Similarly, mounds at Sleeping Giant and Silver Creek are fairly uniform within the site. Overall, the sustaining sites look fairly uniform internally and stand in stark contrast to the Hershey site. The idea of proximity to water is one worth repeating. While all sites enjoyed access to the river, Hershey is the only one that was located directly on the flood plain of the river. The other sites do not seem to have used the Sibun as their primary water source but are located along streams that feed into the Sibun. These streams all feed into the river at a point above the Hershey site. Any commerce from these sites then would have to pass by the Hershey site.

The Oshon District

The Samuel Oshon site is part of a collection of sites that make up what can be termed the Oshon district. In addition to the Oshon site, the district includes the following sites: Obispo, Sak Tzimin, and Neal’s. The sites in this district are discussed in Thomas and Secchiaroli (2002). Therefore we will not describe them again in detail but simply refer to them in the discussion that follows. Also, see Morandi,
Chapter 15, for a description of the excavations conducted at Obispo and Harrison, Chapter 16, for work at the Oshon site.

The Oshon District is located approximately 10 km from the opening of the Sibun River into the Caribbean Sea. Between the district and the sea are mangrove swamps and coastal sands. The **Oshon site** is the largest in the district with two plaza groups and several house platforms scattered around the plazas. The northern plaza features two stone monuments set in front of a circular building. It is clear from the monuments and the unusual architecture that the site had a civic-ceremonial function. The total number of structures at the Oshon site (n=36) is comparable to the Hershey site.

The **Augustine Obispo site** contains stone monuments and a ritual aspect but still appears to be secondary to Oshon in both size and importance. It is essentially a small plaza group with a few outlying scattered mounds that are relatively small. The key features of the site are two stone monuments. One is broken and appears to be an altar. Scattered around this monument are fragments of ceramic *incensarios*.

**Sak Tzimin** and **Neal’s Site** are informal arrangements of small to medium-sized mounds. The platforms at Sak Tzimin are arranged in a linear fashion and not in plaza groups. Neal’s site contains one large steep sided platform and three small platforms. Once again there is no formal arrangement of the mounds and the sites are fairly small.

The Oshon site with its plaza groups and ceremonial structures appears to be the focus of the district and may have been a regional center for the sites in the district. It must be noted, however, that while secondary sites in the Hershey District are located above the Hershey site, secondary sites in the Oshon District are located downriver from the Oshon site. The Obispo site is the farthest downstream and is the only one in this area that is located on the south bank of the river.

**Comparison of the Districts**

The Hershey District and the Oshon District anchor the two ends of the Sibun River Valley. The Hershey and Oshon sites are the largest and arguably the most important sites in their respective districts. Hershey contains a greater volume of construction than the Oshon site but both feature similar numbers of structures, formal plaza groupings, and civic-ceremonial as well as residential architecture. This is where the similarities end. The civic-ceremonial center of the Hershey site appears to be Plaza A with its large pyramid and attached ball-court. The layout of this site is reminiscent of Classic period Maya sites found in the Petén and the Belize River Valley. A ceremonial focus of the Oshon site appears to be the circular structure in Plaza A. Two stone monuments had been reset in front of this structure. The Hershey site does not contain any stone monuments.

Satellite settlements are found around both sites. These satellites do not contain a civic-ceremonial component and therefore may have been subsidiary to the larger sites. Another indication of the importance of the larger sites is the great variation among structures within each site. The buildings in Plaza A of the Hershey site are much larger than buildings in the other plaza groups and larger than the platforms founds at the other sites. Similarly, the Oshon District structures at the Oshon site show a greater degree of differentiation within the site than the structures at the other sites in the district. This size differentiation may be evidence for a hierarchy within the sites with differential access to land, resources, and the means to construct buildings, or may reflect different functions. In contrast, the platforms in the smaller sites of each district show less differentiation, and for most part, the buildings appear fairly similar to one another. The
Obispo site in the lower reaches is an exception. It is a small site but has two stone monuments. This settlement may have been a satellite site of Oshon and situated across the river.

From its location the Oshon site appears to have been the gateway to and from the Caribbean Sea. The importance of the Oshon site may have arisen from its control of access to the Caribbean Sea. The ability to control the transfer of goods upstream may have been part of the wealth that was generated in the lower reaches. Trade could have included cacao and granite.

The Hershey site located at the foot of the Maya Mountains would have been in a position to control highland resources. It is also better situated in reference to the Petén, Stann Creek, and the Belize River Valley. In fact, the upper reaches of the Sibun River may have been part of a route that led from the Petén to the Caribbean Sea. The importance of the Hershey site would have arisen from this contact with the larger and more powerful sites of the Belize River and the Petén. Also, if the soils supported the growth of cacao in the past as they do today, then the cultivation and transport of this precious commodity would have been of critical importance to several dominant powers in the region.

Movement along the river may be further examined by the location of the subsidiary sites within each district. The Hershey site is downriver from its subsidiary sites and therefore may have controlled the traffic and commerce that flowed downstream from this site. Similarly, the Oshon site may have restricted the flow of goods upriver from the sites that were between it and the coast. The Obispo site may have achieved a certain distinction as being one of the first sites encountered as travelers came up the river from the Caribbean, although it did not enjoy the same size and prominence as the Oshon site.

Differences between the two anchor sites may also be a factor of time. The Hershey site’s importance and prestige may have been tied to the Petén and may have collapsed at the same time as these sites collapsed. So the Hershey site may have been the dominant site early in the occupation of the Sibun River. Occupation at the Oshon site appears to have continued well past the Classic Period and into the Postclassic Period. This may be linked to the general shift in power from the internal sites to the coastal regions in the Postclassic. The Oshon site, with its proximity to the Caribbean, may have been positioned to benefit from the new coastal focus. It is possible then that later in the sequence of occupation along the Sibun, the Oshon site was the most important player in the valley.

This brief discussion of two regions along the Sibun River shows that while both were dependent on the Sibun River, sites varied greatly in size, complexity, and possibly political affiliations. These differences once again emphasize the incredible complexity of Maya culture and the difficulty in formulating generalizations that apply to the Maya region as a whole.
The XARP 2001 research area includes sites in the upper, middle and lower reaches of the Sibun River Valley. This paper focuses on construction techniques at three of these sites: Pakal Na, the Hershey site, and the Samuel Oshon site. The site of Pakal Na is located in the middle reaches of the valley in a citrus orchard on land owned by a Belgian conglomerate called BGMC. The Hershey site is located in the upper reaches of the valley in a cacao orchard on land formerly owned by Hershey-Hummingbird Ltd. The Samuel Oshon Site is located in lower reaches of the river valley on privately owned land.

This paper focuses on architectural construction techniques and materials at the aforementioned sites. Analysis is based on excavation records and personal observation. In most cases, excavation units were established to expose surviving architecture or the interior construction of a structure. Analysis begins with a brief description of excavations at each of the three sites.

Site Descriptions

Pakal Na

Excavations began at the site of Pakal Na during the 1999 field season. Four operations were excavated focusing on structures 127 and 130. Operation 13 (2 × 4 m unit) was located on Structure 127 while Operations 14 (1 × 5 m unit) and 22 (1.5 × 1.5 m unit northern extension of Operation 14) were located on Structure 130. Operation 16 (1 × 2 m unit) was a midden deposit located along the southern side of Structure 130. The 2001 season saw the continued excavation of Operation 22, including a 2.5 × 2.5 m northern expansion of the unit. The operation thus became a 2.5 × 5 m unit broken down into two squares A (1999 and 2001 excavation) and B (2001 expansion and excavation).

Two new excavations were conducted during the 2001 field season. Operation 36 was located on Structure 136, a mound cut by a bulldozer. The excavation unit was established after the slump from the road-cut was cleared. The unit was placed in the center of the mound in order to uncover possible surviving architecture. The Operation was divided into 2 squares where only Square A (2 × 4.5 m unit) was excavated. Operation 37 (1 × 3 m unit) was located on Structure 131 after a magnetometer detected anomalous signals from the top of the structure that might indicate a baked clay surface.

Excavations at Pakal Na covered the two large plaza groups and small plazuela group at the site. Operations 14 and 22 exposed a sequence of architectural phases, and burials in the largest
structure (Structure 130) at the site. Operations 13, 36, and 37 exposed Structures 127, 136, and 131, respectively, yielding a fair sample of the structures at Pakal Na.

**Samuel Oshon Site**

Excavations began at the Samuel Oshon site in 1999. Operation 18 (1 × 2 m unit) was established to expose the architecture of Structure 401. Operation 20 (1.5 × 4 m unit), a southward extension of Operation 18, was established in order to further expose Structure 401. Operation 19 (1 × 2 m unit), laid out on the northern side of Structure 437, extended from the surface of the low platform to the plaza floor. Operations 21 (1.5 × 4 m unit) and 23 (a triangular unit) were established between Structures 437 and 401 to determine how and if the structures were related.

The 2001 season brought about the establishment of Operation 24, a 5 × 5 m unit on the northeastern side of Structure 402. The operation exposed the northeast quadrant of a round structure and the area around two uncarved stelae that are located along the eastern side of the structure. The unit was broken down into 4 squares, each 2.5 × 2.5. The purpose of the operation was to expose the architecture of Structure 402 as well as examine how each stela had been held in place.

The Oshon site consists of two plaza groups with outlying mounds and has a total of 37 structures. The units of excavation focused on Structures 400, 401, 402, and 437 within Plaza A. Plaza A consisted of five structures atop a large raised platform, Structure 400. The Plaza surface consisted of tightly packed limestone and chert cobbles. These excavations provided a great deal of information regarding the construction methods of some of the structures at the site. However, it would be interesting to have a sample from Plaza B or from an outlying structure like Structure 424, which lies in close proximity to the river.

**Hershey Site**

Excavations at the Hershey site began at the start of the 2001 season. Operation 50 (1 × 8 m unit) was located in Group D, with square A revealing Structure 530 and Squares C and D exposing Structure 531 as well as part of the floor between the two structures. Operation 51 (4 × 6 m unit) was located in Group A, on Structure 503. Square A exposed the staircase and exterior retaining wall while square F revealed the interior construction of Structure 503. Operation 53 (1 × 2 m unit) was located in Group C, and covered the alley between Structures 518 and 519, exposing part of the retaining walls of platform Structure 518.

The units of excavation completed during the 2001 field season covered structures in three of the five main groups at the Hershey site. Further investigations during the 2003 field season will undoubtedly yield a more complete sample of architectural construction at the Hershey site.

**Data Description**
Operation 18 was originally a 1 × 1 m unit that was expanded another meter in order to expose the corner of Structure 401. Some small hard clay nodules were discovered at the bottom of Zone 2, lying just above the cobble plaza surface, which could indicate there was once a hard clay surface over the cobble layer (Figure 18.1). The plaza floor was removed as Zone 4 and contained an evenly distributed layer of limestone cobbles with a few chert cobbles. A two-course limestone basal retaining wall representing the north side of Structure 401 was discovered and called Zone 5. The limestone blocks were well shaped and fit together nicely to create the wall. These stones ranged in size up to 50 cm in length and 10 cm in width. These stones were not set on top of the surface; instead, they were set into the plaza surface. Zone 10 consisted of thin limestone slabs that made up the retaining wall of Structure 401.

Figure 18.1 Planview of Operations 18 and 20, showing plaza surface.

Operation 20, the extension of Operation 18, was established to reveal the western side of Structure 401. The tumbled surface of Structure 401 was represented in Zone 2 and consisted of limestone, chert and reddish sandstone cobbles. An inset corner of the western side of Structure 401 was uncovered in Zone 3, and Zone 4 further revealed the inset northwest corner of the structure. The cobble plaza surface was revealed in Zone 5 (Figure 18.1). A solid layer of cobbles was fully exposed and removed as Zone 6. The limestone retaining wall on the west edge of
Structure 401 was exposed as Zone 7 and was constructed of stones 10-25 cm in length. The interior construction of Structure 401 was revealed in Zone 13, a compact silty clay that would have been retained by the limestone wall.

Operation 19 revealed the northern side of Structure 437, a low platform, and the plaza floor. A compact earthen surface was uncovered below Zone 1 and was bound on the north by Zone 3, a retaining wall at the edge of the platform. The plaza surface, a high concentration of cobbles with a high surface, was uncovered as Zone 5 and met up with the retaining wall.

Operation 21 was an extension of Operation 19 that further revealed the plaza surface between Structures 437 and 401 and uncovered the platform (Structure 400) retaining wall. A cobble surface, labeled Zone 4, in the southeastern corner of the excavation, was uncovered below Zone 3 and indicated the edge of Structure 401. A narrow passage of silty clay mixed with cobbles was discovered between Structures 401 and 437 and called Zone 6. Operation 23 served to connect the cobble surface of Structure 401 with the cobble surface of Operation 21 to give an uninterrupted view of the cobble surface found in Operations 20 to 21 (Thomas 2001: 200).

Excavations during the 2001 season focused entirely on Structure 402 and the two stelae in front of the structure. Structure 402 is a round structure that appears to be constructed exclusively of limestone at first sight. Operation 24 was set up as a 5 × 5 m unit along the northeastern edge of the structure and included the two uncarved stelae. The rounded edge of Structure 402 was first exposed in the southwestern corner of square B when Zone 1 was removed (Figure 18.2). The tumble in front of the outermost preserved wall was removed as Zone 2 and consisted of limestone gravel and cobbles, with a few chert cobbles. Some of the cobbles may be tumble from the upper terrace, or may have been supports for the stelae. The stelae appear to postdate the last phase of construction and were placed in shallow cuts into the underlying cobble surface (also Zone 2) in front of Structure 402. When Zone 2 was removed, the three-course outermost wall of structure 402 was revealed; the two lower courses were inset. Below Zone 2 were the poorly preserved remains of what appeared to be a plaster floor that would have been cut into during the erection of the stelae. The floor extended 20-25 cm from the wall.

Zone 4 was restricted to square D and included the construction fill that supported Stela 1, as well as the plaza floor. The zone was found to the east of the structure and consisted of limestone gravel and cobbles. The compact earthen layer below Zone 4 was excavated as Zone 6 and probably represents the interior construction fill of the platform (Structure 400). The construction fill behind the outermost wall was removed as Zone 5, along with part of the wall. The fill consisted of densely packed limestone gravel and cobbles in a silty matrix. When Zone 5 was removed another wall was exposed. Zone 7, similar and adjacent to the Zone 4 plaza surface, was restricted to the area below the Zone 5 construction fill.
The construction fill between two veneer stone walls that lie behind the outermost wall was removed as Zone 8 and consisted of a semi-compact silty matrix with a high density of limestone cobbles (Figure 18.2). The interior construction fill, recorded as Zone 9, was characterized by a series of vertically pointed free standing limestone boulders (up to 80 cm long) set behind the innermost veneer stone wall (Figure 18.2). These large stones were set in such a way that they might represent an interior retaining wall, holding a loose silt matrix with limestone cobble construction fill. The construction fill below Zone 9 was removed as Zone 10. The fill consisted of mostly limestone gravel in a silt matrix. A high concentration of small chert cobbles was also removed as the plaster surface was approached.

According to Ben Thomas, excavation of Operation 24 appears to indicate that there were two phases of construction at structure 402. Phase 1 probably consisted of a raised platform (Zone 5 - construction fill and outermost retaining wall) with a single room structure on top (Zone 8 - rubble core between the inner and outer veneer stone walls). During Phase 2, the upper courses of the Zone 8 wall were removed and the room was filled in with large boulders and cobble (Zones 9 & 10), thus creating a two-terrace structure. The stelae were probably erected at the very end of
the Phase 2 construction and may have commemorated the change in function of Structure 402 from a room to a terraced platform.

Pakal Na

Operation 13 was set up on Structure 127, a small structure that was possibly a shrine, on top of a basal platform that made up a plazuela group. The orange clay matrix of Zone 2 appeared to be the construction fill for the platform, while Zone 3 (primarily restricted to Square B), represented the remains of a platform surface, due to the remaining gray and white patches of a floor (Figure 18.3). Zone 5 was restricted to Square B and consisted of a mottled matrix of reddish orange compact clayey soil that would have been construction fill for the platform. Zone 6 also showed signs of a mottled matrix with a darker brown soil in Square A. There was also a light density of deteriorated limestones on the top of Zone 6 that might represent an earlier construction fill for Structure 127.

![Figure 18.3 Planview of Operations 13, Square B.](image)

Operation 14 was placed on the central axis of Structure 130 and revealed two distinct phases of construction. A large limestone stone (more than 1 m wide) was discovered in Zone 2 and appeared to be an eastern facing stone for Structure 130. A high density of root activity in Zone 2 appears to have disturbed the architecture of the structure. A cobble surface made of river pebbles and cut limestone slabs was found at the base of Zone 3 (Figure 18.4). Zone 4, a unit of construction fill consisting of river pebbles and limestone cobbles, may represent the final phase of construction for Structure 130 (Figure 18.4). An earthen layer, Zone 8, was found below Zone 4 and appears to represent an earlier phase of construction.

The large limestones removed as Zone 5 appear to be out of their original context, but may have served as a retaining wall for the upper terraces of Structure 130 or as a staircase (Harrison
Zone 6, similar to Zone 4, consists of a high density of river pebbles in Square A. In Square B, Zone 6 contains a high density of river cobbles that spilled out from the construction fill retained by the stone slab (Zone 2). This zone is below Zone 4 and appears to represent an earlier phase of construction. The river cobbles of Zone 6 continues into Zone 12, which covers the limestone cobbles that comprises the plaza surface (Zone 13). A crude retaining wall of an upper terrace was uncovered as Zone 7.

![Figure 18.4 Cross section of north wall of Operation 14.](image)

Zone 8 was removed from Square A and consists of a compact silty clay soil that probably functioned as a packed clay core from an early phase of construction. Zone 11, a mottled matrix, was found directly below Zone 8 and consisted of a more compact earthen construction fill that would have made up the inner core of Structure 130. Zones 16 and 18 also represent a mottled matrix construction fill. Zones 20, 21, and 23, all consisting of a mottled matrix, represent the earliest phase of construction of Structure 130 (Harrison 2001: 182-183).

Operation 22 focused primarily on excavation of the burial pit feature; however a great deal of information regarding the construction of Structure 130 was gained in the process. At the bottom of Zone 1, a portion of the limestone retaining wall of the third terrace was uncovered along the west side of the excavation. A one-course retaining wall with a sloping surface above and below was revealed in Zone 2. This one-course wall may be associated with lower one-course retaining walls in that they might have functioned as a staircase (Harrison 2001: 184). An upper terrace surface constructed of river gravel was discovered and removed, along with its underlying fill, as Zone 3 (Figure 18.5). A two-course wall retained the construction fill and surface. Zone 4 ran
below Zone 3 and consisted of the gravel fill that covered the lowest terrace (Figure 18.5). Zone 10 was restricted to Square A and consisted of the compact mottled clay construction fill of Structure 130 that underlies the earlier river gravel construction (Figure 18.6). Zone 20, also restricted to Square A, is predominantly a mottled clay layer that appears to be part of the Phase 1 construction. Zone 12, in Square B, consisted of a predominantly compact mottled clay fill, with a few limestone and river inclusions. Zones 10, 12, and 20 all appear to be part of the Phase 1 construction of Structure 130 (Figure 18.1).
Operation 37 was established on top of Structure 131 after a magnetometer survey detected evidence of a possible burned surface (see Welch, Chapter 12 for detailed descriptions of Operation 37). The unit was originally set up as a $1 \times 2$ m unit but was expanded when a limestone wall (Zone 2) was discovered at the bottom of Zone 1. The unit was extended one meter to the south to expose the wall from the northern and southern sides. Zones 3 and 7 consisted of the construction fill found to the north of (behind) the Zone 2 wall. The fill consisted of a clayey matrix with a few gravel-size river cobble inclusions. A high concentration of charcoal was removed as Zone 4 (between Zones 3 & 7) and may have caused the anomalous readings from the magnetometer. Zone 6 was removed from the area south of the Zone 2 wall and consisted of a cobble surface and a lower limestone retaining wall. Zone 9 was removed below the Zone 6 cobble surface and consisted of a river gravel and cobble fill. Zones 5 and 8 were removed from the area south of the wall and consisted of a semi compact construction fill with river cobbled, gravel, and few limestone inclusions.

Operation 36, located on Structure 136 and set up after the slump from a bulldozer cut was removed, exposed the southwestern side of the mound (see Morandi, Chapter 11 for detailed description of Operation 36). Square A was originally a $2 \times 3$ m unit that was later expanded 1.5 m to the southwest in order to expose a limestone retaining wall (Zone 12). Zones 3 and 4 exposed the undisturbed part of the mound and consisted of an earthen layer with very few gravel inclusions (see Morandi, Chapter 11). At the bottom of Zone 4 a limestone cobble surface was uncovered and removed as Zone 5. This surface may have represented the final construction phase of Structure 136. Zones 6, 7, 8, and 15 (a posthole) continued below Zone 5 and consisted of mottled sandy clay fill that had virtually no stone or artifact inclusions. The zones were ended arbitrarily to maintain stratigraphic control, but each was a continuation of the same mottled clay construction fill that appears to constitute the core of Structure 136. Zones 2-8, and 15 all were restricted to the northern wall of the square ($0.5 \times 2$ m area). Zone 9 was located in front of the limestone cobbles that had been uncovered from Zone 1. This zone consisted of a compact sandy clay matrix with a few tumbled limestone blocks. Excavation of Zone 10 caused the unit to be expanded to the southwest. This earthen layer had a high concentration of limestone gravel and gave way to the top course of a preserved wall (Zone 12). Zones 11 and 13 were removed from the area southwest of the wall and consisted of a coarse gravely silt with gravel and cobble inclusions (only in Zone 11). Some of the larger limestone cobbles were probably tumble from the wall. Zone 12 was a limestone retaining wall with four intact courses. Zones 14 and 16 are the same layers of sterile alluvium that underlie Structure 136. They each are located at the same depth and appear to have an identical semi-compact silty clay matrix.

**Hershey Site**

Operation 50 was located in Group D and was established in order to expose part of the architectural construction of Structures 530 and 531 (see Harrison, Chapter 5 for detailed description of Operation 50). Square A was set on Structure 530 and revealed very little preserved architecture. Zone 4 consisted of a high concentration of river cobbles and gravel with a silty clay soil. Only ten, roughly cut limestone cobbles, not *in situ*, were found in this zone, and they may have been part of a retaining wall that held the river cobble construction fill. There was also a possible gravel surface that was restricted to the southwestern corner of the square.
Squares C and D exposed Structure 531 and part of the surface between the structures. Zone 2 of Squares C and D consisted of a high concentration of limestone gravel that covered an apparent limestone cobble surface. This surface appears to be on top of Structure 531. Zones 3 and 5 are restricted to Square C and include the area to the west of a two-course limestone retaining wall. Zone 5 was the surface of the plaza that was constructed of a compact earthen matrix with a medium density of limestone gravel, and a light density of river gravel. At the base of Zone 5, 10 cm of plaza construction was excavated, revealing large river and limestone cobbles that would have comprised the surface between the structures. Square D exposed the western side of Structure 531. The top of Zone 6 was a limestone cobble surface (found at the base of Zone 2) that sloped down into Square C, and would have been retained by the two-course wall. The zone ended with a limestone retaining wall that ran north to south in the middle of the square. The series of four stones, combined with two other stones slightly to the east, appear to represent an earlier phase of construction. The orientation of the stones suggests that Structure 531 may have been an apsidal structure during its first phase of construction.

Operation 51 was located in Group A on Structure 503 (see Harrison, Chapter 6 for detailed description of Operation 51). Square A exposed the exterior facing, plaza surface and part of the northern staircase while Square F exposed the interior and early phases of construction. Zones 2, 3, 4, and 7, in Square A consisted of tumble from the exterior retaining wall and staircase of Structure 503. Upon reaching Zone 11, the plaza surface, a well-preserved nine-course limestone wall, was exposed along the southern wall of the square. The wall represents the exterior retaining wall of Structure 503. The surface of Zone 11 might have had plaster cover, but there is no remaining evidence of such construction. A compact earthen layer with small limestone gravel inclusions is the only evidence of the plaza surface. Underlying the surface is a layer of limestone gravel (light density) and small river cobbles (0.2 cm-6 cm), recorded as Zone 14, which would have supported the gravel/plaster surface. Zone 15 lies below Zone 14 and has a sandier matrix with a higher density of river gravel. This zone is probably a natural feature upon which the plaza and Structure 503 were constructed.

Square F, located on top of Structure 503, revealed many floors that represent different periods of construction. Zone 5 is a semi-compact earthen layer that may have been an earthen surface or possibly runoff from Structure 501. Zone 6 represents a layer of limestone gravel construction fill for Structure 503. This zone also contained a medium density of flowstone and travertine in the northeastern corner of the square, that would have been part of the construction fill. This fill continues to Zone 9, which lies directly below Zone 6, and the limestone gravel increases to include cobble size stones. Zone 10 consisted of a deteriorated plaster floor that was best preserved in the eastern half of the square. Zone 12 was an area of high root disturbance that contained construction fill for Structure 503. Approximately 15 cm below Zone 10, an earlier and better-preserved plaster floor was uncovered as Zone 13. The floor had a smooth surface despite the inclusions. The construction fill that was found in Zone 16 constituted the core of Structure 503. Directly below the second plaster floor (Zone 13) was a layer of limestone gravel, which was followed by 25-30 cm of limestone cobbles ranging from 7.5 to 50 cm in length. Below the large limestones was a mottled clay matrix consisting of three primary colors. The clay matrix continues
into Zones 17 and 18. The bottom of Zone 18 interfaces a deteriorated surface, removed as Zone 19. This surface overlaid a clayey silt fill with gravel inclusions.

Operation 53 was located in Group C, between Structures 518 and 519 (see Acone, Chapter 7 for detailed description of Operation 53). A concentration of limestone and river cobble tumble was recorded as Zone 2 and most likely represents the remains of at least a two-course retaining wall and the construction fill of Structure 518. Zone 3 consisted of a compact earthen surface that overlaid Zone 4, a dense river cobble and gravel surface. Zone 5 represented the construction fill that supported the cobble surface (Zone 4). The fill consisted of large limestone boulders and river cobbles built approximately 50 cm above the plaza surface.

**Analysis**

Excavations completed in Plaza A of the Oshon site revealed that the Maya were using a variety of construction materials and techniques. The plaza surface (Structure 400) consisted of limestone, chert, and sandstone cobbles that were tightly packed together. A packed earthen or clay layer probably overlaid this cobble fill, creating a smooth plaza surface. Structures 401 and 437 appear to have consisted of compact earthen/clay cores retained by outer limestone walls. Excavation of Zone 6 in Operation 24 indicates the platform (Structure 400) was constructed of an earthen core. Operation 21 reveals that a limestone wall retained the earthen core of Structure 400. In comparison to Structures 401 and 437, Structure 402 had a high density of limestone used in construction, while it lacked a compact earthen core.

Structures at the site of Pakal Na display a consistent pattern of architectural construction, with a few variations. Excavations at the site provided a broad sample of the structures at the site. During their first phases of construction, Structures 127, 130, and 136 appear to have been built of a compact mottled clay matrix retained by limestone walls. The mottled appearance of the clay matrix suggests basket load construction of the three structures. Operations 14, 22, 36 and 37 revealed that gravel and cobble surfaces were placed above the clay construction fill in order to create platform and terrace surfaces. Zones 3, 4, and 7 of Operation 37 (Structure 131) appear to be a compact clay construction fill that lacks a mottled coloration and is held in place by the Zone 2 limestone wall. Further excavation of Structure 131 might reveal a mottled clay structural core. The excavations at Pakal Na revealed that most structures underwent at least two phases of construction, which can be seen by the fact that there are numerous gravel and cobble layers throughout the stratigraphic profiles.

Excavations at the Hershey site indicate that limestone and river cobble were the primary materials used in the construction of the structures. Operation 50 revealed that a limestone retaining wall held a cobble core. The earlier absidal wall (Zone 6) was also constructed of limestone cobbles. Operation 51 (Structure 503) revealed an exterior limestone retaining wall and northern staircase, along with numerous phases of construction. The structure may have started as a low platform with a plaster floor (Zone 19 or possibly earlier) and subsequently raised using cobble and clay fill. The mottled clay matrix in Zones 16-18 appears to indicate a basket load construction.
Operation 53 represents the saddle between Structures 518 and 519 and appears to show that Maya builders constructed a passageway, raised above the plaza floor, between the two structures.

Conclusions

The relatively high density of chert cobbles used in construction fill at the Oshon site indicates that the Maya had a local source that was easily accessible. The stelae in front of the round structure, 402, combined with the extensive use of limestone, also suggests that the structure probably held a ritual importance. Maya occupants of the Oshon site must have had a number of material resources available for construction due to the fact that limestone, chert, sandstone, and clay (probably mined from the river) were used in building the structures found in Plaza A.

The extensive use of clay construction fill at the site of Pakal Na indicates that the Maya were using their most available material source: clay from the river. The mottled matrix of most structures suggests that a basket load construction technique was utilized to build up a mound, which would be faced with limestone blocks. Unlike the Oshon site, there was not a high density of chert cobbles used in the construction, indicating that the Maya of Pakal Na probably did not have access to the source used by Oshon.

The Hershey site, like Pakal Na, appears to have been constructed using available materials such as river stones, limestones, clay and to a small extent, cave formations. Structures in Groups A, C, and D all contained limestone and river cobbles and the limestone was used primarily as exterior stones and the river stones as fill. The use of cave formations in the construction fill of Structure 503 (Zone 6) indicates that the Maya were removing speleothems from local caves to be sprinkled throughout their architectural constructions.

It seems evident that the Maya of the Sibun River Valley were utilizing the materials available to them in the construction of their structures. A pattern in the construction techniques appears to be apparent throughout all three sites described in this paper. Most structures appear to have been constructed of clay or cobble cores that were retained and faced by limestone walls. Plaza and structural surfaces vary from packed earthen layers to plaster floors but all appeared to consist partially of limestone inclusions. This pattern suggests that limestone was the best exterior material for construction along the Sibun, while clay might have been the most available substance.

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Morandi, Steven & Ben Thomas
Caves in the Maya area provide the best context for the archaeological study of Maya ritual. With minimal soil and sediment deposition in most cases and their relative protection against destructive processes of weathering and erosion, caves remain much the same as they were when in use by the Maya. Utilization of the cave is not restricted to the deposition of artifacts but in fact includes the modification of natural cave features. An initial study (Brady 1997) suggests that the breakage, movement and caching of dripwater formations, referred to here as speleothems, is widespread in the Maya area. The following field report seeks to document similar behavior found within the caves of the Sibun River Valley, Belize.

Evidence for the utilization of caves by the Maya is not restricted only to the caves themselves. Speleothems collected at settlement sites by the Xibun Archaeological Research Project (XARP) suggests a relationship between the surface and the subterranean. The symbolic association of speleothems with fertility, water and the underworld known as Xibalba, while not the primary focus of this analysis, is also addressed below.

Research Methods

While a number of caves in the Sibun-Manatee Karst were explored and surveyed during the 2001 field season, time permitted the detailed study of only three: Actun Chanona, Arch Cave and Actun Yax Tun. Of these, Actun Chanona, with its complex human alteration, dominates the subject matter. The analysis is limited to the modification of dripwater formations. Areas of speleothem modification were measured, drawn, photographed and described, depending on the type of alteration. Other types of modification including the construction of platforms, walls and altars and the mining of clay are discussed by Peterson (Chapter 3) and Cobb (Chapter 4).

In addition to the cave data, evidence of speleothem utilization was recovered from four surface sites excavated during the 1999 and 2001 seasons. A sample of 51 suspected speleothems was collected from Pakal Na, Pechtun Ha, Hershey and Cedar Bank. Note that not all speleothems found were collected and/or recorded. Excavation at Structure 503 at Hershey yielded dozens of speleothems of similar size and weight from which only a sample was collected. Other speleothems remain uncollected due to their size. Each collected speleothem was weighed and measured. Data from specimens recovered from excavation were taken to permit a distributional analysis. Some doubt existed about the identification of three specimens. They were designated “unidentifiable” and not included in the analysis.
Speleothem Modification Within the Cave

Encountering large areas of burning in caves, particularly in relation to hearth features, is a fairly common occurrence (Brady & Prufer 1999: 135). Of the caves explored in the Sibun-Manatee Karst, only one shows signs of large scale burning. Actun Chanona contains at least eight extensive areas of burning located in separate and distinct sections of the cave (Figure 19.1). Whether areas of burning are consistently associated with constructed cave features has not yet been determined. Interestingly, areas of burning occur only among zones of dense stalagmite and stalactite growth. Some of these areas are over 35 m in length. Regions with dense stalagmite growth alternate with stretches of floor with no formations. The heavy fire-blackening around clusters of stalagmites in contrast to the light dusting of charcoal found in areas lacking them suggests that the speleothems were the focus of the burning. Found in association with each area of burning are both large and small pottery sherds, many covered in charcoal indicating they had been positioned there before the burning occurred. Several sherds have small speleothem fragments adhering to them. What appear to be three stone hearths have also been observed in two of the burned areas.

Among several areas of densely packed stalagmites, large speleothems appear to have been intentionally removed. Broken stalagmites cleanly snapped at their base often lie nearby covered in charcoal. As the base also displays signs of fire-blackening, burning (or multiple burnings) occurred after the speleothem breakage took place. Clearly the breakage was not meant to terminate the utilization of the area.
A distinct type of stalagmite breakage was noted in a burnt area located above and to the west of the “Drum Room.” The majority of burnt stalagmites in the cave have been snapped cleanly but here it appears that the speleothems were fractured by the intensity of fire. As musical artifacts (drum and ocarina) were recovered in this area, Polly Peterson (personal communication, 2001) has suggested that the Maya may have set intense fire(s) so that the sound of the explosion accompanied the music.

Most areas of burning have soda straws growing from the ceiling and several of the areas were noted to contain fire-blackened and melted soda straws. Fire blackening on the ceiling above most of the areas (where the ceiling is under five meters high) confirms the strength of such fires. As soda straws are delicate, they may have been broken from the ceiling by the heat of the fire.

There is also an unnatural pattern of soda straw breakage in alcoves unassociated with the areas of burning at both Actun Chanona and Arch Cave. In Actun Chanona, the deliberate removal of soda straws from a restricted area is noted in the alcove around Human Remains 3 and 4. Within the areas of growth smaller sections of soda straws have been broken.

Soda straw breakage in Arch Cave is considerably different than at Actun Chanona. The stalactites here grow sparsely in patches, each approximately one meter in diameter with low vertical clearance. Only particular patches show breakage. The absence of broken formations on the cave floor below or nearby indicates that the formations must have been removed (Figure 19.2). Similar patterns of the removal of specific groups of stalactites have also been recorded in the caves of Quintana Roo (Lopez & Alberto 1995: 420-421).

Figure 19.2 Soda straw breakage in Arch Cave.
Movement and Internal Transport

Immediately east of Human Remains 2 and 5 in Actun Chanona, a series of speleothems appear to have been broken from their origin and moved several meters away. Large pieces of charcoal, several pottery sherds and a calcified human rib, presumably part of the human remains found approximately two meters to the west, are found within and around the speleothems. These artifacts, particularly the charcoal, suggest the displaced formations were used as an altar. According to Helmke and Awe (1998: 152) it is not unusual for speleothems to be used in ritual and particularly in altar-like contexts within a cave. In Actun Uayazba Kab in the Cayo District of Belize a large fallen speleothem found in alignment a specific modified cave feature shows classic signs (including charcoal and small offerings) of having served as an altar.

Displaced speleothems seemingly served other purposes as well. Formations removed from their origin contour paths throughout the cave presumably to designate roads to areas of apparent importance. The least complicated path toward the Great Platform in Actun Chanona is lined end to end with large speleothems each over a meter long. The absence of speleothems growing nearby indicate those lining the path must have been moved from elsewhere in the cave.

Near the entrance to Actun Chanona, displaced speleothems serve a different function. The most accessible entrance to the cave is blocked through most of the year by a pool of still water. Perhaps in an effort to protect the virgin water from contamination speleothems have been imported to and placed within the pool to serve as stepping-stones. Again, the lack of speleothems growing within or above the pool indicates that these speleothems, each nearly a meter long, had been brought from another location within the cave.

Walls

Constructed walls are prominent features of the Sibun-Manatee Karst caves. Some walls serve as a visual barrier to specific areas while still permitting physical passage; others serve to block chambers, alcoves or crawlspaces (Kenward 2000: 74-75). Interestingly, only three of the excavated caves at Tiger Sandy Bay, Gracy Rock and the Maya Mountains, Actun Chanona, Arch Cave and Actun Yax Tun, contain speleothems in addition to pieces of limestone breakdown within constructed walls. Each of these walls function as a physical barrier to particular features of the cave.

Actun Yax Tun at Tiger Sandy Bay is a north-south oriented cave only about 25 m long. The cave has been cut through a hill that separates two small valleys and is entirely in the light zone. Despite its lack of depth, Actun Yax Tun contains a wall composed of speleothems and breakdown that serves to block passage through the cave. For such an effort to have gone into the construction of a wall here suggests that there may be more to cave ritual than artifacts and darkness.

Despite its large size, Actun Chanona has surprisingly few constructed walls or at least features still recognizable as such. Only one wall appears to use speleothems in addition to breakdown as building material. This wall was constructed in the alcove where human remains 3 and 4 are located and appears to block the main space from a perilous ledge. Unfortunately, in its current state of disrepair, it is nearly impossible to reconstruct its original form.
The final wall containing speleothems is located in the main entrance to Arch Cave. Surveying the entrance from inside the cave, it is clear that a partially dismantled wall constructed of both breakdown and speleothems blocked the small diagonal slit that forms the main entrance. The remains of the original wall is nearly half a meter high but significant piles of rubble located just inside suggests that the impediment was once much higher. The presence of a quantity of speleothems may indicate that the wall once reached the ceiling and served to completely close the entrance off to the surface.

**Speleothem Modification on the Surface**

**Speleothem Importation to Settlement Sites**

XARP has documented the importation of speleothems at surface sites around the Sibun-Manatee Karst. In two seasons (1999 and 2001), 59 formations were collected from four separate sites. It should be noted however that these represent only a sample of all the formations noted. At some sites, Hershey in particular, a number of unrecorded and uncollected speleothems were found at Structure 503.

The speleothems come in a variety of types and appear in a number of different contexts. Over 50% of the formations collected are pieces of flowstone 10-80 cm in length (at Hershey some uncollected formations were significantly larger). Stalactites, soda straws and one lone stalagmite make up the remaining formations (Figure 19.3). In addition, several pieces of travertine (limestone found in areas of running water, like river beds, that is formed by the same processes as cave flowstone) were collected and noted and, due to their similar appearance to flowstone, may in fact be equally as significant as the formations directly from the cave.

Surface site speleothems were recovered from six areas: construction fill, earthen layers, tumble, surfaces, midden and burial pits (Table 19.1). Artifacts of every category appear to be associated with these formations including: human bone, baked clay material (BCM), sherds, net weights, ground stone, chipped stone, obsidian, debitage, unworked shell, animal bone, charred wood and fire-cracked rock. Consequently, the possibility of linking cave formations with a specific artifact assemblage appears remote.

**Discussion**

Rain and fertility, essential elements in an agricultural society, are closely associated with caves (Brady 1997: 732); the controller of rain himself, Chac, lives within the cave. Essential in the terrestrial focus of their religion, the *Cordemex Dictionary* (Barrera Vasquez 1980: 123) indicates the relationship between speleothems and water. The Maya word for the Spanish *estalactita* (stalagmite) is *ch’ak xix*, a word meaning distilled water in a well or cave. As suggested by the
linguistic association, the speleothem symbolically holds water. Presumably, by striking open the rock, the water is released. Evidence from Actun Chanona and Arch Cave demonstrate the large-scale breakage of speleothems. These formations appear to have been removed by two means: physically snapping stalagmites from their base or allowing explosion by excessive heat.

Figure 19.3 Stalactites, soda straws, and one long stalagmite (illustration by author).

Burning is an integral part of modern Maya ritual. The K’iche Maya refer to ceremonies as “burnings” (Cook 1986: 139) and to traditional altars where rituals are performed as “burning places” (Bunzel 1952: 431). The frequency with which evidence of burning is reported in caves suggests that the modern pattern has ancient roots. The presence of charcoal on the floor and fire blackening of formations and ceilings is evidence that this was an activity area of greater emphasis than other areas lacking such evidence. The close association of burning with areas of speleothem growth suggests that areas of dripping water were considered more important to the ancient Maya than areas adjacent to them that lacked formations.
Ethnographic and ethnohistorical evidence suggest the concept of fertility to be of equal importance within ritual cave usage. According to an Aztec creation myth the sun, the moon and even the sky were created in the interior of the earth, metaphorically suggesting the representation of the cave as the womb (Heyden 1976: 1). The modern Tzotzil Maya use the word for cave “cen” to humorously refer to a woman’s vagina (Brady 1996: 52; Laughlin 1975: 132). As speleothems are physically grown from the body of the cave, it is likely that they too contain the cavern’s powers of fertility.

The connection between rain and fertility in an agricultural society may motivate the ritual focus on speleothems within the caves. The transportation of speleothems represents a reciprocal exchange: pottery and other offerings were deposited in the cave at the same time that speleothems were removed. The recovery of cave formations in a wide variety of contexts suggests that speleothems had a diverse range of functions. Recent ethnographic data from the Mexican state of Guerrero records the reverence of stalagmites and stalactites as deities (Heyden 1987: 129). Speleothems taken from caves in this area at a time of marriage are said to represent the bride and groom. As the stones are phallic they are thought to bring fertility to the couple (Ravicz & Romney 1969: 39).

Archaeological investigation provides evidence for the display of speleothems in the public arena in addition to their usage within the household. Stalactite columns set in front of structures at Yaxchilan in the Usumacinta Valley indicate the significance of speleothems in relation to the society instead of to the smaller family unit (Maler 1903: 183). A large stalactite found in the façade tumble of Structure 503 at Hershey may have been an effort to not only designate the structure as religiously significant but to literally include the powers of the cave within its architecture.

Conclusion

While speleothem modification consumed the least time and effort of all construction that took place in caves (i.e., platform building), it served functions of equal importance. Revered for their powers of water and fertility, speleothems used within altars and walls may have been both functional and symbolic. The utilitarian use of speleothems as path markers and bridges would have proven particularly useful when entering the cave during rituals involving fires when the consuming smoke of would have created a dependency on those speleothems designated as geographical markers.

Caves were considered the entrance to the realm of deities and ancestral spirits (Brady & Prufer 1999: 129). Chac, the deity of rain, resided within a cave and symbols of water and fertility are often associated with those of the cave. These powers have been attributed to speleothems in ethnographic and ethnohistorical literature; growths from the body of the cave have seemingly been imbued with similar powers as the cave itself.

Evidence from surface sites lend strength to the importance of speleothems. The discovery of formations among surface excavations indicates their use at the settlement. Maya artifacts found within the caves suggest a symbolic and material reciprocity between their deposition there and the speleothems taken from the cave to the settlement.
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**Endnote**

1 Despite the tenuous connection between archaeological features and cave formations, evidence from the 1999 and 2001 XARP seasons indicate the possibility of a connection between structures at which speleothems have been found. Both Structure 100 located at Pechtun Ha (Harrison & Acone 1999: 147) and Structure 503 at the Hershey Site appear to have served religious purposes relative to their settlements (Str. 100 is a small, stone structure in a group of entirely earthen structures; Str. 503 is the largest pyramid among the largest group at the site). Both structures yielded an excess of cave formations both within the construction and among the exposed tumble.