

SACRED LANDSCAPE AND SETTLEMENT IN THE SIBUN RIVER VALLEY



XARP 1999 ARCHAEOLOGICAL SURVEY AND EXCAVATION

Patricia A. McAnany, Editor

Boston University, Department of Archaeology and International Programs

Ben S. Thomas, Production Editor

Polly A. Peterson, Steven J. Morandi, Ellie Harrison, and Kevin Acone
Production Assistants

2002

Institute for Mesoamerican Studies

Occasional Publication No. 8

**University at Albany, State University of New York
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Preface and Acknowledgments

The practice of archaeology is distinctive in its ability to absorb the willing hands and alert minds of countless individuals. During fieldwork, the apocryphal romance of the discipline is quickly dispelled by the redundancy and tedium of field research and the physical discomforts and challenges that often accompanies it. Nevertheless, one of the most successful and practical ways of collecting archaeological information continues to be field-school programs. A combination of training and research, such programs offer both undergraduate and graduate students an opportunity to participate in fundamental discoveries upon which new knowledge and new ideas about the past are based. The information presented in this volume represents this hybrid approach to archaeological practice in which research and training walk hand-in-hand and students are immersed in a three-month field season that constitutes only one part of a long-term research project.

Situated in the central portion of Belize, Central America, this research program is directed towards documentation of surface settlements within the Sibun River valley as well as investigation of the sacred landscape of the adjacent Sibun-Manatee karst. As the creator, director, and teaching professor of this project, my goal is to provide students with the skills to investigate the past in a technically competent and ethically sound manner. Of equal importance is the engendering of a participatory understanding of the research process and the links among questions, field methods, and design of analysis. During the months of February, March, and April of 1999, In this effort, I was assisted in this effort by several colleagues and graduate students who are acknowledged below.

Entitled the Xibun Archaeological Research Project (XARP) after Colonial-period spelling of the river, this project was funded through the Division of International Programs at Boston University. Thirteen undergraduate students were trained in the methods of archaeological field research: Kevin Acone, Heather Adkins, Carolyn Audet, Katie Cockerell, Elizabeth Dembrowsky, Geralyn Dion, Justin Ebersole, Sally Graver, Amalia Kenward, Jason Paling, Corlyn Secchiaroli, Adam Weik, and Errin Weller.

Field Director, Ben Thomas, supervised survey and excavation at the surface sites. The mapping of the Sibun valley settlements was undertaken by Steve Morandi, Lewis Bowker III, and Tamarra Martz who were aptly assisted by field school students. Land surveyor, Brian Norris, designed the survey layout and “miles” of sight-lines were laboriously cleared by Don Ramon Placido, Samuel Ortiz, Humberto Lone, and Ronaldo Matus. Field school student, Corlyn Secchiaroli, examined the freshly collected site survey data for her independent research project.

Excavations at Pechtun Ha and Pakal Na were supervised by Eleanor Harrison, while Ben Thomas and Steve Morandi undertook excavations at the Oshon site. All students participated in archaeological excavations but special mention goes to those who completed independent research

projects on topics related to the excavations: Kevin Acone on the architecture of Pechtun Ha, and Katie Cockerell, Sally Graver and Adam Weik on the pottery, fauna, and lithics respectively of Pechtun Ha. Errin Weller examined artifact densities across the three excavated sites while Jason Paling analyzed the obsidian.

Additional support for the cave studies was provided by The Ahau Foundation. Personnel for the cave research included Polly Peterson, who supervised the program of reconnaissance, mapping, and surface collection and innumerable Boston University undergraduate students. Three students deserve special mention: Amalia Kenward, who later completed a Senior Thesis based upon the 1999 cave research, Justin Ebersole who completed an independent research project on freshwater shell deposits found near the openings of many of the caves, and Carolyn Audet who analyzed pottery collected from the floors of the caves for her independent research project. Sean Downey worked to tie in the location of the caves with GPS. Two experienced cavers from Austin, Texas, Allan Cobb and Bonnie Longley, volunteered their considerable skills in cave exploration and mapping, and local caver, Bruce Cullerton, spent many a Sunday either exploring caves with us or fixing our vehicles.

Soils geographer, Pat Farrell, examined the cacao-growing potential of the Sibun Valley soils and was assisted by student, Heather Adkins. Leanne Stowe supervised the processing of artifacts in the field laboratory.

Local residents of the valley gave generously of their time in oral-history interviews conducted by Elizabeth Dembrowsky. Belizeans, in general, responded positively to the interviews conducted by student, Geralyn Dion, in an effort to gauge Belizean perspectives on archaeological research.

Visual documentation of the season was augmented by the photographic expertise of Deirdre Portnoy and the video savvy of Wardell Eisner. John A. Labadie provided the students with instruction on the art of drawing.

The entire staff of the 1999 project extends a note of gratitude to our hosts at Monkey Bay Wildlife Sanctuary, Matthew and Marga Waals Miller, and especially to our Monkey Bay liasons, David G. Buck, Julia Feder, and Elias Ortiz. For the members of the kitchen staff—Benedicta Perez, Mayra Perez Ortiz, and Maria Isabel Ortiz—who worked daily from dawn until sunset to keep our bellies full, we extend a very special thank you. Local landowners Steve Downard, Jean Paul Cantareul, Samuel Oshon, Augustine Obispo, Joachin Meijira, and Percy Chastanet were most gracious in allowing us access to their land for the purpose of archaeological research.

All research was conducted under permit from the Department of Archaeology in Belmopan, Belize, and we thank Commissioner Allen Moore for his support of this project.

Patricia A. McAnany
Boston University, June 2002



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Chapter 1

Sacred Landscape and Settlement in the Middle and Lower Sibun Valley

Patricia A. McAnany

Introduction

Initiated in 1997, the Xibun Archaeological Research Project aims to combine an understanding of caves—places of ritual pilgrimage—with surface residential sites. Behind this simple goal stands a diverse array of field and analytical methods as the domain of the cave and that of the house mound demand very different types of field investigation as well as analysis. Yet this warranted methodological separation has been extended into the cognitive realm with the result that the sacrality of caves often is emphasized in contrast to the profanity of settlement locales. This volume addresses the linkages between the two realms. A statement of a “work-in-progress”, the pages to follow present the methods and results of field investigation in the Sibun River valley (Figure 1.1) and adjacent karst of Belize, Central America, from February through April of 1999.

Ethnographic research among Maya people has left little doubt that indigenous perceptions of landscape were infused with notions of sacrality and animism. Key dichotomies of the Western tradition—between secular and sacred, between animate and inanimate—are not constructs of traditional Maya perceptions. In reference to specific natural features, few landforms carry the cosmological weight of cave openings (Brady and Ashmore 1999). Long heralded as an entrance to the Maya Underworld, caves played a key role in testing the mettle of the hero twins in the K’iche’ epic, *Popol Vuh*. During the Late Classic, portals of Chenes-style stone buildings were fashioned to resemble the open maw of the “earth monster”, *Cauac*. Although the significance of caves to Maya perceptions of death and afterlife as well as fertility and regeneration have been long acknowledged, only recently have archaeologists begun to systematically investigate caves, to record their many cultural attributes, and to link them to surface settlement (Brady 1997).

Documenting the location of settlements and caves via survey methods is a central part of XARP, since little systematic research had been conducted in the valley prior to 1997. Miles of survey traverses and the collection of hundreds of GPS points (described in Chapter 2) has resulted in the generation of a set of detailed maps of valley settlement and cave districts (see end pocket). Recognition of a settlement hierarchy (Chapter 9) is beginning to emerge and, with help from soil geographers, we are beginning to understand how the distribution of settlement is linked with fertility differentials among the soils of the valley (Chapter 3).

In the Sibun-Manatee karst, use of caves included pronounced human modification of the cave environment, artifacts deposited within cave chambers, entoptic pictographs drawn on the walls of caves, and ritual feasting on *jute* snails at the mouths of caves (see Chapters 4-8). Archaeological remains point to fertility, ancestors, and renewal as some of the major ritual themes underlying cave pilgrimage.

In this volume, cave ritual is not disembodied from society but rather contextualized within the larger, lived experience of Classic Maya people of the Sibun River Valley. Referred to as the Xibun River in some early European documents and maps (Chapter 15), this valley was known as a *cacao*-producing area during the early Colonial period and supported a *visita* (Jones 1989:288). Xibun Maya of the earlier Classic period probably also utilized the fertile alluvial soils of the valley to grow *cacao*, although extensive palaeo-ecological research (now underway) remains to be implemented in order to evaluate this assumption (but see Chapter 3 for a preliminary assessment of soil potential). As with any archaeological survey, initial questions involving the chronology of settlement and the distribution of sites throughout the valley landscape beg to be answered before more refined questions can be posed. Towards this end, extensive reconnaissance and instrument-survey have been undertaken in the middle and lower reaches of the valley (Chapters 2 and 9). To date, it appears that the two largest sites in the valley (Hershey and Samuel Oshon) are placed strategically at the upper and lower limits respectively of cultivation (Figure 1.2). Initial excavation at the down river Samuel Oshon site has revealed a high density of obsidian blades (Chapters 12 and 13), suggesting that its residents were strategically positioned (both geographically and economically) for the water-borne trade of this highland commodity.

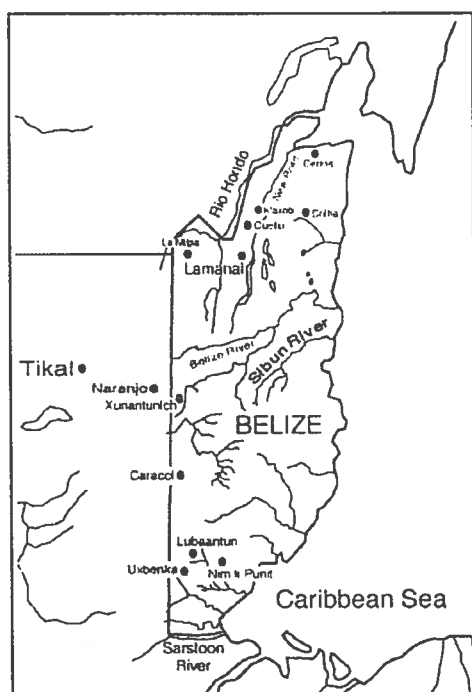


Figure 1.1 Maya Lowlands showing the location of the Sibun Valley.

Smaller settlements (located in the middle reaches of the valley) do not appear to have been impoverished in any sense of the word. Although the twilight years of the Classic period are often perceived as a time when Maya society suffered extreme protein shortages, midden deposits containing tapir and peccary have been located at Pechtun Ha (Chapter 10). Acute social stratification, also thought to typify Late Classic society, is brought into question by the presence of a lavishly furnished central burial interred in the largest structure at nearby Pakal Na, a second tier site in the middle valley (Chapter 11). Many of the excavations in the middle section of the valley yielded materials that reinforced the cosmological centrality of caves to Xibun Maya farmers. At Pechtun Ha, a shrine structure was capped with speleothems transported from caves across the river (Chapter 10) and the remains of a ceramic torch that could have been used to light the passage

through caves was recovered from Pakal Na (Chapter 11). Comparative analysis of artifact densities across the excavated sites indicates considerable variability in span of occupation and depositional processes (Chapter 14).

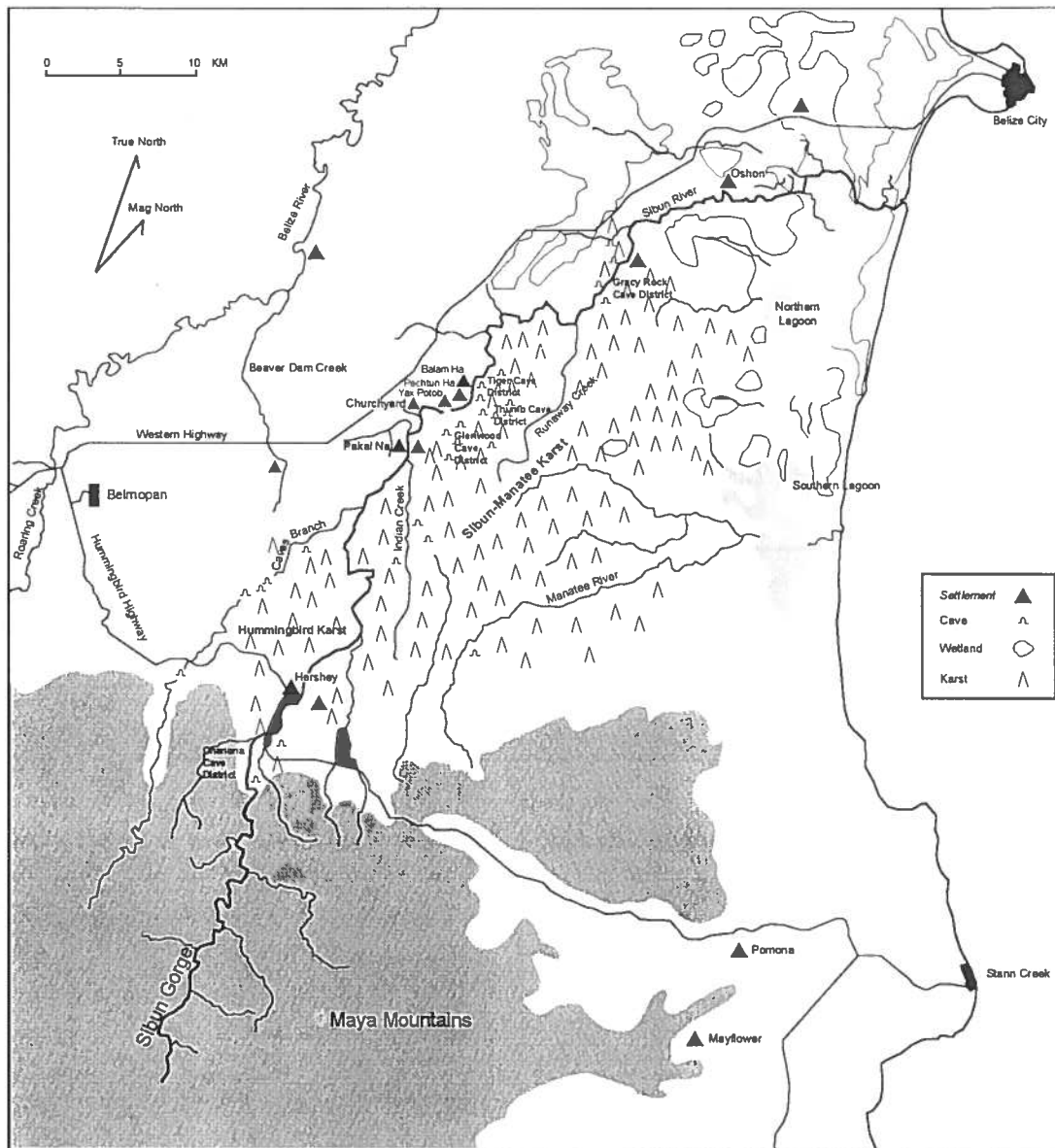


Figure 1.2 Known archaeological sites of the Sibun River Valley.

Research presented in this volume, including the artifact analyses within Part II, was not conducted within a time bubble. Belizeans, and particularly contemporary residents of the Sibun valley, play a strong role in shaping the material legacy of their past. In the final section, focus shifts to the present with a questionnaire-driven exegesis of Belizean attitudes towards archaeological research (Chapter 16) and a presentation of oral histories from several Sibun valley residents (Chapter 17). All told, contributions to *Sacred Landscape and Settlement* comprise but the opening chapters of an unfolding epic that spans two millennia and combines an insatiable appetite for cacao—and its place of production in a river valley of the eastern Lowlands—with the cosmological

centrality of caves and an in-depth view of the material signature left by ritual supplicants in the caverns of the Sibun-Manatee karst.

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Chapter 2

Locating Sites within the River Valley and Adjacent Karst

Steven Morandi and Brian Norris

Introduction

During the 1999 XARP field season, ground control was established in the middle and lower sections of the Sibun River Valley. Topographic surveys were conducted at select sites in the lower, Freetown-Sibun region as well as at the sites of Pechtun Ha and Pakal Na which are located upriver in the middle reaches of the valley. Eight prehistoric Maya sites, with a total of 100 architectural mound features, were accurately located and tied horizontally and vertically into the 1997 control network and published control points set by the Survey Department of Belize. The surveys—conducted by Brian Norris, Lewis Bowker III, Steve Morandi, Tamarra Martz, and several field students—utilized total stations and GPS (Global Positioning System) receivers. Lines of sight and trails through the dense jungle were cut and cleared by local *macheteros*: Samuel Ortiz, Don Ramon Placido, Umberto Lone, Ronaldo Matus, and Samuel Oshon, Jr. Coordinates for many of the cave sites of the Sibun-Manatee Karst were obtained by utilizing differential GPS techniques. Sean Downey collected and processed the GPS data. The mapping of cave sites was performed by cave exploration teams led by Polly Peterson, and is described in Chapter 4.

Total Station Survey Methodology and Instrumentation

Efficient and accurate survey of areas covered in dense jungle ultimately can be traced to good judgment in the placement of traverse points. Maximizing the spacing between traverse points reduced the number of setups, and thus the time needed, to cover a particular distance. It also minimized the propagation of inherent errors. Because the human eye is imperfect for leveling and measuring the height of survey equipment, and in centering points in eyepieces, errors are an ever-present fact in all stages of field surveying. To minimize the error, survey traverses were set up to close upon themselves in loops where possible. Survey traverses were mathematically adjusted to distribute inherent errors, thus “balancing” the traverse based upon statistical analysis of the raw field observations.

The survey field crews attempted to maximize the number of field shots taken from each traverse point to reduce the number of setups needed to complete each survey. When possible, traverse points were set on the tops of structures that offered an unobstructed view of the surrounding area. Minimizing field data collection time and maximizing accuracy, while providing students an elementary understanding of basic land measurement techniques, were the primary goals. Conditions such as dense jungle undergrowth and canopy, rain, mud, river crossings, vehicle dependability, and power limitations were among the challenges that were overcome.

Topographic surveys were conducted using a Lietz Set-3B Total Station mounted on a tripod. Foresights and backsights along traverses consisted of prisms with tribrach mounts set atop tripods. Traverse points were set with 5/8-inch iron rebar, survey tacks set in wooden stakes (a “hub and tack”), and less commonly, PK nails, drill holes or scribed marks set in materials such as pavement, rock or metal. Each traverse point was sketched and referenced to two or more nearby and relatively stable features (e.g., large trees, house corners, or road signs) by measurement to the nearest centimeter using 30-meter nylon tapes. Such “tie sketches” were numbered sequentially and recorded in a separate surveyor’s notebook to be used for future relocation of the traverse points. After establishing each new traverse point, other detailed topographic data (consisting of so-called “field shots”) were collected using a prism-mounted range pole. A telescoping 6-meter range pole was used to survey unusually deep features such as river oxbows, or to collect survey data from behind tall structures without setting up the total station at a different point.

For student training purposes, all data were recorded manually in a surveyor’s notebook, in tandem with the electronic data collector. The height of the total station, and foresight, backsight, and range pole prisms were recorded to the nearest millimeter using a metric tape measure. For each survey point, the total station calculated the horizontal distance to the nearest millimeter, and the horizontal and vertical angles to the nearest second of arc. Traverse points and field shot points were numbered using separate sequential number sets to avoid complications in later data analysis. A rough sketch of the spatial layout of all traverse points and field shot points was made at each setup to aid in processing the data. All data were manually entered at the end of each day into a computer using AutoCAD 14 and Softdesk survey software to ensure the integrity of the survey data. Using this methodology, data collection errors could be identified and corrected as soon as possible, minimizing problems in later stages of data processing.

Architectural features in the form of mounds, representing the remnants of prehistoric structures, were mapped in detail. The orientation of the long axis of all non-circular mounds was also recorded. Each mound was identified by a unique structure number. After topographic mapping was completed, rectified mapping of the structures was undertaken to create a rough sense of the original shape of the structures represented by the current topographic features.

The 1999 XARP Total Station Survey

Topographic survey was carried out at Pechtun Ha, a previously identified site consisting of a small plaza group with a few outlying structures overlooking an oxbow named Boat-Billed Heron Pond (Map Sheets 1 and 6).

The next survey project was to connect the previously completed Churchyard Road traverse to the Churchyard Site and to continue to the southwest along the northern side of the Sibun River. Unfortunately, the Churchyard Site, known from the 1997 XARP season to consist of several low mounds, was destroyed before 1999, and no traces were found (Map Sheet 1). Low vegetation and a nearby bulldozer led us to believe that the site may have been plowed recently.

Moving to the southwest, the survey team encountered a fairly large and visible site sprawled across several orange orchards. Pakal Na proved to be a collection of both single and clustered mounds arranged in a linear pattern and extending over one kilometer along the north side of the Sibun River (Map Sheets 2 and 8). No exploration on the south side of the river was carried out in

this area due to the extremely dense growth of spiny bamboo, though several structures may exist there.

Returning to Churchyard Road, the survey team extended the traverse across the Sibun River and along a trail used to access an impressive piece of tower karst known locally as “The Thumb”. Three small mounds, comprising the Underfoot site, were located along this trail and were subsequently mapped (Map Sheet 1).

Over the next two months, the survey team proceeded to map four sites in the lower section of the valley, including the “anchor” site of Samuel Oshon (Map Sheets 3 and 9). Though a handful of Oshon site structures were known from the 1997 reconnaissance of the area, thirty-seven structures were located upon clearing and further, more intensive reconnaissance. Two distinct plaza groups were uncovered at the site center and several outlying groups of one to five mounds were identified as well. A large survey loop anchored by Belizean Department of Survey Control Points 29, 30, and 31 along the Western Highway, was created to tie in the Oshon Site to the UTM coordinate grid.

Finally, the last month of surveying included the location and mapping of smaller sites found east of the Oshon Site along the northern side of the Sibun River. Moving eastward, the first site encountered was Sak Tzimin, which consisted of many low small, single mounds easily observable in pasturelands (Map Sheets 3, 10, and 11). Further east was a single mound approximately 3.5 meters in height, named the Neal Site after the property owner (Map Sheets 3 and 12). Mr. Neal parks his truck in a hollowed out portion of the south side of the mound. The Obispo Site was found across the river and to the east of the Neal Site (Map Sheets 3 and 13). It consists of several small mounds in a quadrilateral arrangement, and two stone monuments, one of which had broken into two pieces. All sites east of the Oshon Site were tied into existing survey points and thus have associated UTM coordinates. Many more archaeological sites likely exist to the east of the surveyed area, though further reconnaissance is necessary to test this hypothesis.

Similarly, the region west and southwest of Pakal Na may contain several sites, though the area has not been systematically investigated to date. A quick reconnaissance of this area revealed two small mounds on the south side of the Sibun River near the Bradstar Bridge which were spatially identified using GPS (Map Sheet 1, Subsketch D).

GPS Survey Methodology and Instrumentation

In 1999, the XARP field season included GPS technology as part of its archaeological survey program, and Sean Downey was responsible for its implementation, use and maintenance. This dramatically increased the efficiency of the survey in many ways. First, in many cases it was no longer necessary to link highly inaccessible cave sites to the project control network by the painstaking establishment of long traverses through the jungle. Also, many roads and trails could be easily and quickly mapped using a roving receiver carried in a backpack or mounted on a car. Furthermore, the stored GPS data could be downloaded into AutoCAD for map viewing in order to check for errors in data collection. Finally, it was possible to have two survey teams working on different projects at once, increasing the amount of data that was collected over the duration field season. The biggest challenge that using GPS presented was the availability of open sky due to

jungle canopy or irregular terrain. This was overcome by combining GPS techniques with traditional total station and compass and taping methods.

A Sokkia Differential GPS system was used, which consisted primarily of a stationary base receiver and mobile receiver (or “rover unit”). Other GPS equipment included a hand-held computer for setting data collection parameters, VCR batteries, a tripod mounted with a tribrach for stationary data collection, a 50 meter nylon measuring tape, and a 5 meter metal measuring tape. A rock drill and hammer, Suunto compass, clinometer, and stadia rod were also valuable field tools associated with the GPS survey.

A GPS Base Station was established at Monkey Bay Wildlife Sanctuary. A GPS antenna was mounted on the roof of the Research Station building. The antenna was then tied into the project control network with a total station using triangulation methods. The relative accuracy of the GPS derived data varied based on several factors. Length of data collection period proved to be an influential variable, with more accurate positions possible with longer setups. A 45-minute data collection session at a known UTM marker along the Western highway, for example, yielded a position within about 3 centimeters of the expected value. Another factor was satellite obstructions due to overhead tree canopy and the karst terrain. All differential GPS processing achieved approximately one-meter accuracy for GPS surveys in the cave districts.

Though the GPS unit was advantageous for survey in remote areas, it had limitations as well. The most common problem with using GPS in the Sibun region of Belize was the dense jungle canopy that blankets much of the area south of the river. In areas where little sky was directly visible, it was often difficult for the receiver to locate satellites. For this reason, many of the cave entrances were not directly located using the GPS receiver. Instead, a point on the tower karst formation above a cave entrance and the dense vegetation was pinpointed using the GPS receiver (for an example, see Map Sheet 7). Then, the known point was linked to the cave entrance using tape measure, a Suunto compass, and a clinometer. These data, in turn, were tied to those generated by the cave mapping team. A discussion of identified and mapped cave sites is found in Chapter 4.

Results

The end result of approximately 12 weeks of survey along the areas of the Sibun River described above is a set of 13 map sheets produced by Joseph Beaulieu, Kevin Daniel and Brian Norris at James W. Sewall Company in Old Town, Maine. Newly named sites include the Neal Site, Augustine Obispo Site, Samuel Oshon Site, Pakal Na, Sak Tzimin, and Underfoot. These maps will prove invaluable for future archaeological analysis in the area.

The first non-cave sites along the south side of the Sibun River were found during the 1999 field season. The Obispo Site, containing a small formal mound group with outlying structures and two stone monuments, represents the largest of these sites. Significantly, few karst formations exist in this region, giving more room for settlement, as compared with areas to the west that are crowded by steep sided cone karst formations south of the river. In the karstic middle section of the Sibun River, there are three small mounds that comprise the Underfoot Site as well as two small mounds near the Bradstar Bridge southwest of the Pakal Na site. The function of these features is unknown, and their placement between the Sibun River and adjacent karst is intriguing.

The location of prehistoric Maya sites near oxbows north of the Sibun River is a pattern identified during the 1997 XARP field season at the sites of Balam Ha, Yax P'otob, the Churchyard Site, and Pechtun Ha (Map Sheets 1, 4, 5, and 6). The 1999 XARP survey data indicates that this is the case for Pakal Na and the Oshon Site as well (Map Sheets 2 and 3). Did the Maya occupy active bends in the river, or did they settle along oxbows that had already been separated from the river's course? Future work along the Sibun river is aimed at the elucidation of such questions.

After the 1999 XARP field season, it is becoming apparent that significant ancient populations once occupied much of the land along the Sibun River. Fairly continuous settlement appears in the middle-and-lower-sections of the valley that have been intensively investigated to date.



Chapter 3

Evaluating Soil Potential in the Middle and Lower Reaches of the Sibun River Valley

Pat Farrell and Heather Adkins

Introduction

The Sibun Valley is a landscape of rich archaeological and Colonial history, biotic diversity, and contemporary grassroots conservation efforts. The “soilscape” of the valley mimics this rich, diverse and vulnerable pattern. The edaphic diversity of the watershed is a product of its dynamic alluvial history and the highly varied terrain through which the river courses: from its headwaters in the granitic Maya Mountains, through the Sibun-Manatee cone karst and savanna pine ridges, to its saline mouth at the Caribbean. The riverine setting no doubt provided a fertile but flood-prone landscape for the Late and Terminal Classic Maya who inhabited its banks. Dunning and others have demonstrated the need for regional-scale investigations of Maya adaptive strategies in the lowlands, due to the great spatial variability of the lowland environment (Dunning *et al.* 1998, Fedick 1996). Soil is an excellent medium with which to approach this variability, because it is a sensitive indicator of climate, geology, vegetation, relief, and human land use (Jenny 1941). As an initial step in examining contemporary and past soil fertility and susceptibility to degradation, the potential for arboriculture, and the alluvial history of the Sibun River, we conducted a soil survey of the river valley’s middle and lower reaches.

The Sibun Watershed

The Sibun Watershed lies within the Central Watershed region of Belize, which includes the drainages of the Belize River to the North and the Manatee River to the South. These rivers generally flow northeastward, from headwaters in mountain and plateau regions through flat coastal plains, to their mouths at the Caribbean Sea (Boles 1999). The Sibun River Watershed encompasses an area of 1,170 km² and the total basin length is 85.5 km. The basin may be divided into four sections (Figure 3.1), the headwaters, mid-reaches, and lower reaches, and coastal zone, according to general differences in topography, geology, hydrology, and vegetation (Boles 1998). This classification scheme provides a solid framework for studying the soilscape of the valley as well, because these factors also control soil variations. The general characteristics of the river valley sections are described below.

Headwaters

The headwaters of the Sibun dissect the Maya Mountains, an uplift bounded to the North and South by faults. The mountains are Paleozoic in age and consist of metamorphosed sediments (metasediments) and intruded granites (Bateson and Hall 1977; Baldwin 1979). Mountain Pine Ridge is a dissected granitic plateau within the Maya Mountains. Slope angles in the headwaters

region are typically 25-35 degrees, with elevations reaching 1000 meters. Vegetation consists of upland pine forest and broadleaf forest. In general, the soils in the headwaters region are thin, acidic and unattractive for cultivation, but pockets of deeper soil are found where local relief allows for greater soil development (Boles 1998; Dunning *et al.* 1998). A transition belt between the headwaters and mid-reaches sections of the river is defined by a structural fault, which separates soil parent material of the granitic rock of the Maya Mountains from the limestone-derived and alluvial soils of the mid-reaches section.

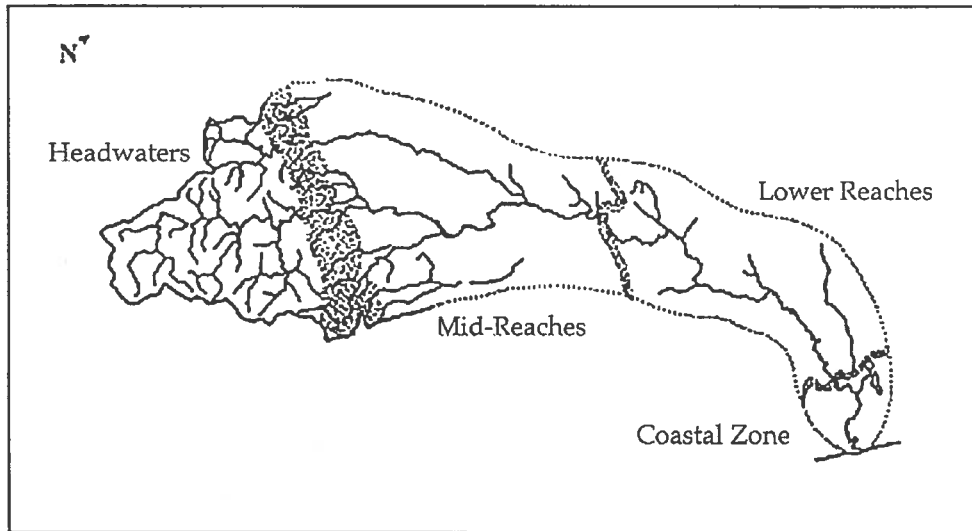


Figure 3.1 Map of the Sibun River Watershed (Boles 1999:6)

Mid-Reaches

Elevations in the mid reaches section range from 40 – 400 meters, as the river flows out of the base of the Maya Mountains and traverses the flat plain on its way to the coast. This region includes highly varied soils of both limestone and alluvial origins, and receives the greatest impact from human activities, including citrus cacao cultivation, grassland development for ranching, and urbanization. As the river enters this zone, it flows through karst landscapes—including the Boundary Fault Karst region on the southwest and Sibun Manatee on the southeast—and colluvium-filled valley floors (Boles 1998). The main floodplain channel of the Sibun narrows in the mid-reaches section, bounded by the upland (“Sandy Pine Ridge”) on the northwest and the karst foothills to the southeast. The limestone of the karst foothills is of Cretaceous age, and originated as shallow water deposits on the Yucatan platform (Baldwin 1979). It is expressed as conical and tower karst in the Sibun Hills (McDonald 1975). The Sibun and its tributaries incise the karst into blocks of uplands that include subterranean streams, enclosed depressions, and residual hills and valleys (Day 1993). On the west side of the river in the mid-reaches section, the Cretaceous limestone is overlain by a thin sequence of Tertiary deposits, including limestone, dolomite, marl, and gypsum. In places, Pleistocene sediments occur on top of these deposits, and are expressed as uplands (Baldwin 1979). Natural vegetation in this region is broadleaf forest on the karst hills, savanna and savanna/thicket on the sandy upland ridges, and riparian forest on the modern floodplain. Soils developed on limestone

in this region vary from thin stony soils to deep clayey soils. The alluvial soils in this portion of the river are thick and fertile and have been used extensively for cacao and citrus production (King *et al.* 1992; Day 1993).

Lower Reaches and Coastal Zone

The central coastal plain of Belize is drained by the lower reaches of the Belize and Sibun rivers, and the Northern, Western and Southern Lagoon catchments. The region has a high water table, which is saline in places, with a shallow (<1 meter) lens of freshwater floating on top of a salt wedge (King *et al.* 1992). The transition to the lower reaches of the Sibun River is gradual and marked by increased meandering as the stream's gradient decreases. The coastal plain sediments consist of alluvium, colluvium, and occasional beach ridges, demonstrating sea level change during the Quaternary. Sea level rose rapidly from 35,000 – 8500 B.P., and then slowly up to its present level by 2000 yrs. B.P. (King *et al.* 1992). The Sibun traverses these shorelines as it flows to the Caribbean Sea. An example of an ancient shoreline is the veneer of quartzite pebbles, probably eroded from the Maya Mountains, near Mile 29 on the Western Highway (Baldwin 1979). Oxbow lakes, abandoned meander channels, and poorly drained marshes characterize the upper portion of this section. The organic soils here support lowland pine forest and tropical savanna (Boles 1998). As the river nears the sea in the Coastal zone of the watershed, the landscape becomes estuarine, with saline organic soils, marshes, and mangrove vegetation. Citrus operations are common in the upper portion of this section, where alluvial soils are similar to those in the mid-reaches.

Climate and Soil Moisture

The climate in the Sibun Valley is tropical monsoon (Am), with marked dry and wet seasons. Average annual precipitation varies within the valley, generally increasing from the coast to the Maya Mountains, with a range of 1500 – 2500 mm. The dry season extends from February to April and the wet season from May to October, with peak rainfall in June and September. Mean annual temperature is 25 degrees Celsius (King *et al.* 1992; Hartshorn *et al.* 1984). The soil moisture regime is "ustic" due to the seasonal pattern of precipitation, the mean annual temperature, and rainy season duration of 3 months or more (Soil Survey Staff 1999).

The marked dry season and the negligible dry season flow in tributaries, such as Dry Creek and Caves Branch, make water supply a problem for farmers, although domestic water is available from caves and springs in the karst region (Day 1987). The Sibun maintains flow throughout the dry season, making proximity to the river an important criterion for cultivation and settlement location, both now and in the past (Day 1987; Boles 1998; Miller 1981). Water availability is a particularly acute concern in the karst region of the watershed, where subterranean flow replaces surface streams. With the exception of Blue Hole, a submerged sinkhole in the karst hills, there are few perennial water supplies between Caves Branch and the Sibun (Day 1992).

Soil Survey

There have been several soil surveys of Belize, both country-wide and regional, (King *et al.* 1992, Coultas *et al.* 1997, Jenkin and Birchall 1975; Hartshorn *et al.* 1984; Lietzke and Whiteside 1981; Muhs *et al.* 1985; Reeder *et al.* 1996; Wright *et al.* 1959). We know of no survey of the Sibun Valley that examined the relationship between soil and settlement. The watershed divide provides an appropriate natural boundary for a regional survey. Our survey was designed to model the landscape as a way of examining land use, contemporary and past, and its dependence and impact on soil distribution. The results presented here represent a preliminary assessment of the soils of the lower mid-reaches and the lower reaches of the river. The mid-reaches survey was more extensive than the lower reaches and therefore includes more detail. Our ongoing project will further develop these models and create similar models for the headwaters region.

Sampling transect locations (Figure 3.2) were chosen to include the major landform assemblages within the valley and the associated soil types. Soils were extracted with a soil core hand-sampler, one inch in diameter. Soils were described in the field according to the USDA standard methods (Soil Survey Staff 1999). Profile descriptions included soil color, texture, structure, horizon thickness, and presence of mottles, slickensides, concretions, or any other significant observation. Selected samples (from the mid-reaches) were collected for evaluation of organic content which is determined by a loss-on-ignition analysis.

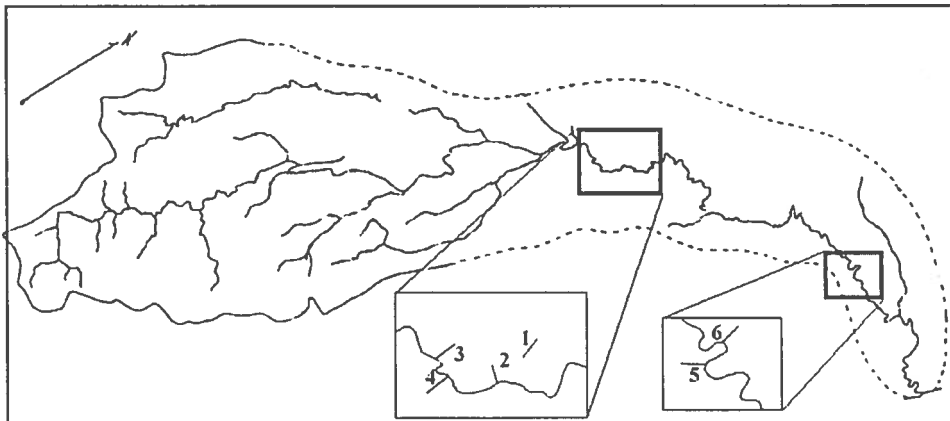


Figure 3.2 Sampling Transect Locations

Soil Transects of the Mid-Reaches Section

We established four soil transects (Figure 3.2) in the lower portion of the mid-reaches section, near the transition into the lower reaches. Transect 1 included six profiles: four on the upland, and two in the disturbed soil of a citrus orchard (Profiles 33 and 34). Results of soil profile observations and loss-on-ignition analysis are presented in Table 3.1. Transect 2 extended south, from the orchard to the site of Pechtun-Ha. Elevation dropped very gradually from the orchard to Pechtun-Ha. Ten soil profiles, at 50 meter intervals, were recorded and seven were sampled for loss-on-ignition analysis. Results are shown in Table 3.2. The first cultural mound encountered in the transect occurred between Profiles 11 and 12. Profile 13 was on a small cultural mound at the site of

Pechtun-Ha, which is perched on a floodplain bench that drops approximately 8 meters to the floodplain below, where an oxbow lake is located. A local informant reported that during periods of high water, livestock that grazed at the site had to be moved to the top of the cultural mounds to avoid inundation. This account demonstrates the drastic seasonal changes in flow in this section of the river. Transect 3 extends south to the river. Nine profiles are included in the transect (five sampled and four with field descriptions only; Table 3.3). The transect ends on a natural levee at the edge of a bench overlooking the river. Transect 4 extended south from the river to the karst foothills. The transect included 13 profiles, eight of which were sampled. The transect began with Profile 19, at the low floodplain bench, and continued to Profile 31, at the base of the karst foothills. Table 3.4 shows the results of the sampled transect.

Soil Landscapes of the Mid-Reaches Section

Based on profile descriptions, field reconnaissance of the landscape, and previous soil surveys of Belize, we created generalized soil profiles of the observed soil types in both reaches, and created a landscape diagram for the mid-reaches section (Figure 3.3). This landscape diagram is a model of the catenas (toposequences) and lithosequences of the valley soils and serves as a framework for examining relationships between soil types, settlement patterns, and land use. We identified five prominent soil types in the mid-reaches, and five types in the lower reaches sections of our study area.

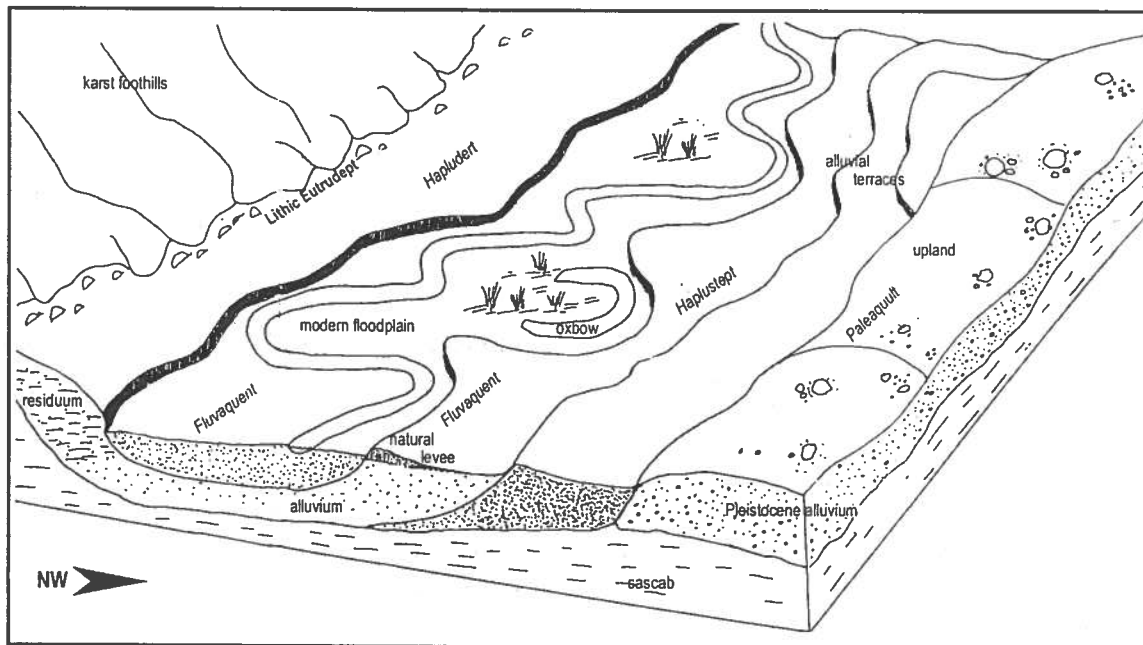


Figure 3.3 Landscape of the mid-reaches of the Sibun River

In this section of the river, the uplands on the northwest side of the valley are locally known as “Sandy Pine Ridge” and are characterized by pine savanna vegetation (Figure 3.4), which is probably maintained by frequent natural fire (Lietzke and Whiteside 1981), and sandy soils. The typical soil of this landscape is a highly weathered Ultisol (a Paleaquult), developed on



Figure 3.4 View of the pine savanna

Pleistocene alluvium of the coastal plain sediments which overlie soft unconsolidated limestone known as “sascab”. Sascab is formed by deep weathering (King *et al.* 1992; Darch 1981). The soil has yellowish brown, sandy clay loam surface horizons, upper subsurface layers of gravel in a clay matrix (often highly gypsiferous), and red and white mottled subsoils of compact clay. The gypsum layers formed within an earlier, drier climate and time of lower sea levels (King *et al.* 1992). Due to the highly weathered nature of these soils and the impermeability of the subsoils, they are considered to have low agricultural potential. Their erodibility is evident in the deep gullying where they are exposed along roadsides (Figure 3.5).



Figure 3.5 Roadside gully

This soil matches the soils of the “Puletan Suite”, identified by King *et al.* (1992). A typical profile of this soil type, from the Tiger Sandy Bay region, is described below.

Horizon	Depth (cm)	Description
A	0-10 cm	very dark grayish brown (10YR3/2) silty clay loam; quartz grains in weak subangular blocky matrix; roots throughout
B	10-18	brown (10YR 4/3) silty clay loam; weak subangular blocky; increased clay content from above; approx. 5% medium sand ; few pebbles; increase in number of roots
Bty	18-38	brown (10YR4/3) silty clay; subangular blocky; approx. 5% coarse sand; few pebbles; faint orange mottling; many fine black roots; smooth abrupt boundary; gypsum crystals
BCtyc	38-46	transitional layer; light yellowish brown (10YR6/4) stiff clay matrix with 50% coarse sand of varying lithologies; strong subangular blocky; many prominent strong brown (7.5 YR5/8) mottles; Mn inclusions (2-5mm)(black with red skin); clay skins; gypsum crystals
Css	46+	light yellowish brown (2.5YR4/8) clay; with abundant prominent red (2.5YR4/8) and strong brown (7.5YR5/8) brown mottles; 2% coarse sand; wedge-shaped peds; mild slickensides; large amounts of Mn concentrated in the upper 15 cm); fine roots throughout; with depth, mottles are larger and color deepens to red (10R4/6); slickensides stronger with depth

The landscape on the northwest side of the river includes at least three alluvial terraces (Figure 3.3). Remnants of a high terrace are reported to exist in the survey area, but we were unable to find them in our survey. Two lower alluvial terraces are common in the project region, although they have been disturbed quite significantly by bulldozing for citrus cultivation that obscures the subtle topographic changes that indicate terrace levels. We could find soils of the middle terrace only in the cultivated orchards (Profiles 33 and 34 of Transect 1) and, therefore, the profiles describe highly disturbed soils. We encountered soils of the lower terrace (floodplain bench) in Transects 2 and 3. The soil of the lower terrace is an Inceptisol (a Fluventic Haplustept), a young soil developed in mixed siliceous and calcareous alluvium. The natural vegetation is evergreen to semi-deciduous

broadleaf forest, although the great majority of this terrace has also been altered for cultivation of citrus (Figure 3.6), and cacao, or is covered by secondary growth following cultivation.



Figure 3.6 View of a citrus orchard

This soil has brown, silty clay loam surface horizons that overlie yellowish brown, mottled silty clay, containing iron-manganese concretions. Structure is weak and clay skins are rare because these soils are young and periodic additions of fresh alluvium counteract the effects of weathering and leaching. King *et al.* (1992) describe this soil as “Quamina Subsuite”. A typical profile, from Transect B, is described below.

Horizon	Depth (cm)	Description
O	0-8	brown (10YR4/3), silty clay loam; crumb structure; organic; many roots
A	8-25	brown (10YR5/3), silty clay loam; weak subangular structure
B	25-82	yellowish brown (10YR5/4) silt loam; weak subangular structure; (2.5YR4/6) mottles increase with depth along with clay content

The terrace is covered by a natural levee near the active floodplain. The floodplain in the lower portion of the mid-reaches section contains numerous oxbow lakes and poorly drained backswamps. The typical soil, of both the natural levee and the active floodplain landscapes, is an Entisol (a Fluvaquent): an extremely young soil developed in siliceous alluvium on floodplains and low floodplain benches where flooding is frequent, giving this soil both its fertility and main constraint to cultivation. The soil profile is characterized by alluvial layering, little horizonation, no clay skins, and a lack of structure; the soil tends to develop a surface cap from raindrop erosion. This type of soil has been used extensively for cacao cultivation. King *et al.* (1992) classify this soil as the “Monkey River Subsuite”. A typical profile is shown below:

Horizon	Depth (cm)	Description
A	0-9	brown (10YR4/3) sandy loam; single grain; fine sand
C	9-75	dark yellowish brown (10YR 4/4) fine loamy sand; single grain; grades to medium sand

The soils on the east side of the river contrast sharply to those described above because their parent material is limestone-derived, from the Sibun-Manatee cone and tower karst hills (Figure 3.7). There are no alluvial terrace structures on the east side of the river comparable to those described



Figure 3.7 Sibun-Manatee karst

above because the subsurface drainage of the karst surface precludes overland fluvial erosion and deposition (King *et al.* 1992). The active floodplain soil is a Fluvaquent, described above for the soil of the natural levee and active floodplain. Two other typical soils were identified along the transect from the river to the karst foothills. Most of the area is covered by a Vertisol (a Typic Hapludert), with high shrink-swell clay content which is demonstrated by surface gilgai and subsurface slickensides. The soil has a dark gray, silty clay surface horizon, grading into a dark brown clay upper subsurface horizon with yellow mottles, strong structure, and poor drainage. King *et al.* (1992) classified similar soil as the “Cabro Subsuite”. These soils had strikingly high organic matter content in their surface horizons. A typical profile is presented below.

Horizon	Depth (cm)	Description
A	0-33	very dark grayish brown (10YR3/2) silty clay loam; very weak subangular blocky structure; clay increases with depth; roots and organic matter throughout: clear smooth boundary
AC	33-50	yellowish brown (10YR5/4) silty clay matrix; subangular blocky; strong brown (7.5YR5/8) mottles; Fe-Mn concretions
Css	50-75	yellowish brown (10YR5/4) clay matrix; subangular blocky; distinct red (2.5YR) mottles; Fe-Mn concretions; clay skins; mild slickensides

At the base of the karst foothills (Figure 3.7), the soil is thin and stony; it is an Inceptisol (a Lithic Eutrudept) with a peat surface horizon over a dark brown clay loam subsurface. The organic nature of this soil is illustrated in the organic matter profile. A typical profile is described below. This soil corresponds to the “Cabro Subsuite” of King *et al.* (1992).

Horizon	Depth (cm)	Description
O	0-12	dark brown (7.5YR3/2) clay loam; peaty, crumbly
AC	12-25	dark brown (7.5YR3/3) clay loam; weak blocky; roots; more clay

The survey in the mid-reaches section demonstrated the great differences between alluvial soils—formed on fluvial sediments—and residual soils formed on limestone parent material. The better-drained alluvial soils are more heavily leached and therefore contain less organic matter and fewer soluble chemical constituents (Reeder *et al.* 1996). In addition, because organic matter decays slowly in the higher moisture conditions of limestone soils, the organic matter content of soils in Transect 4 contrasts sharply with that of Transects 1, 2, and 3 (Tables 3.1, 3.2, 3.3, and 3.4). There is considerable contrast between Transects 2 and 3 and Transect 1, as well. Transect 1 is in an older (Pleistocene) alluvial soil, which is highly weathered, leached, and poorly drained.

Soil Transects of the Lower Reaches Section

Sampling locations in the lower reaches of the river were selected to represent the major landscapes and their associated soils. Two transects, north and south of the river, included these landscapes (Figure 3.2). The transect south of the river (No. 5, Figure 3.2) began at the water’s edge and continued southwest, on an alluvial terrace currently being used as pasture, to a second terrace,

covered in broadleaf forest. The north transect, (No. 6, Figure 3.2) began at the modern floodplain and continued northward to the Belize Plain upland.

Soil Landscapes of the Lower Reaches Section

Survey in this region was of a more preliminary nature than that in the mid-reaches though several soil landscapes and types were identified and described. The river in this reach is unlike the mid-reaches section because it has a higher water table and its distance from the karst foothills prevents the soils from exhibiting striking differences from one side of the river to the other. As in the mid-reaches section, the floodplain is bounded by two alluvial terraces. Both terraces, particularly the lower one, have extensive backswamp regions: that is, flat swampy land between the channel and the edge of the bench. In several places, the natural levees have been breached and alluvial splays (alluvial washes) overlie the alluvium of the terrace. Five alluvial and one upland soil were identified: the active floodplain, two alluvial terraces, an alluvial wash (in the south transect only), and the Belize plain. The active floodplain was accessible in the dry season, with a levee occurring 10 meters from the river's edge, suggesting the wet season waterline.

The typical soil identified on the modern floodplain is an Entisol (an Udifluent) and shows the characteristic profile of a young, poorly developed alluvial soil, overlying old coastal alluvium. King *et al.* (1992) classified this soil as the "Sennis Subsuite". A typical profile is presented below, although it does not extend to the underlying coastal alluvium.

Horizon	Depth (cm)	Description
A	0-4	yellowish brown (10YR5/4) sandy loam; organic; many roots; fine sand
AC	4-75	yellowish brown (10YR5/4) loamy sand; single grain; dark red (2.5YR3/6) mottles

The lower terraces on both sides of the river are covered with alluvial soils which are slightly older than the floodplain soil. These soils are frequently, but not annually, flooded. These are predominantly Entisols (Fluvaquent), and show slight signs of weathering, such as clay translocation. Faint brown and pale brown mottles appear and increase with depth, indicating a seasonal change in the water table. Comparable soils are described by King *et al.* (1992: 73) as the "Quamina Subsuite" soils, which "have some drainage limitations but are potentially productive agricultural soils." A typical profile is described below:

Horizon	Depth (cm)	Description
A	0-8	brown (10YR5/3) silt loam; organic; limited fine sand; compact

B1	8-20	brown (10YR5/3) silt loam; weak subangular; fine roots; concretions
B2	20-75	yellowish brown (10YR5/6) silty clay loam; few mottles; concretions; clay skins

Soils of the high floodplain bench developed on mixed siliceous and calcareous alluvium. Horizonation is still weak, but there is an increase in both clay content and mottling, indicating an older, more highly weathered and leached soil than that of the lower terrace. A typical profile of this soil is presented below. King *et al.* (1992) identified a similar soil as “Canquin Subsuite”.

Horizon	Depth (cm)	Description
O	0-10	brown (10YR/3) silt loam; many fine roots
A	10-50	yellowish brown (10YR5/4) silty clay loam; weak subangular blocky; mottles; concretions
B	50-75	yellowish brown (10YR5/6) silty clay; weak subangular; concretions; increased mottling with depth

On the south transect (No. 5 in Figure 3.2), an alluvial wash terrace covers the high floodplain bench in places. This alluvial wash (or “splay”) deposit originated when floodwaters breached the natural levee and deposited sediment. Its soils are therefore younger than those of the high floodplain bench. A similar soil is described by King *et al.* (1992) as the “Sennis Subsuite”. This soil is an Entisol (Udifluent) and is common in alluvial wash deposits in the Sibun Valley. A typical profile is presented below.

Horizon	Depth (cm)	Description
A	0-7	brown (10YR5/3) silty clay loam; weak subangular; roots
AC	7-25	brown (10YR5/3) silty clay loam; limited very fine sand; weak subangular; brownish yellow (10YR6/6) mottles increase with depth
C	25-75	brown(10YR5/3) silt loam; increase in very fine sand; mottled

The north transect (No. 6 in Figure 3.2) includes the Belize Plain upland. The upland soil is calcareous with a faintly mottled, brown silty loam surface soil. The clayey subsoil is evident at the

surface by the presence of “crayfish castles” and gilgai. The subsoil is a brown clay with strong subangular structure and slickensides. This soil is an Aquult, similar to the “Bocotora Subsuite” described by King *et al.* (1992).

Horizon	Depth (cm)	Description
A	0-20	brown (10YR5/3) silt loam; weak subangular; faint mottles of pale brown (10YR6/3) and brownish yellow (10YR6/8)
B	20-75	brown (10YR5/3) clay; strongly mottled; strong subangular; slickensides

Discussion

The Sibun Valley has attracted settlement in both the present and past. Not only is the river itself an attractive resource in an otherwise water-deficient environment, but the river’s deposits have created an invaluable resource in the form of productive soil. Cultivating the soils of the alluvial terraces, especially the middle and remnant upper terraces (Figure 3.3), represents environmental optimization. That is, these soils do not possess the xeric conditions of the drier karst upland soils, the flood-prone nature of the active floodplain, the poor drainage of the clayey residual soils, nor the highly leached nature of the older upland soils.

The alluvial landscapes represent a soil chrono-sequence, in which the youngest soils are those of the active floodplain, where fresh alluvium is still deposited. These are the most fertile and the most frequently flooded soils. The lower terrace soils are next in age. They accumulate alluvium less often, but still maintain a high nutrient status. Older still are the higher terrace soils, which receive fresh alluvium only during flood events. Finally, the upland soils, developed on Pleistocene alluvium, are the oldest. Due to weathering and leaching, and the resulting compact clay subsoils and low pH, they no longer possess the characteristics of alluvial soils. Thus, the favored soil units for cultivation are the mid and upper alluvial terraces.

Muhs *et al.* (1985), in a study of Colonial period cacao orchards at Negroman in western Belize, concluded that alluvial soils are ideal for cacao cultivation, due to their structural stability allowing root penetration, their moderately developed texture, good drainage, high nutrient status, and high organic matter content. Low magnitude floods do not damage cacao because the trees are deeply rooted, living for 70 –80 years (Wood 1986). The alluvial terraces of the Sibun valley, in both the mid- and lower reaches, possess these desired attributes, and it seems likely that these were important landscapes of cacao production for the ancient Maya. However, many questions remain.

The presence of alluvial soils that appear to be suitable for cacao in the present landscape is circumstantial evidence, at best, of past agricultural practices. Cacao leaves a scant trace in the archaeological record because of the scarce and perishable pollen it produces, and because the processing of cacao, which includes fermentation and drying, does not necessarily leave a physical signature (Muhs *et al.* 1985; Wood 1986). Cacao cultivation may leave a chemical imprint on the

soil, however, in elevated total phosphate levels, for example. A systematic soil phosphate survey, at the site scale, would be a useful preliminary step in such an investigation (Dunning 1989; Eidt 1973; Farrell and Woodward 1999).

Extracting pollen cores from oxbow lakes in the Sibun floodplain would be informative as well. Sharer (1994) suggests that cacao was probably monocropped, although intercropping is the most effective method for sustainable arboriculture. A diversity of species discourages pests or disease that favor a single species, reducing the risk of disease spreading through the stand. Cacao typically loses 40% of the potential crop to pests, diseases, and weed competition (Wood 1986). Intercropping is difficult to detect in the pollen record because it often mimics the natural forest assemblage (Gomez-Pompa *et al.* 1987). It is possible that cacao was intercropped with shade trees, as is common in modern plantations. Shade is necessary for establishment of young cacao plants, but after the cacao trees grow and establish a canopy, branches of neighboring cacao trees overlap and can create sufficient shade for development of young cacao plants (Wood 1986). Therefore, an absence of shade trees in the pollen record would not necessarily rule out cacao cultivation.

Climate change is another critical component of this issue. Sea levels may have been as much as one meter lower during the latter part of the Classic period (McKillop 1993). Paleoclimatic evidence suggests that there were localized drought conditions from A.D. 250 – 1300 that intensified between A.D. 700 and 900 (Hodell *et al.* 1995; Curtis *et al.* 1996; Whitmore *et al.* 1994). There are significant implications for the Sibun watershed ecosystem. In the lower reaches of the river, areas that are currently inundated with seawater would have been exposed and much of the area that is now swamp or seasonal wetland would have been dry. The water table throughout the watershed would have been lower, making water even less available than it is presently. Lower precipitation levels would be problematic in the well-drained alluvial soils because they do not retain water. In that sense, the clayey residual soils may have been better candidates for cultivation in periods of drought. Cultivators throughout the Yucatan peninsula are capable of adapting to clayey calcareous soils (Dunning 1992). A lower water table also would have made lower terrace soils less vulnerable to frequent flooding, and therefore more favorable landscapes for cultivation.

Conserving soils in the Sibun valley requires maintaining favorable soil conditions (Reeder *et al.* 1996). Forest clearance has had a significant impact on those conditions. In the cone karst region, Furley (1987) found that contemporary forest clearance causes reduced biomass, organic matter content, drastic decreases in clay content of soil, and increased sedimentation downslope. Evidence suggests that the Late Classic Maya were intensive land managers in the Sibun region. They cleared forest, farmed valleys and limestone uplands, and built terracing and floodwater impoundments (Day 1987, 1993; Dunning *et al.* 1998). This management resulted in accelerated soil erosion and altered the composition of the forest (Furley and Newey 1979). By the 10th – 11th centuries, the forest in the Sibun region may have reverted to secondary growth forest. In the 19th and early 20th Centuries, commercial logging caused a second wave of deforestation, and by 1900, most of the Sibun valley had been selectively logged (Day 1993). Since the mid-twentieth Century, forests in the region have been cleared primarily for subsistence agriculture and commercial agricultural expansion. As population and commercial enterprises continue to expand beyond the lower terraces, marginal lands—such as steep karst slopes—are being cultivated. This practice accelerates soil erosion and threatens the long-term sustainability of the soils (Boles 1998, 1999; Day 1993; Furley and Newey 1979). Currently, the Sibun Forest Reserve has set aside 430 sq km for sustainable forestry and soil conservation (Boles 1999; Day 1993). It is conceivable that the ancient

Maya in the Sibun valley resorted to marginal land cultivation as well, as their numbers grew and available land became scarce. Sediment cores from the oxbow lakes of the Sibun will help to unravel the chronology of soil erosion and deposition during the Late and Terminal Classic periods.

Conclusion

Dunning *et al.* (1998) identify a variety of “adaptive regions” for agriculture in the Maya lowlands based on environmental variability and archaeological evidence to date. The Sibun traverses three of these adaptive regions: the Maya Mountains, the Hummingbird Karst, and the Caribbean/Coastal Margin. Archaeological evidence has demonstrated a different suite of adaptive strategies for each region. While this scale of investigation is useful for looking at adaptive variability in the lowlands as a whole, it obscures many important details of environmental optimization and vulnerability. The watershed scale of our soil survey of the Sibun valley is more appropriate for addressing such details. The survey revealed a variety of soil landscapes in the project region and identified those most favorable to cultivation. Important issues that need to be addressed by further soil and sediment analysis are soil and pollen evidence of cacao cultivation, climatic variability, and soil erosion and deposition cycles.

Table 3.1 Profile descriptions and organic matter content, Transect 1

PROFILE	Depth (cm)	Color	Texture	Structure	Notes	(cm) Percent Organic Matter
32	0-5	10YR7/3	clay	blocky	strong 2.5YR5/8 & 7.5YR6/8 mottles	
	5-30	10YR7/3	clay			
33 (orchard)	0-20	10YR4/3	silty clay loam	subangular	10YR6/8 & 7.5YR5/8 mottles	
	20-30	10YR6/3	silt loam	granular		
	30-47	10YR6/8	silty clay	subangular		
34 (orchard)	0-11	10YR5/3	silty clay loam	subangular	10YR6/2 & 2.5YR5/8 mottles Fe-Mn concretions; mottled concretions; 10YR6/2 & 2.5YR5/8 Fe-Mn concretions; 10YR6/2 & 2.5YR5/8 mottles; clay skins	
	11-22	10YR5/3	silty clay loam	subangular		
	22-48	10YR5/4	silty clay loam	subangular		
	48-61	10YR5/4	silty clay	subangular		
	61-80	10YR5/4	silty clay	subangular		
1	0-10	10YR3/2	silty clay loam	subangular	quartz grains 5% sand; pebbles 5% coarse sand; smooth abrupt boundary strong 2.5YR4/8 & 7.5YR5/8 mottles; 2% coarse sand; Fe-Mn concretions; slickensides	
	10-18	10YR4/3	silty clay loam	subangular		
	18-38	10YR4/3	silty clay	subangular		
	38-46	10YR6/4	clay			
	46+	2.5YR4/8	clay	blocky & wedge		
2	0-6	10YR5/6	silty clay loam	subangular	5% med sand 10YR6/8 & 10YR6/3 mottles Fe-Mn concretions; abrupt smooth boundary 10YR6/8 & 2.5YR3/4 mottles; Fe-Mn concretions; slickensides	
	6-11	10YR6/3	silty clay	subangular		
	11+	10YR6/3	clay	subangular-blky		
3	0-5	10YR5/6	sandy clay loam	subangular	40% very coarse sand; pebbles siliceous pebbles; concretions; mottles strong 7.5YR5/8 & 2.5YR3/6 mottles very coarse sand; pebbles	
		7.5YR5/6				
		10YR6/4				
	5-17	10YR4/4	sandy clay loam	subangular		
		10YR7/6				
	17-29	7.5YR5/6	clay			
29-79	10YR7/1	sandy clay	blocky			
	10YR7/2					
	10YR7/6					
79+	2.5YR4/8	clay	blocky & wedge	slickensides		

Table 3.2 Profile descriptions and organic matter content, Transect 2

PROFILE	Depth (cm)	Color	Texture	Structure	Notes	Percent Organic Matter	
						(cm)	
4	3-18	10YR5/3	clay loam	subangular	abrupt smooth boundary		
	18-30	10YR5/6	clay loam	subangular	Fe-Mn concretions		
	30-95	10YR5/6	clay loam	subangular	7.5YR4/6 mottles		
5	0-10	10YR4/2	silty clay loam	subangular	few medium sand Fe-Mn concretions 7.5YR4/6 mottles		
	10-31	10YR5/3	clay loam				
	31-80	10YR6/6	clay loam				
6	0-8	10YR4/3	silty clay loam	subangular	Fe-Mn concretions 7.5YR4/6 mottles		
	8-25	10YR5/3	clay loam				
	25-74	10YR5/6	silty clay				
7	0-5	10YR4/3	silty clay loam	subangular	concretions 2.5YR4/6 mottles		
	5-22	10YR5/4	silty clay				
	22-82	10YR5/4	clay loam				
8	0-5	10YR5/3	clay loam	subangular	concretions; 7.5YR mottles		
	5-29		silty clay loam				
	29-89		10YR5/4				silty clay loam
9	0-9	10YR5/3	silty clay loam	subangular	concretions 7.5YR4/6 mottles		
	9-23	10YR5/3	silty clay loam				
	23-86	10YR5/4	clay loam				
10	0-8	10YR4/3	loam	crumb	7.5YR4/6 mottles		
	8-56	10YR5/3	clay loam	subangular			
11	0-7	10YR4/2	clay loam	subangular	few sand mottles;concretions mottles;concretions		
	7-19	10YR4/3	clay loam				
	19-53	10YR5/4	clay loam				
	53-84	10YR5/6	silty clay loam				
12	0-7	10YR4/3	silty clay	subangular	sherd 7.5YR5/6 mottles		
	7-26	10YR5/4	clay loam				
	26-69	10YR5/4	clay loam				
13 mound	0-3	10YR4/3	silt loam	subangular	7.5YR4/6 mottles		
	3-50	10YR5/4	clay loam				
	50-75	10YR5/4	silty clay loam				

Table 3.3 Profile descriptions and organic matter content, Transect 3

PROFILE	Depth (cm)	Color	Texture	Structure	Notes	(cm) Percent Organic Matter
14 mound	0-13					
	13-47	7.5YR4/4	clay loam	subangular		
	47-70	10YR5/4	silty clay loam	subangular		
15	0-7	7.5YR3/2	silt loam			
	7-36	10YR4/3	clay loam		concretions	
	36-64	10YR5/6	silty clay loam	subangular	concretions, mottles	
16	0-10	10YR4/3	silty clay loam		few fine sand	
	10-36	10YR5/3	silty clay loam		few fine sand	
	36-96	10YR5/8	clay loam	subangular	fine sand, concretions, mottles	
17	0-5	7.5YR3/2			highly organic	
	5-17	10YR5/4	silt loam	subangular		
	17-70	10YR5/6	clay loam	subangular	concretions, mottles	
18	0-5	10YR4/3			highly organic	
	5-20	10YR5/4	clay loam		few fine sand	
	20-75	10YR5/6	clay loam		strong brown mottles	
35	0-27	10YR4/3	silty clay loam	subangular	faint mottles	
	27-72	10YR5/4	clay loam	subangular	2.5YR4/8 mottles	
36	0-18	10YR4/4	silty clay loam	subangular		
	18-36	10YR5/4	silty clay	subangular		
	36-75	10YR5/4	silty clay	subangular	7.5YR5/8 mottles	
37	0-8	10YR4/4	silty clay loam		wet	
	8-25	10YR5/4	silty clay	subangular		
	25-61	10YR5/4	clay	subangular		
	61-75	10YR2.5/8	silty clay	subangular		
38 natural levee	0-9	10YR4/3	loam	granular	fine sand	
	9-75	10YR4/4	sandy loam	granular	fine sand coarsens with depth	

Table 3.4 Profile descriptions and organic matter content, Transect 4

Depth (cm)	Color	Texture	Structure	Notes	(cm) Percent Organic Matter
0-39	10YR4/4	sandy loam	granular		
39-75	10YR4/6	sandy loam	granular		
0-14	10YR4/4	silty clay loam			
14-36	10YR5/6	silty clay loam	weak granular		
36-50	10YR5/8	silty clay loam	granular		
50-75	10YR4/4	silty clay	subangular		
0-14	10YR4/4	silty loam			
14-25	10YR4/6	silty loam	weak subangular		
25-36	10YR5/6	silty clay	weak subangular		
36-57	10YR5/6	silty clay	subangular		
57-76	10YR5/4	silty clay	subangular	faint 7.5YR5/8 mottles	
0-10	10YR5/3	silty clay loam	weak subangular		
10-31	10YR5/6	silty clay loam	weak subangular		
31-60	10YR5/6	silty clay	subangular	faint 10YR6/4 mottles 10YR6/4 mottles increase with depth	
60-75	10YR5/4	silty clay			
0-7	10YR5/4	silty clay	weak subangular		
7-38	10YR4/3	silty clay	weak subangular	Fe-Mn concretions Fe-Mn concretions; faint 7.5YR5/6 mottles	
38-75	10YR5/3	silty clay	weak subangular		
0-14	10YR4/3	silty loam			
14-23	10YR5/3	silty clay loam	weak subangular		
23-64	10YR5/3	silty clay loam	subangular	faint 7.5YR5/6 mottles; black flecks distinct 7.5YR5/6 mottles	
64-75	10YR5/3	silty clay	blocky	Fe-Mn concretions; gilgai	
0-30	10YR5/3	silty clay loam	weak subangular		
30-50	10YR6/6	silty clay	strong subangular	faint 7.5YR6/8 mottles; cracking	
50-75	10YR6/6	silty clay	subangular	faint mottles	
0-12	10YR5/3	silty clay loam	crumb		
12-27	10YR5/4	silty clay loam	crumb		
27-75	10YR4/4	silty clay	subangular	wedge-shaped peds; clay skins; mottles	
0-14	10YR4/2	silty clay	weak subangular	crayfish castles at surface	
14-30	10YR5/3	silty clay	subangular	faint mottles; wet clay skins;	
30-46	10YR6/4	silty clay	subangular	10YR6/8 mottles	
46-75	10YR6/4	clay	subangular	clay skins; distinct 10YR6/8 & 10YR6/1 mottles	
0-6	7.5YR4/1	clay		mucky	
6-25	7.5YR5/1	clay	subangular	clay skins; Fe-Mn concretions; 7.5YR6/8 & 10YR5/3 mottles	
25-45	7.5YR5/1	clay	strong subangular	slickensides; 10YR7/8 mottles	
45-75	7.5YR5/1	clay	subangular	slickensides; clay skins; black flecks	
0-33	10YR3/2	silty clay loam	weak subangular		
33-50	10YR5/4	silty clay	subangular	7.5YR5/8 mottles; Fe-Mn concretions 2.5YR mottles; concretions; slickensides	
0-16	7.5YR3/2	clay loam	crumb		
16-39	7.5YR3/2	clay loam	blocky		
39-47	7.5YR4/4	clay	blocky	clay skins; black flecks clay skins, slickensides, 2.5YR4/8 mottles, concretions	
47-61	7.5YR4/4	clay	blocky		
61-75	7.5YR4/4	clay	blocky	slickensides, Fe-Mn concretions, mottles	
61-75	10YR6/8	clay	blocky		
0-12	7.5YR3/2	clay loam	crumb	peaty	
12-25	7.5YR3/3	clay loam	blocky	increased clay	

Table 3.5 Profile descriptions, Transect 5

PROFILE	Depth (cm)	Color	Texture	Structure	Notes
11a	0-4	10YR5/4	sandy loam	granular	fine-med. sand
active floodplain	4-60	10YR5/4	loamy sand		2.5YR3/6 mottles
	60-75	10YR5/4	loam		fine sand wet; 2.5YR5/8 mottles
12a	0-8	10YR5/3	silt loam		
low bench	8-75	10YR5/6	silty clay loam		concretions; mottles
13a	0-11	10YR4/3	silt loam	subangular	charcoal; compact
high bench	11-50	10YR4/4	loam	subangular	concretions; mottles
	50-75	10YR5/	silty clay loam	subangular	concretions; mottles; compact
14a	0-17	10YR5/3	silt loam		
high bench	17-50	10YR5/6	silt loam	crumb	mottles
	50-75	10YR6/6	silty clay	subangular	7.5YR5/8 mottles
15a	0-12	10YR4/3	silt loam		
high bench	12-50	10YR5/3	silty clay	subangular	concretions; mottles
16a	0-8	10YR5/3	silty clay loam	subangular	
high bench	8-25	10YR5/6	silty clay	subangular	mottles
	25-75	10YR5/3	silty clay	subangular	very compact;mottles
17a	0-10	10YR5/3	silt loam		
high bench	10-61	10YR5/3	silty clay loam	subangular	
	61-75	10YR5/6	silty clay	subangular	7.5YR5/8 mottles
18a-1	0-18	10YR3/1	sandy loam		wet
alluvial wash	18-30	10YR4/1	silty clay		wet
18a-2	0-60	10YR3/2	loamy sand		
19a	0-13	10YR2/1	sandy loam	granular	
	13-50	10YR5/4	sand	granular	coarse sand

Table 3.6 Profile descriptions, Transect 6

PROFILE	Depth (cm)	Color	Texture	Structure	Notes
1a	0-4	10YR6/4	sandy loam		fine sand
active floodplain	4-75	10YR5/6	sandy loam		very fine sand;7.5YR5/8 & 2.5YR3/6 mottles
2a	0-3	10YR5/3	sandy loam		
natural levee	3-28	10YR5/4	sandy loam		fine sand
	28-61	10YR5/8	sandy clay loam		
3a	0-4	10YR6/3	loam		very fine sand
low bench	4-16	10YR6/6	silt loam	subangular	concretions
	16-75	10YR6/6	silt loam	subangular	concretions;mottles
4a	0-4	10YR4/2	silt loam	subangular	
low bench	4-25	10YR5/3	silt	subangular	
	25-75	10YR5/3	silty clay	subangular	mottling;clay skins
5a	0-7	10YR5/3	silt loam		
	7-75	10YR5/3	silty clay	subangular	10YR6/8 mottles
6a	0-39	10YR4/3	silt loam		concretions;mottles
	39-50	10YR5/3	silty clay	subangular	concretion;mottles
	50-62	10YR5/6	silty clay	subangular	concretions;mottles;clay films
7a	0-7	10YR5/3	silty clay	subangular	
alluvial wash	7-25	10YR5/3	silty clay	subangular	10YR6/6 mottles
	25-75	10YR5/3	silty clay	subangular	mottling;clay skins
8a	0-22	10YR3/2	silty clay	subangular	
Belize plain	22-75	10YR5/3	clay	subangular	mottling;clay skins; "crayfish castles" at surface
9a	0-8	10YR5/3	silt loam		
	8-25	10YR5/4	silty clay	subangular	mottles
	25-75	10YR5/3	clay	subangular	10YR6/8 & 10YR6/3 mottles; clay films
10a	0-28	10YR5/3	silt loam		
	28-41	10YR6/6	silty clay	subangular	7.5YR5/8 mottles

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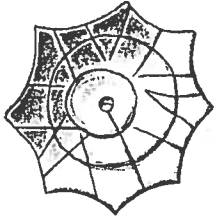
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PART I

SACRED LANDSCAPES



Chapter 4

Shedding Light on Xibalba through Cave Survey and Surface Collection

Polly A. Peterson

Introduction

Nothing is more welcomed in the dry season than an afternoon rain shower to quench the insufferable heat, nourish the crops, and provide water for sustenance and daily tasks. In the Sibun River Valley, the winds usually blow from the southeast, the direction of the karst. Maya farmers who settled along the river would have seen the rains coming in sheets over the savanna and felt the winds blow over the banks. Perhaps they believed that Chak rode forth from his subterranean home with his magic calabash filled with rain and wielding his lightning axe, as people of the Yucatán say today (Redfield and Villa Rojas 1934:139).

Perhaps the Maya paid homage to Chak, god of rain, in caves because they believed that he lived within these dark places that connect the underworld with the world of the living. During the dry season when the river was low and passable by foot and the threat of drought was greatest, the ancient inhabitants of the Xibun visited the watery underworld via the caves that flank the south side of the river (see Ebersole, Chapter 8 for evidence of seasonal cave use). They feasted on freshwater mollusks (*jute* and *Pomacea* spp.), burned copal, ritually killed vessels, and offered their prayers to the gods. Ceremonies may have been both public and private. Based on ceramic evidence (Audet, Chapter 7), Xibun Maya performed rituals in local caves from the Early Classic through the Terminal Classic periods (AD 250-900).

Entering the caves is no easy task (which is a commonly cited reason for the neglect of cave studies in Maya archaeology). Caves are places of danger and fright. A torch could extinguish from a sudden air current leaving the bearer in complete darkness. One must consider the falls, slips, heights, insects, bats, and bloodsuckers. Today, assassin bugs (*Apiomerus* sp.) can be persistent and Chagas' disease and Histoplasmosis are serious concerns. In the past, if a person were sacrificed, the smell would permeate throughout the cave. Ritual performance would involve careful planning and preparation before entering into the subterranean realm. The following passage from the Popol Vuh provides a fitting description of caves:

One and Seven Hunahpu went inside Dark House. And then their torch was brought, only one torch, already lit, sent by One and Seven Death... When these were brought to One and Seven Hunahpu they were cowering, here in the dark... Xibalba is packed with tests, heaps and piles of tests. This is the first one: the Dark House, with Darkness alone inside. And the second is named Rattling House, heavy with cold inside, whistling with drafts, clattering with hail. A deep chill comes inside here. And the third is named Jaguar House, with jaguars alone inside, jostling one another, crowding together, with gnashing teeth. They're scratching around; these jaguars are shut inside the house. Bat House is the name of the fourth test, with bats alone inside the house, squeaking,

shrieking, darting through the house. The bats are shut inside; they can't get out. And the fifth is named Razor House, with blades alone inside. The blades are moving back and forth, ripping, slashing through the house (Tedlock 1985:112).

The houses of Xibalba are analogous to the rooms and chambers of caves. Perhaps the reenactment of the tests of the Hero Twins was the focus of cave ritual. Xibalba is not portrayed as an inviting place in this creation narrative. What compelled the Maya to enter this daunting place? Serious obligations must have been at stake.

History of Cave Studies in the Sibun

Today we are drawn to caves by the valuable information that they contain about Maya cosmology. The remarkable preservation of artifacts *in situ* is one of the benefits of cave studies. Limestone peaks rise from the southern banks of the middle reaches of the Sibun River. These are the scenic cone karst which serve as the focal point for our cave studies. The following is a brief summary of previous cave research in the Sibun-Manatee karst, excluding discussion of caves of the prominent tributaries of the Sibun River, such as Caves Branch.

Thomas Gann's (1929) excavations inside Batty's Cave, reported to be upriver from Gracy Rock, yielded red slipped and utilitarian ceramics, a *mano* and *metate*, flint, and obsidian. Walls were also observed although they were interpreted as hog pens built by Batty whom local inhabitants of the area described as living in the cave (Gann 1929:244-246). Nearby at Gracy Rock Hill Cave, the 1988 Queen Mary College Expedition noted sherds and a vessel under an active drip that had been covered in flowstone (Marochov and Williams 1992:17).

Apparently Joseph Palacio worked in the Sibun, although I have been unable to locate his unpublished manuscript, "Excavations in Three Cave Sites in the Sibun River Valley." Graham et al. (1980: 161), report that Palacio found three shoe-shaped vessels in Xibun caves.

Actun Polbilche is the most widely known cave in the Xibun. Richard Woods and Michael Malone discovered the cave that was named after the wooden spear discovered near a hearth. The cave contained a rich assortment of artifacts including *ollas*, *Olivella* shell tinklers, a Roaring Creek Red bowl, and a wooden box containing a stingray spine and an obsidian blade (Malone 1971; Pendergast 1974). Limited reconnaissance during the 1999 field season failed to relocate the opening to Actun Polbilche; more intensive reconnaissance is planned for future seasons.

The DOA has investigated several caves in the Xibun (see McAnany 1998 for detailed discussion). Tiger Bay Cave (DOA 33/191-3) was mapped by B. MacLeod, C. J. Rushin, and H. Topsey who found a wooden bowl and two inverted black ceramic bowls *in situ* in a niche. These are now located in the DOA archives.

Present Study

In 1997, the XARP team explored nine caves in the Tiger Sandy Bay cave district. The goals of the 1999 season were to locate and map caves in the middle reaches of the Sibun that bore

evidence of Maya activity. Reconnaissance of three different cave districts on the south side of the Sibun river was undertaken during the 1999 season: Glenwood, Thumb, and Tiger (see Map Sheets 1 and 2 for location of districts). The Thumb, a prominent tower karst formation, occupies the center of the study area. Tiger Bay cave district is located to the east of the Thumb while Glenwood Cave is situated to the west of the Thumb. Each district is named after its most conspicuous cave or feature but each of the three areas contains many caves, only a sample of which are described below. Within the selected chambers, detailed mapping was conducted with compass, tape measure, and clinometer. GPS information, generally collected from a point on the karst above the cave opening, was tied to the cave maps via tape, compass, and clinometer traverses (see Chapter 2 for complete discussion). Areas chosen for surface collection were marked on cave maps, and artifacts were collected for future analyses. All whole vessels were analyzed and recorded in the field and left *in situ*. Careful observations of natural and artificial cave features were recorded in a systematic fashion and entered into the XARP database (Yaxche, FileMaker Pro Version 5.0).

The Thumb District

Actun Ik , "Wind Cave"

Looking southeast from Monkey Bay, one particular formation sticks out like a sore thumb due to the contrast between its blinding white limestone peak and the surrounding green jungle. "The Thumb," as it has been dubbed by local residents, is a central landmark of the Sibun River Valley. It is one of several tower-karst features that rise from a relatively flat valley. These formations characteristically contain caves systems (Moore and Sullivan 1978:24). The Thumb is no exception.

In the Thumb, two breezy pass-through caverns named Actun Ik connect via a crawlspace inhabited by bats (Figure 4.1). The smaller of the two east-west oriented caves has an interesting side chamber with three entrances and four artificial walls. Two of the walls are located at the entrances to the chamber, one surrounds a small niche, and the other encloses an alcove. A narrow southern passage leads to a depression in which sherds have been deposited. A crab claw and the proximal end of a macroblade were discovered in the walled niche and alcove, along with sherds of polychrome and flanged vessels.

A larger windy pass-through is located just south of the first. Red handprints are found on the ceiling of a low overhang near the western entrance. They are positive handprints made by pressing paint directly onto the smooth white limestone. One of the four handprints has six fingers because the artist moved her or his hand in the process of creating the print, thus smudging it (Figure 4.2).

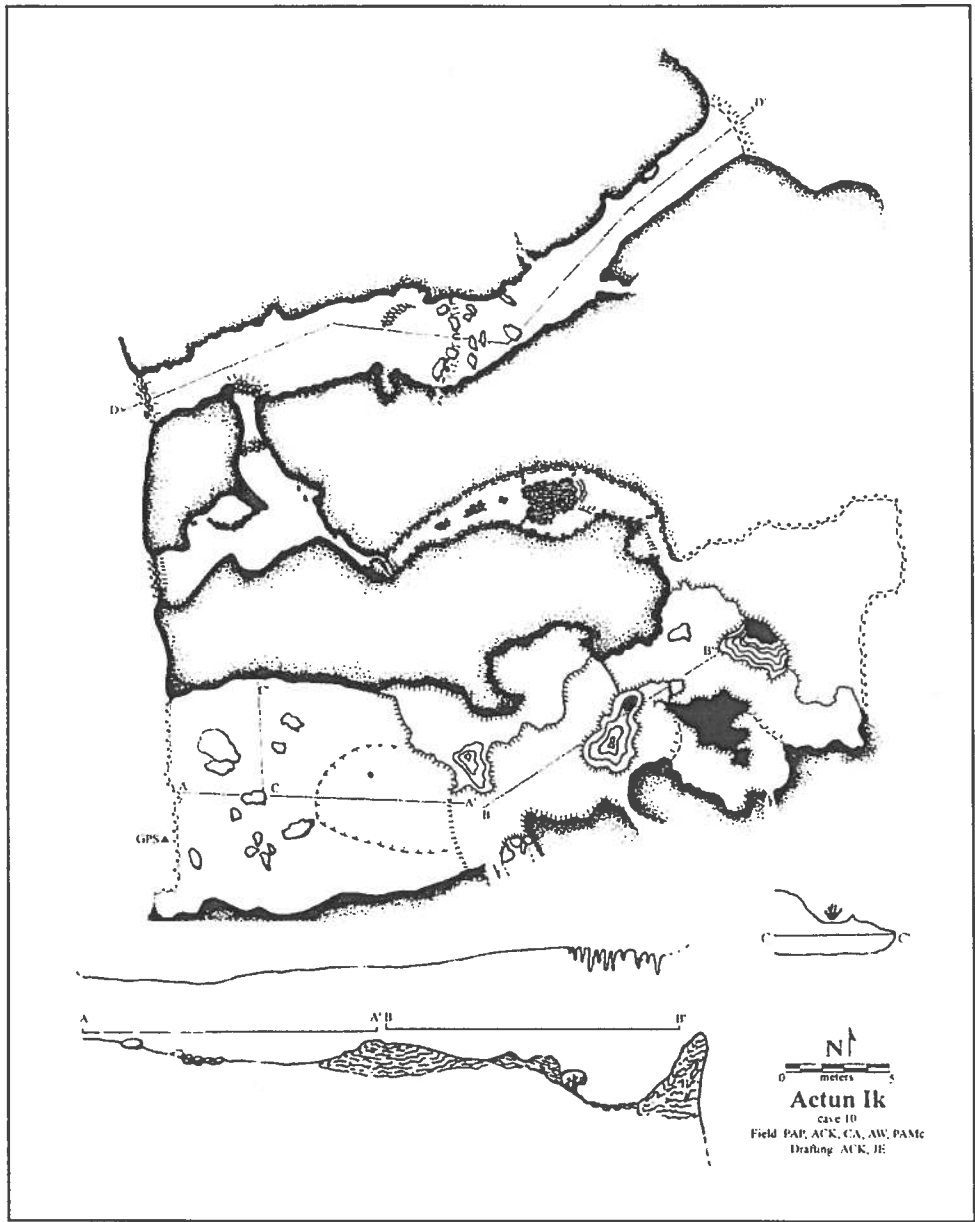


Figure 4.1 Map of Actun Ik.



Figure 4.2 Handprints in Actun Ik (photo by P. A. McAnany).

Other charcoal drawings in the cave are found on an overlying layer that has since chipped or spalled off in several places exposing the clean white surface beneath. Kevin Acone, who first discovered the pictographs, noted that all areas that retain this varnished coating show evidence of charcoal sketching. Fire clouding may have contributed to the darkness of the older veneer. Allan Cobb heated some soot from the fire-clouded ceiling located in the vicinity of the pictographs and noted the unmistakable scent of copal. Cobb collected a very small sample of charcoal from one of the drawings for accelerator mass spectrometry. This sample yielded an age of 1100 BP \pm 50 BP for the pictographs (Rowe et al., Chapter 6). This date is consistent with the ceramic data and the period of settlement in this area.

The only previously reported cave paintings in Belize occur at Actun Dzib, Bladen 2 Cave, and Roberto's Cave in the Toledo District, and Actun Uayazba Kab in the Cayo District (Awe 1998:143-146; McNatt 1996:89-90; Stone 1995). The artists of Actun Uayazba Kab created outlines as well as triangles using their hands to form the negative images.

Actun Ibach , "Armadillo Cave"

This cave, named after the armadillo skeleton that was found inside of it, is a maze of passages situated at four different levels (Figure 4.3). Located north of the Thumb, there are multiple entrances to this cave system. Although it is presently dry, flowstone formations and stalactites attest to the presence of drip water in the past or perhaps seasonally.

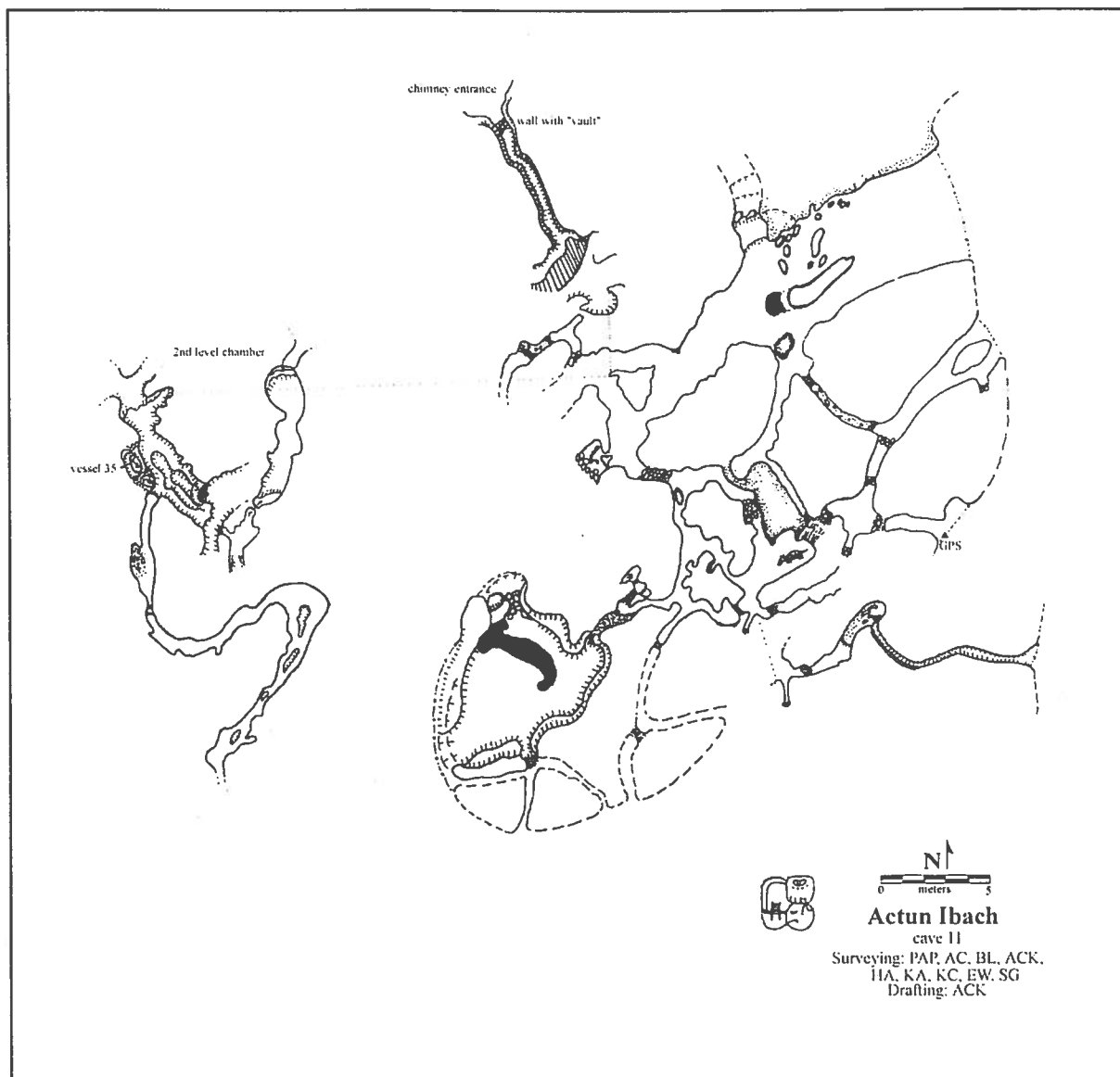


Figure 4.3 Map of Actun Ibach.

Modification of the cave includes the construction of artificial walls, steps, and a vault. These features are similar to surface architecture and employ materials available in the cave. For example, the vault is composed of a flat speleothem that has been wedged in a natural entrance to the cave. Modification of caves and use of natural niches for caching are common activities in the study area. Actun Ibach is notable for its complete *olla* located in a niche on the second level of the cave.

Many bats have roosted inside the dark chambers. Armadillo and peccary bones were collected, although they appear to postdate Maya use of the cave. The armadillo may have died of natural causes and decomposed inside the cave.

Glenwood District

Glenwood Cave

Glenwood is a very large cave located on the western flanks of the middle Sibun karst (Figure 4.4). About a mile from Glenwood Ranch, the cave is recorded in the DOA archives as being reported in January 1980, by Mrs. P. Wotton of Belize City who was friends with the late L. Woods (DOA 33/191-6). In fact, "Lyn Woods Caves 1957" is carved at the entrance.

Favored hangout of locale residents, Glenwood Cave bears many familiar names. On its walls are scrawled the signatures of Richie Woods, Jr., Billy Valdez, and Cora Nightingale, among others. "God is Love" and "Nixon Knew, Do You?" are also etched in remote chambers. The graffiti includes a date of 1957, when local residents began hanging out in "The Ballroom," which is filled with calcite crystal formations, rimstone dams, and cave pearls. An old wooden wagon indicates the cave's modern visitors. One half of a Roaring Creek Red bowl was observed in a niche and left *in situ*. No other vessels were discovered, although deposits of sherds and extensive use of the entrance and remote chambers has been observed.

Bats roost in some areas of the cave and deep deposits of guano cover the floor. Gibnuts have made little leaf nests in small crawlspaces and their tracks and bones are found throughout the cave.

Alteration of the cave includes steps carved into a natural flowstone shelf and the construction of two altars. Altar 1 was discovered by Allan Cobb who recognized that this natural flowstone shelf had been modified (Figure 5.2). The intentional breakage of the shelf is evident due to the great force that would have been necessary to change the thick edge. Altar 2 is reached by crawling through a small opening in the floor (Figure 5.1). The floor slopes toward the back and the ceiling is domed enough to sit under. The altar, discovered this season by Jaime Awe during his first visit to the cave, is made of a flat speleothem placed on flowstone rubble. Three large sherds and charcoal were placed beneath the altar. All of the raw materials of construction must have been brought to this small room from another area of the cave, as they did not naturally occur here.

The distal end of a trapezoidal green obsidian blade was discovered along the edge of the water-worn limestone floor in the entrance to Glenwood Cave (see Paling, Chapter 13 for detailed discussion). It was associated with several black-on-red rim sherds that may date to the Early Classic. One source for green obsidian is Pachuca in Central Mexico. This blade, along with a side-notched projectile point of green obsidian from Tiger Bay Cave (now archived at the DOA 33/191-3), are evidence that the visitors to the cave were trading with Central Mexico. The shoe pot may also be an indicator of trade with Central Mexico where such vessels have enjoyed long-standing popularity.



Figure 4.4 Map of Glenwood Cave.

Pine Torch Rockshelter

The only rockshelter investigated by the XARP project, this cave differs from a true cavern in that it is shallow and completely in daylight (Figure 4.5). Pine Torch Rockshelter is located in an area of karst just north of Glenwood Cave. Collections from the rockshelter include two pine torches, two *manos*, a *metate* fragment, a great deal of debitage, the proximal end of an obsidian blade, a crab claw, and animal bone. In the past, this location may have been used as a hunter's camp judging from the significant presence of lithics and animal bone. Modern hunter's trails snake through the area today. The crab claw and the obsidian blade, however, suggest ritual activities. Crab claws have been found in Actun Ik and Ek' Waynal, and a complete crab shell was observed at River Cave.

The presence of shells in the caves may be symbolic of the watery underworld or evidence of ritual feasting. Obsidian blades are indicative of ritual bloodletting in the context of caves, but it is possible that this particular specimen had a more utilitarian function.

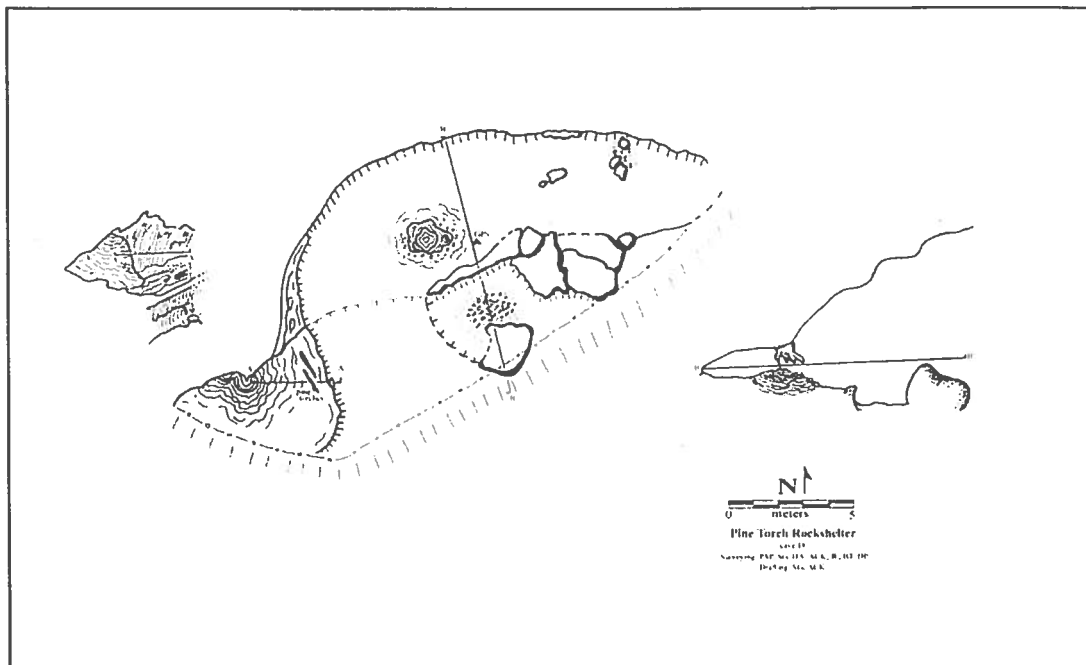


Figure 4.5 Map of Pine Torch Rock Shelter.

Torches have been noted at Actun Polbilche and Tiger Cave (Pohl & Pohl 1983:32). This season, we found a ceramic torch holder at Pakal Na, two heart of pine torches in the rockshelter, and several small burned wooden splints in Glenwood Cave. Ceramic torch holders have been documented from three caves in the Sibun—Pothunter Cave, St. Margaret's Cave, and Chanona Cave. Traditional torch holders were used in Succotz village up until the 1920s (Graham et al. 1980:169-170).

Tiger Sandy Bay District

Actun Yax Tun, "Greenstone Cave"

A large sunlit pass-through cave connects Just Two Valley and Yax Valley (Figure 4.6). It takes its name from the polished greenstone *hacha* that was found under the drip line of the western entrance. This ceremonial axe does not show signs of use, and probably was left in the cave in pristine condition as an offering. The color green may have been significant because of its association with water and regenerative plant life. The axe may have been a gift to the rain god in exchange for his benevolence in watering the fields and orchards. Artificial walls separate the western entrance of Actun Yax Tun from the rest of the cave. The walls are the only division of space in this naturally wide pass-through with a cathedral ceiling.

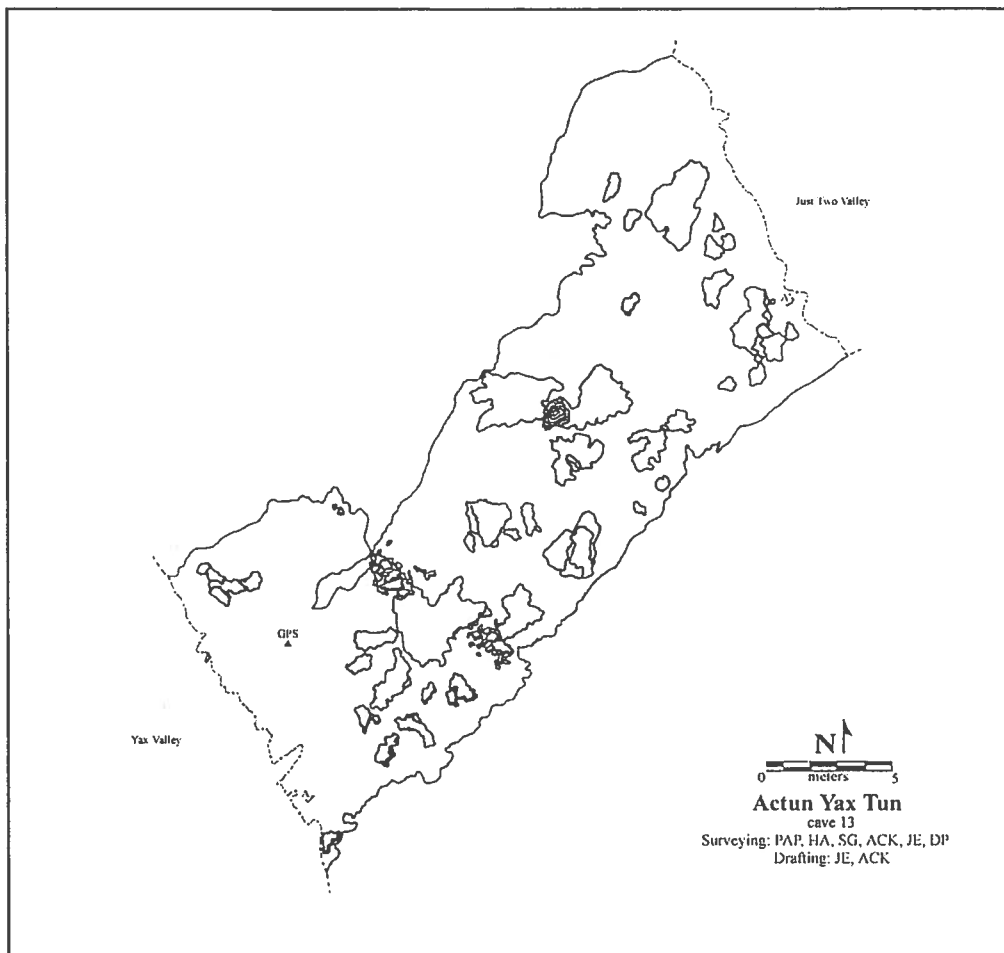


Figure 4.6 Map of Actun Yax Tun.

Shoe Pot Cave

This cave is named for its most significant offering: a shoe-shaped vessel. Bruce Cullerton discovered this shoe pot, along with a globular jar, in a chamber that is accessed via a narrow opening in the north wall of the entrance room (Figure 4.7). The shoe pot is fire clouded on the back of the rim and on the top of the toe. The base is relatively flat although the surface is bumpy (Figure 4.8). It does not appear to have been used for domestic purposes. Shoe-shaped vessels are known ethnographically as a bean-cooking pot in Central Mexican. In the Maya lowlands, on the other hand, shoe-shaped vessels have been discovered primarily in caves, burials, lakes, and the Caribbean Sea, suggesting that their use was ritual rather than utilitarian (Brady 1992:8).

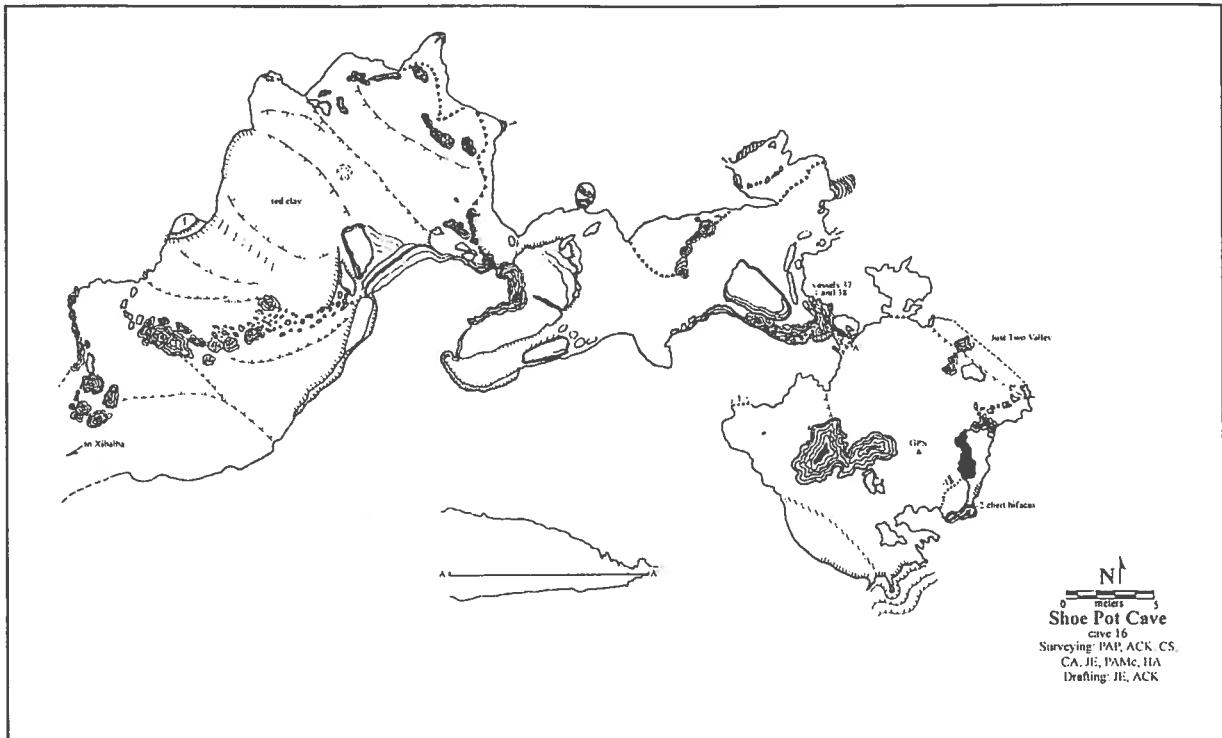


Figure 4.7 Map of Shoe Pot Cave.

Parsons recounts, “According to Zapotec myth, the lightning god keeps rain, clouds, and hail in three shoe pots in his cave” (as cited in Brady 1992:6). It appears that this particular form has symbolic meaning in the context of cave offerings.

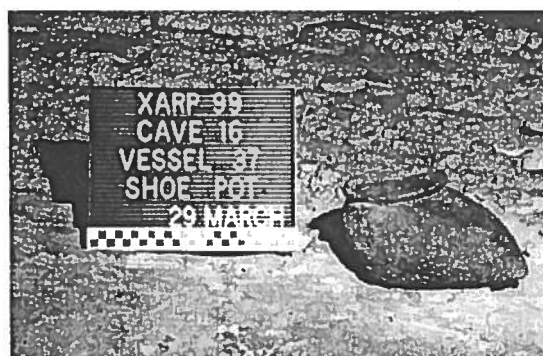


Figure 4.8 Shoe Pot, Vessel 37 (photo by P. A. McAnany).

In Belize, shoe pots have been recorded in Footprint Cave, Chanona Cave, Actun Tzimin, and Actun Balam (Brady 1992:1). Shoe pots found in Footprint Cave and in Sibun caves excavated by Palacio were loosely dated to San José I-II (300 BC-AD 450) based on associated vessels (Graham et al. 1980:161). Seventy-five percent of shoe pots from the Maya lowlands have been found in caves in association with Early Classic to Late Classic assemblages (Brady 1992:4; 7).

(Graham et al. 1980:161). Seventy-five percent of shoe pots from the Maya lowlands have been found in caves in association with Early Classic to Late Classic assemblages (Brady 1992:4; 7).

On the south wall of the entrance to the Shoe Pot Cave, there is an alcove that is accessed by climbing up onto a shelf. There are two openings that face the cave mouth which were partially filled by two artificial cobble walls. An artificial floor was created at the entrance to this alcove by placing flat stones over a large hole in the natural flowstone shelf. A small room containing rim sherds is located beneath an overhang on the south wall of the alcove. It is reached by crawling and thus the walls may serve to block out light and wind from this room. Just west of the entrance to the alcove is a small niche that contained two banded honey brown chert axes placed one on top of the other.

These oval bifaces have a complex history. Both are heavily patinated on one face and polished on the other. They were found patinated sides down in the niche with the distal ends facing out. The upturned faces were calcified, evidence that they were placed in this context in ancient times. Step flaking and crushing on the lateral margins combined with a squared distal morphology strongly suggests that these tools were highly utilized. The amount of weathering which these axes have sustained combined with the extensive damage on the distal ends suggest that they were used, discarded or lost, and later picked up to be redeposited in the cave. Although this context is not sealed, it appears to be a cache, due to its natural concealment. Maya folk knowledge includes the belief that old axes found in the bush contain the power of thunderbolts thrown down by Chak. Bringing these “lightning axes” back to the cave home of the rain god is a most suitable offering.

Ek' Waynal , “Black Hole Place”

A second cave containing charcoal drawings was discovered in the Tiger Sandy Bay district. *Ek' Waynal* was renamed for its most significant feature, the “Black Hole” (Figure 4.9, labeled as “second level chamber”). Formerly this cave had been called Many Walls because of the six artificial walls that were constructed inside the cave (Isaza, Kenward, and Berry 1998:73-74). The new name describes a narrow chamber that is accessed through one of three chimney entrances in the ceiling. Four vessels were discovered *in situ* in two separate offerings in this upper level. One pair of vessels consists of a large inverted *olla* and a Roaring Creek Red bowl, placed in an alcove above the westernmost chimney. A small black incised bowl and a small inverted *olla* were located in the narrow passage between the two chimney entrances. All were killed *in situ*, judging by the reconstructable kill holes. The vessels had been raised and leveled on pieces of limestone. The black bowl apparently was used for burning an offering after it was ritually killed, because the body of the vessel is fire-blackened while the basal sherds removed during the “killing” are not.

A small conch shell was collected below the chimneys in the main chamber. Conch shells were also deposited in Metate Cave and Just Two Cave. The presence of marine shells in caves of the Tiger Sandy Bay area suggests trade or transport from the coast. Why would the Maya make such an effort to acquire marine shell when freshwater shells are readily available? God N, the Pauhtun, is often depicted as emerging from a conch shell or a turtle shell. At Tikal, there is an altar that depicts this old toothless lord of the underworld emerging from a conch inside of a quadripartite symbol that may be interpreted as a cave (Bassie-Sweet 1991:111). Perhaps this lord of Xibalba was invoked in ritual.

The pictographs are located near the Usrey Valley entrance to the cave (see Map Sheet 7). They are abstract and are drawn on an ancient surface similar to the varnished wall of Actun Ik. It is probable that these pictographs also date to the end of the Classic period as they are drawn in the same style as those located within Actun Ik.

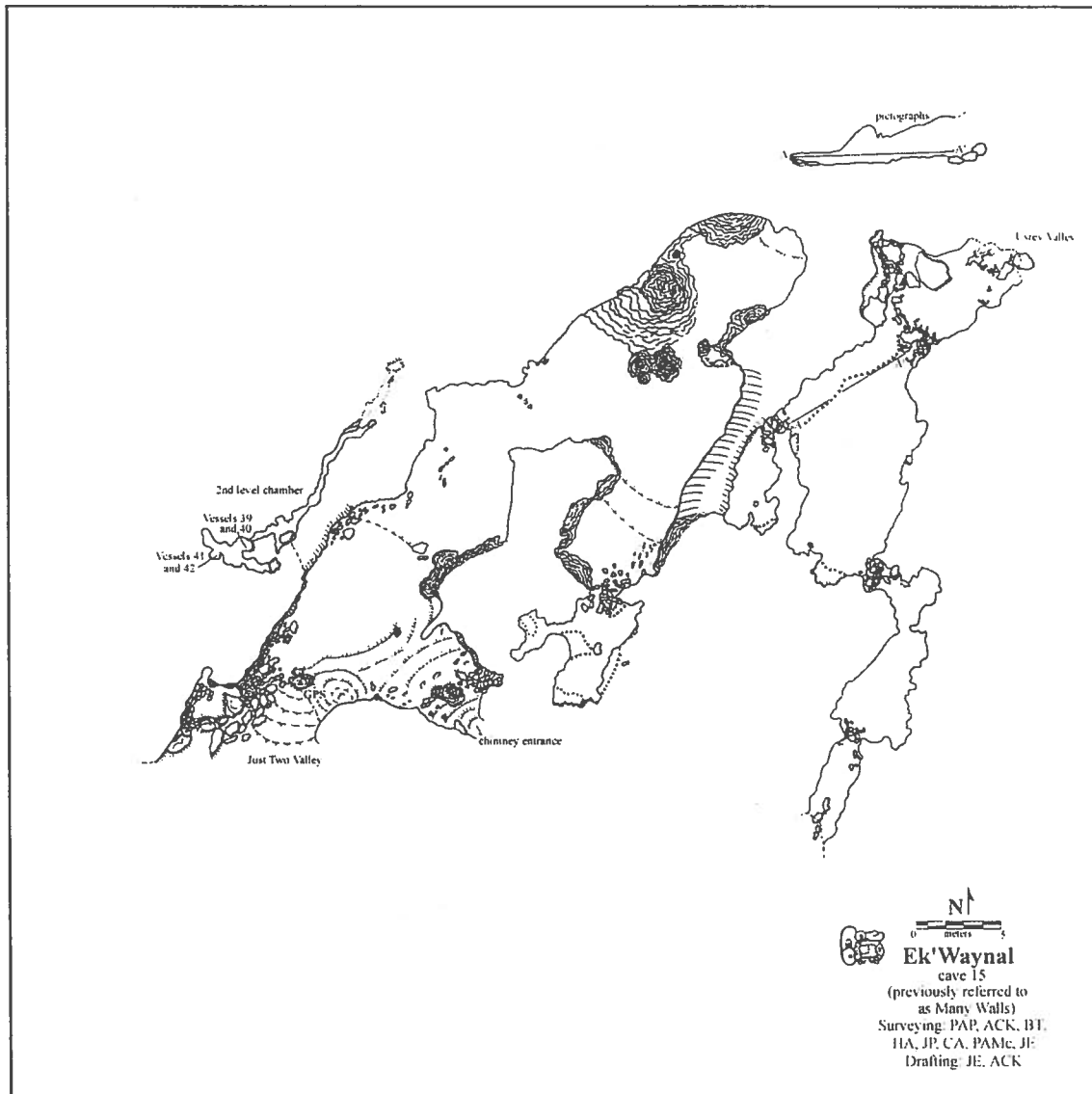


Figure 4.9 Map of Ek'Waynal.

Metate Cave

The karst in Usrey Valley is highly weathered and bears the appearance of swiss cheese. Forming a pass-through cave between the valleys of Usrey and Just Two (see Map Sheet 7), Metate Cave assumes a serpentine form with six separate entrances, caverns on at least five different levels, and some chambers with very high ceilings (Figure 4.10). Fragments of *metates* were recovered

from Actun Ik and Pine Torch Rockshelter, but a complete *mano* and *metate*, along with a small conch and sherds were found in a niche at Metate Cave. Other caves in the study area containing *manos* include Glenwood and Pine Torch Rockshelter. Balankanche, a cave in the Yucatán, contained 232 tiny *manos* and *metates* (Pohl & Pohl 1983:50).

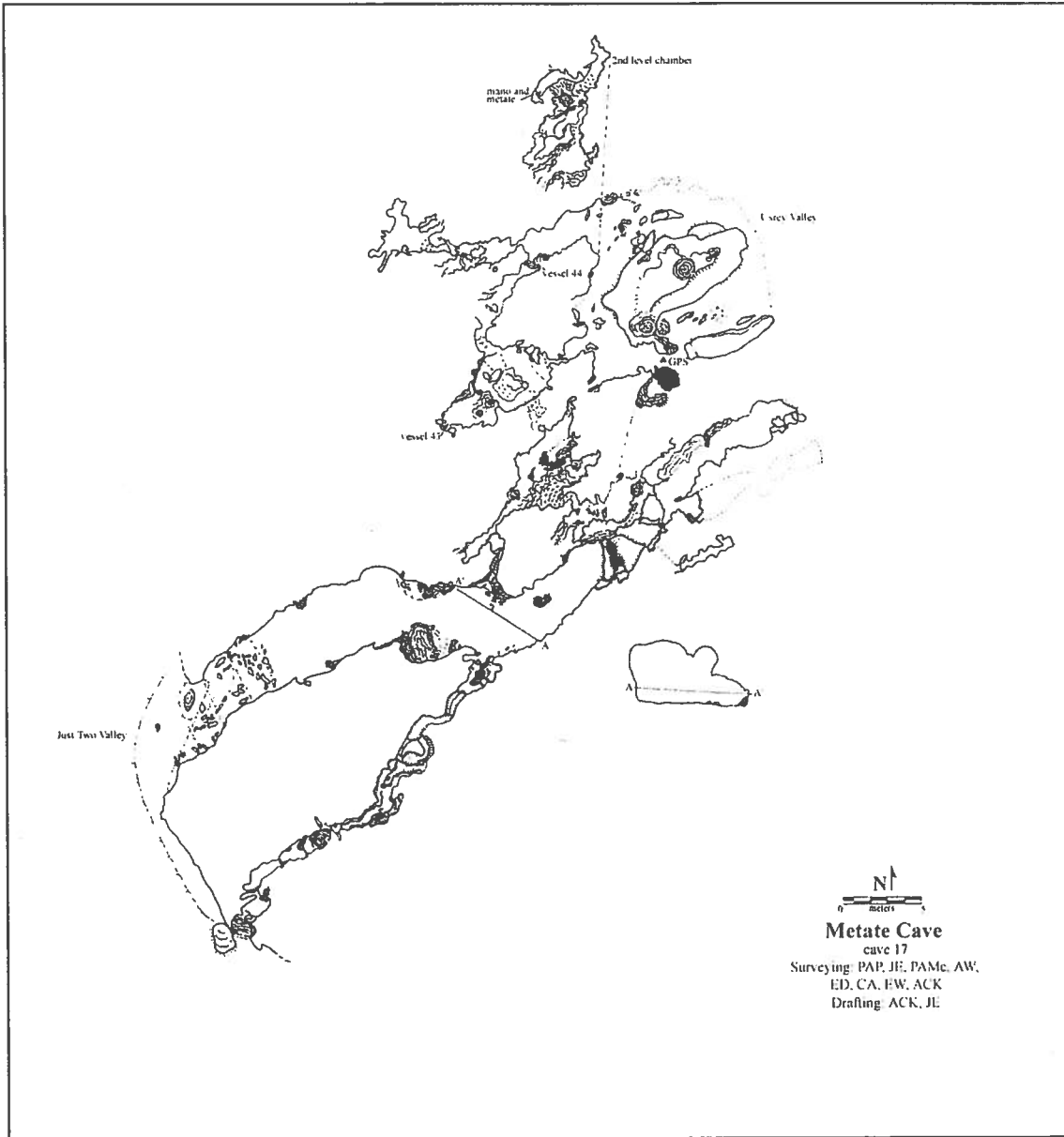


Figure 4.10 Map of Metate Cave.

An oval biface was placed on a natural flowstone ledge near the center of the pass-through. It is made of radiolarian chert that varies from white to honey brown to gray. It is lenticular in cross-section and oval in plan-view; one flake has been removed from the center of the distal end. Polish was restricted to the distal end, mostly on flake ridges. The biface is almost flawless, except for a hinge fracture towards the distal end of one face. The lateral margins bear evidence of use.

Two bowls, one coarse, unslipped and one a flanged polychrome, are located in separate deposits in the cave. Vessel 44, the unslipped bowl, is located in a niche and is visible from the narrow chamber containing the *metate* above it. Vessel 43 is a red slipped bowl with black wave-like designs. It was discovered inverted in an alcove on the first level of the cave.

Pottery Cave

Two caves documented during the 1997 season—Pottery and Chrissy’s Crawl Through caves—were revisited during 1999 when new features were noted and existing cave maps updated. For Pottery Cave, we noted the presence of two altars located on the first level on the southern side of the entrance chamber. The larger of the two is a worked slab of limestone, pecked on the sides, placed at a slant, and propped up on two stones. Another smaller altar is located closer to the wall of the cave next to the first altar. These new observations were added to the map produced by the 1997 XARP team (see Isaza et al. 1997:Figure 5.1).

Chrissy’s Crawl-Through Cave

With the aid of a Suunto clinometer, we were able to map intricate passages and multileveled caves. Lacking a clinometer, the 1997 team had been unable to complete the map of a crawlspace entrance that connects Chrissy’s Crawl-Through with Tiger Valley. The 1999 team mapped the serpentine entrance and then discovered a lancelet spear point in Chamber 1 near the previously recorded *ollas* (see Isaza et al. 1998: Figure 5.8). The point had been crafted from a large macroflake of honey colored radiolarian chert, suspiciously similar to the northern Belizean chert found in the workshops of Colha (Shafer and Hester 1983). The ventral side of the macroflake is still evident in the slight curvature of this face. Cortex is visible on the end of the stem, especially on the dorsal face. Polish is present in the flake troughs as well as on the ridges, perhaps evidence that it was kept in a leather sheath (McAnany personal communication, 1999). There is marginal use-wear on the sides in the form of microflaking. Shallow flakes, especially near the base of the ventral face, span the entire width of the tool. These must have been produced by soft hammer percussion or pressure flaking. Such ritual spears are depicted in the hands of elaborately dressed elite in Late Classic iconography. A Late Classic date for this tool would be consistent with the ceramic evidence from the caves of the surrounding area.

2001: A Cave Odyssey

Continued research is necessary to understand the role that caves played in Maya cosmology. We have only scratched the surface. Time is an issue as the caves are adversely impacted by looting and modern activities. Preliminary reconnaissance has been conducted several caves not mentioned above and these caverns will be the focus of future research. Many require technical equipment, as the Maya were notorious for leaving offerings in places that are difficult of access. Actun Lak’in (East Cave), Actun Hub (Shell Cave), River Cave, Usrey Cave (formerly No Man’s Reach), and Cullerton Cave are among the caves that will be investigated next season. The last bears mentioning.

Cullerton Cave

Fragments of a polychrome plate with a deer design were found by Bruce Cullerton in a small cave located 6.6 vertical meters up a smooth limestone face. Light filters in from the entrance and illuminates the entire cave. There are several *olla* rims on a ledge opposite the two sherds of the deer plate that lay on the floor. The deer is painted red and outlined in black against a burnt orange background. The deer is depicted in a style reminiscent of the deer pages in the Madrid Codex. Calcite partly covers the chevron design around the rim. This pattern is typical of Late Classic (circa AD 600-700) ceramics (Arlen Chase personal communication, 1999).

Discussion

Several patterns emerged during the 1999 season. They are discussed below in order that other archaeologists involved in the study of caves may recognize similar activities and that we may begin to understand regional similarities and differences in cave ritual.

Table 4.1 summarizes the evidence to date, of Maya cave use in the Sibun River valley. The major artifact class is ceramics. Whole vessels are found in over half of the caves. They are always in naturally concealed areas such as niches and hard to reach chimneys. They are all located in dry areas, showing little evidence of calcification, thus they were not intended for collecting *zuhuy ha* ("virgin water"). Most vessels show evidence of burning, indicating that they may have been used as *incensarios*. Residue analysis will determine whether this was the case or if they were used for carrying food. Many of the *ollas* are inverted, however, which suggests alternate purposes. Boiled *jute* may have been transported in such containers (see Ebersole, Chapter 8). Shell and animal bones are often part of ritual feasting or sacrifice.

Table 4.1 Artifacts found in Sibun Caves

CAVES	ollas/jars	shoe pots	bowls	plates	torches	chert tools	obsidian	manes/metates	animal bones	walls	altars	steps	vaults	floors/ramps	carved speleothems	pictographs	greenstone axe	flute	worked shell	unworked shell
Pottery Cave	X		X	X					X	X	X				X					
Tiger Cave	X		X		X	X	X		X										X	X
Pass-Through Cave	X		X																	
Chrissy's Crawl Through	X		X			X				X										
Just Two	X		X																	X
Kate's Whistle Cave						X				X								X		X
River Cave	X		X							X				X						X
Broken Rim	X																			X
Usrey Cave	X									X										
Actun Yax Tun										X							X			X
Cullerton Cave	X			X																
Ek' Waynal	X		X			X	X		X	X						X				X
Shoe Pot Cave	X	X				X			X	X				X						X
Metate Cave	X		X			X		X	X	X										X
Actun Ik			X	X		X		X	X	X				X		X				X
Actun Ibach	X		X						X	X			X	X						X
Pine Torch Rockshelter					X		X	X	X											X
Glenwood Cave	X		X	X	X		X	X	X	X	X	X		X						X

Sherds are more common than complete vessels. Distinctive sherds with incised designs have been found, but do not comprise a reconstructable vessel. This pattern suggests that pottery was broken prior to transport to the caves. The sherds often are fire blackened with a thick layer of charcoal, alluding to their function in burning incense.

Walls and other architecture also are common in caves of the region. In fact, Awe observed more modification within the Xibun caves than in the Roaring Creek area (Awe personal communication, 1999).

Cave Modification

This notion of 'that which is set apart' becomes almost the same as 'that which is holy; that which is effective in dealing with the gods' (Redfield & Villa Rojas 1934: 130-131).

Human spaces within a natural landscape can be defined by enclosure with built features such as walls (see Kenward, Chapter 5). Walls serve to restrict access, block out wind and light, and seal cache deposits. They generally block off natural entrances into and between cave chambers and thus direct the flow of traffic. In this manner, walls can direct ritual procession through a cave and a pathway may be dictated by certain cultural conventions. Participants may be led through a ritual circuit that leads them in specific directions or to particular places within the cave which are deemed especially sacred.

In the Xibun caves, floors and ramps were built to flatten uneven surfaces allowing easier passage. Steps carved into flowstone facilitated climbing slippery formations. Maya pilgrims to the underground caverns were avid cavers and they traveled by torchlight to the depths of Xibalba. Using only bush ladders, they reached places that we find daunting even with technical gear.

Other features appear to have designated areas on the floors of caves. Glenwood Cave features several such spaces delimited by rough limestone blocks near the cave entrance. These features are not the result of breakdown, instead these rock scatters were deliberately constructed. Modern K'iche' Maya create mountain shrines by stacking a mound of stones for offering smoke to the gods (Tedlock 1985:214-215). Could cave shrines be constructed in a similar manner? The ancient visitors to the cave used niches and speleothems as natural torch holders.

Public vs. Private Ceremonies

Remote and inaccessible chambers appear to have been more heavily utilized than the main ones. In Glenwood Cave, for example, the wide, open chambers are sterile while the floors in the side passages are littered with offerings. The Maya especially liked to place offerings in high places or deep recesses that are reached with great difficulty. This is in contrast to the public ritual feasting on *jute* and *Pomacea* that occurred in the twilight zone, just beyond the entrances of the caves (see Ebersole, Chapter 8). These feasts may have been precursory to more exclusive rituals that took place within. A detailed examination of the artifacts collected in the entrances of caves compared to those found inside the chambers will illuminate similarities and differences in rituals that were performed in these contrasting contexts.

The majority of ceramics are utilitarian forms. Some polychrome and incised sherds were collected from the entrances to Glenwood Cave and Ek' Waynal and in remote areas of Actun Ibach and Actun Ik. If the quality of ceramics can be equated to the status of the individuals who deposited them, both elite and commoners participated in public and private ceremonies within the Xibun caves. Luxury items, such as the Pachuca obsidian blade, the greenstone *hacha*, the worked conch pendant, and the ceramic flute attest to the wealth of the ritual participants.

Types of Rituals

Ancient Maya people created cave shrines and left a host of material remains at these features: *jute*, sherds, *manos*, and pine splints. The presence of *manos* suggests the possibility of fertility rituals perhaps at the time of planting (at the end of the dry season). The shells invoke images of the watery underworld. The shell in the Maya numerical system also stands for completion, wholeness, quite different from our notion of zero. Evidence from Shoe Pot Cave also suggests that fertility may have been a central concern motivating pilgrimage to caves where offerings to the rain god may have been made. The recovered bifaces are analogous to Chak's lightning axe and the shoe pot may represent his mythical water carrier. *Manos* and *metates* are frequently found in cave deposits as symbols of maize. Agrarian concerns were most likely addressed through rain ceremonies staged in caves.

Speleothems were found at two surface sites on the north side of the Sibun River—Pakal Na and Pechtun Ha. Ethnographically, speleothems have been recognized as symbols of fertility that are brought into homes in Mexico for propagation of the crops and amulets for pregnant women (Brady et al. 1997). Xibun Maya not only performed ceremonies in caves, they also brought a portion of the sacred landscape back to their residences.

A laurel-leaf chert knife was found in a niche inside Footprint Cave above an area that may have been exploited for its high quality clay. Potters could have left ceramic offerings in appreciation of the clay that was extracted (Graham et al. 1980:171-172). Piles of yellow clay, which Malone thinks was the same paste as the associated vessels, were discovered near a hearth in Actun Polbilche (Malone 1971:5). Clay procurement and associated rituals may also have been performed in Shoe Pot Cave. Future comparison of the clay with petrographic thin sections from vessels found in caves will support or refute this theory. Experimental pottery production is ongoing with clay from the shoe pot chamber.

Bloodletting was an important part of Maya ceremony. The presence of obsidian in the entrances to Glenwood Cave and Ek' Waynal, and in Pine Torch Rockshelter suggests that sacrifice was performed in the light or twilight areas. A stingray spine and obsidian blade, obvious perforation implements, were discovered in a wooden box in Actun Polbilche (Pendergast 1974:49-51). Animal sacrifice may have also been performed. Animal bones have been found in many caves (Table 1) although it is not clear whether these are ancient or modern. The Maya believe in a participatory religion, where gods and humans interact. Blood sacrifice is necessary to nourish the gods so they, in turn, can provide rain and sustenance for humans. There is also evidence that burning copal was integral to cave ritual. Fireclouding on cave walls and on vessels is common.

The modern Tzotzil of Chiapas burn copal so that the black smoke will attract rain clouds (Graham 1997:29). Ceremonies for rain were enacted during times when drought was a threat.

Seasonality

Modern Kekchi make an annual pilgrimage to Naj Tunich before the onset of the rains to pray for their crops (Schuster 1997:52). Today Tzotzil farmers also perform cave rituals at the time of planting, again at the beginning of the rainy season, and at harvest time (Thompson 1970:267). *Jute* found in the twilight zone was apparently collected from the Sibun River during the dry season perhaps indicating that rituals were performed during *milpa* planting.

Conclusions

Caves are part of the sacred landscape of the Sibun River Valley. They were the focus of religious life. Local elite, farmers, potters, and commoners alike made pilgrimages from their riverside settlements to the limestone hills across the river. Use of the caves seems to predate major settlement in the area, as Early Classic evidence has been found in caves and not at the sites investigated thus far. The caves themselves may have been a focus for settlement as ethnographically documented among Zinacanteco Maya (Vogt 1993). Xibun Maya brought pine torches from the savanna, mollusks from the river, and offerings from as far as Central Mexico to the gods who reside in the caves. They even took speleothems back to their residences as symbols of fertility. Caves played an important role in the lives of the Xibun Maya, as they housed the gods on whom their lives depended.

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Chapter 5

Ritual Pathways and the Alteration of Cave Features

Amalia Kenward

Introduction

Though the body of work on Maya cave archaeology is rapidly increasing, it is still focused greatly upon artifacts, which can be easily removed and thus often looted. Less attention has been lavished on modifications to the cave itself. Multi-course cave walls, broken formations, and bulky speleothems, placed in the midst of passages, are much more difficult to alter and destroy. Such alterations are difficult to take notice of, as they are quickly readopted by their surroundings. Yet, the greatest modifications to the karst of the Middle Sibun Valley took the form of construction within the caves.

Alteration to caves is not a recent discovery, just an easily overlooked aspect of cave use. Thompson notes the occurrence of “both offerings and . . . religious architecture [altars, shrines, and stairways]” (Thompson 1970:183) within caves. Large pieces of speleothem have also been used as construction material in caves. At Naj Tunich, a barrier of thick column segments, which probably blocked the entrance to the tunnel system at the end of the Late Classic, was partially destroyed by modern looters (Brady et al. 1997:731). In the case of the Middle Sibun Valley, limestone boulders were commonly used in fill and in the construction of walls. This rubble ranges from fist-sized nodules to table-sized speleothem boulders. In areas where ancient cave features have been deconstructed, this rubble can easily be overlooked as breakdown, until the walls and roof of the cave are examined for evidence of collapse. In cave archaeology one of the greatest challenges is learning what the natural cave environment looks like, so that one can detect alterations to it. Upon visiting the caves in the Sibun-Manatee Karst during the 1999 season, cave archaeologist Jaime Awe remarked on the great frequency of alteration in these caves, in comparison with the caves in the south of Belize in which he has conducted research. During the 1999 season, experienced cavers Allan Cobb and Bonnie Longley pointed out several speleothem boulders that had been reset.

The large number of limestone outcrops within the caves provided raw material utilized in subterranean construction. Quarrying activities in caves altered not only the layout of cave passages but also limestone features. Modifications to caves range from the small-scale to the grand. Most large-scale alterations to caves consist of low, multi-course walls in both cave entrances and passages, but other alterations can include something as slight as the filling of crevices and holes with limestone rubble and the cutting of flowstone. All forms of cave modification involved the use of rubble, be it little speleothem fragments or big pieces of limestone formations. In relation to cave navigation, these modifications can be seen as belonging to one of three categories: neutral construction, aiding construction, or blocking construction. Neutral construction involved the building of slab and stacked stone altars and rubble piles, both which involved the transportation and deposition of cave materials, but did not affect passage through the cave. Aiding constructions

include filled crevices, ramps, steps and stairs, and vaults. Blocking constructions may consist of the resetting of speleothem boulders or several different types of walls.

Table 5.1 Presence of cave modifications in Xibun caves.
(Caves are listed by number)

Modification	Cave Number													
	1	2	3	4	5	6	8	10	11	12	13	15	16	17
Altars	P	-	-	-	-	-	-	-	-	P	-	-	-	-
Blocking Walls	P	P	-	P	-	-	-	P	P	-	-	P	P	P
Crevice Filling	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Designation Walls	-	P	P	P	P	-	-	P	P	P	P	P	P	-
Entrance Walls	-	P	P	P	-	-	-	P	P	-	P	P	-	-
Ramp	-	-	-	-	-	-	-	-	-	-	-	-	P	-
Reset Boulders	-	P	P	P	P	-	P	P	P	P	P	P	P	P
Rubble Piles	-	P	P	-	P	P	-	P	-	P	P	P	-	-
Stairs and Steps	-	-	-	-	-	-	-	-	P	P	-	P	-	-
Tiling	-	-	-	-	-	-	-	-	-	P	-	-	P	-
Vaulting	-	-	-	-	-	-	-	-	P	-	-	-	-	-

Modifications Neutral to Cave Navigation

Neutral constructions neither blocked nor aided access through the cave passage. Yet they took equal amounts of forethought and effort to construct as did the other modifications. Altars and rubble piles are included in this category because the building material is native to the cave environment and involved transportation and construction. Altars and rubble piles should be viewed as focal constructions around which other features were created to aid or block access.

Altars

Altars are a rare find within the Sibun-Manatee Karst, though they are noted in Naj Tunich in Guatemala (Stone 1995:128-30), and eleven other caves in Belize (McNatt 1996:90). The term altar is applied rather loosely to features that were focal points of activity. There is no set construction style to altars in caves, though two different types were identified by the XARP cave team. Some altars consist of long flat slabs of limestone propped up on smaller pieces of rubble, like a table,

while other altars use natural flowstones and outcrops in the cave in conjunction with large piles of speleothem boulders. In the Sibun, Glenwood Cave had the greatest number of altars, but was also the largest cave recorded during the two field seasons. Glenwood Cave contained the only definite example of a piled rubble (or stacked-stone) altar, and several examples of slab altars. Only two altars, both found in Glenwood Cave, were allocated numbers.

Slab altars were found in both the Glenwood and Tiger Sandy Bay Districts, two in Glenwood Cave, and two on the first level of Pottery Cave. Of the two altar-like features recorded in the entrance to Pottery Cave, one was a small, thick, flat limestone slab, raised up on four rectangular limestone chunks, and the other was a large piece of dressed limestone with rounded edges, about three-fourths of a meter wide by one and a quarter meters long. The dressed stone was still resting upon two limestone pieces. Altar 2, of Glenwood Cave, was located in a small chamber, reached through a narrow hole, under a large flowstone in the passage to “The Ballroom” (Figure 5.1). The Altar was in the corner of the subchamber, constructed from a roughly flat section of limestone, propped up on small limestone breaks, in a semi-circular shape. This construction is similar to the altars used in modern K’iche’ calendric ritual.

There are hundreds of altars—quemaderos, as they are called. Each is shaped like a large horseshoe, a curve of earth and ash and broken pottery stacked carefully in a half-oval. Each is black with the dense smoke of pine and copal incense . . . This is the place of the altars, the place of broken pots. Each priest or priestess, called chuch-kahau, has an altar . . . You find your chuch-kahau. On his altar you will place your offerings of broken sherds (Ries 1943:248).

Another dismantled slab-style altar may have been located in a small room off the Altar 1 chamber in Glenwood, the floor of which was dominated by a collapsed pit. On the far side of the room, on a flowstone, there were approximately six limestone blocks, two of which were placed at a forty-five degree angle, and a long flat limestone slab lay close by, still resting on a few of the blocks.

Stacked-stone altars are the more common form of altar within the caves. There is a fine line between these and some wall features, and distinguishing criteria depends on their placement. Unfortunately, many altars of this type normally go unnoticed. Stacked altars do not block passageways and they normally focus around a particular cave feature. Speleothem boulders, which are randomly placed in caves and do not serve in blocking the cave passage, may have been used similarly to the slab altars. Alternatively, these boulders may have also served as anthropomorphized stones. In Naj Tunich one stacked altar was located in a remote passage known as K’u Multun. This altar consisted of a heap of stones, about a meter high, stacked against the cave wall and capped with a tall vertical slab of limestone that was crowned with two olla rims (Stone 1995:128-30). Pope and Sibberensen (1981:53) note similar rubble and pottery conglomerations in Alta Verapaz caves: “of the three cave locations studied, two featured crude architectural constructions made of rough limestone blocks. Both Early and Late Classic pottery was found to be incorporated in them.”

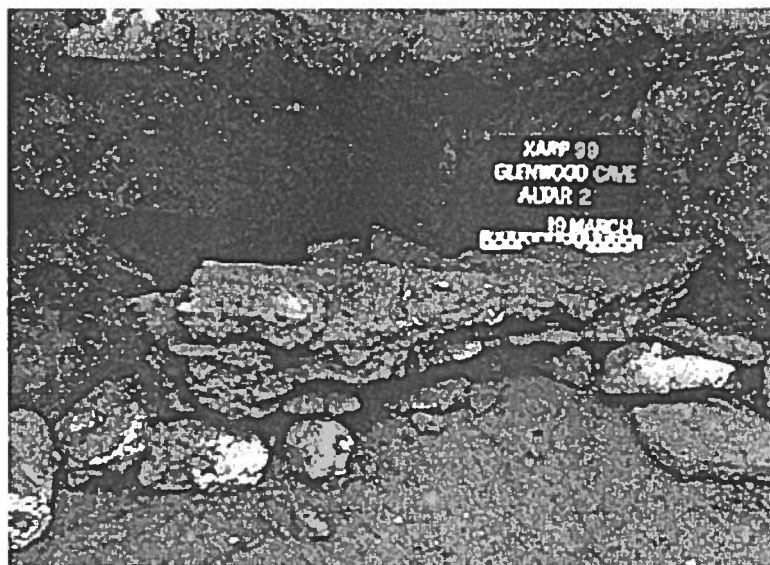


Figure 5.1 Glenwood's Altar 2 (photo by P. A. McAnany).

Glenwood's Altar 1 (Figure 5.2) was located at the end of a long chamber within the depths of Glenwood. More than five thousand pottery sherds were collected from the chamber, the majority of which were thickly encrusted with charcoal. The room was strewn with rubble piles and broken speleothems. The altar itself was a natural flowstone in the chamber wall, the bottom of which had been cut and hollowed out. The hollowed section had once been piled up with rubble, which had been removed, probably during historic times, and is now strewn about the cave floor. Overall, slab altars are much easier to identify, which is probably why this type is most commonly discovered. Stacked-stone altars are more easily overlooked, but also probably involved greater construction efforts and may have been constructed in phases. It seems probable that the two types of altars served different ritual functions.

Rubble Piles

There are numerous piles of rubble within the Sibun-Manatee caves, which while appearing to be rubble, tend to be focal areas for artifacts. Some rubble-strewn areas are the result of the dismantling of constructed walls at entrances, but a majority of these rubble concentrations are probably deconstructed stacked-stone altars.

Modifications That Aid Navigation

Whereas altars are rare in the Sibun, other types of modification are extensive. Although construction is dominated by imposing walls, more subtle construction involved the modification of navigable passages within the caves. Stairs were carved into solid limestone, crevices and drop-offs were filled, and certain cave passages were modified to facilitate travel.

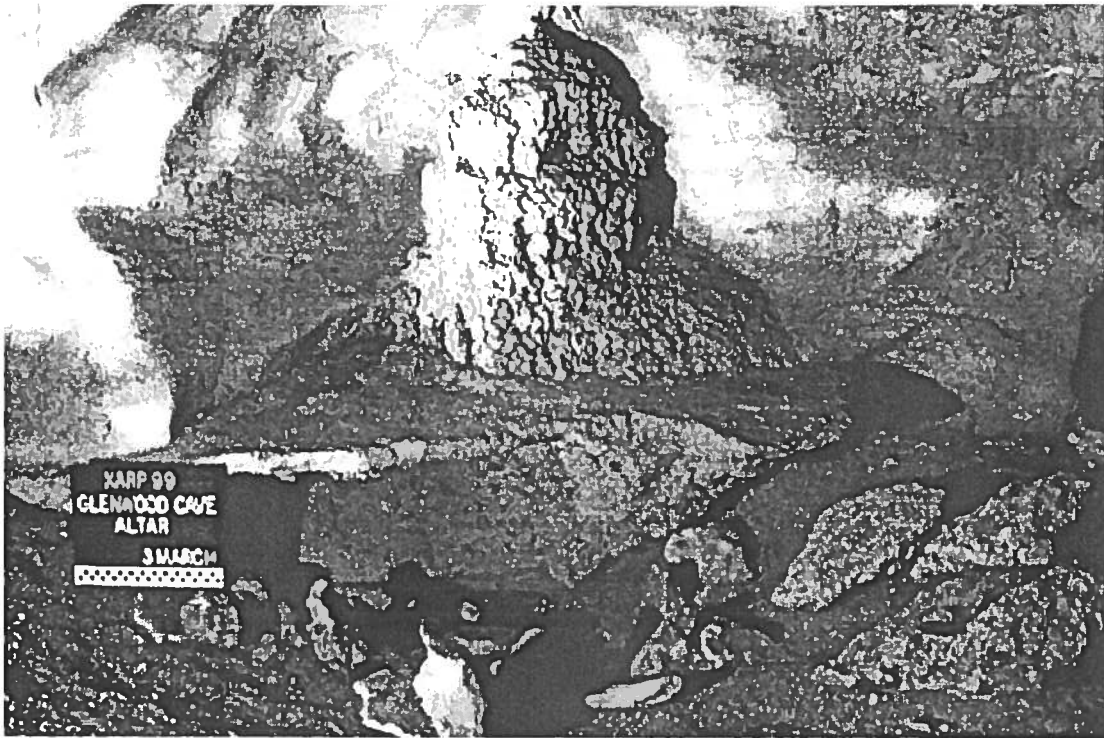


Figure 5.2 Altar 1, Glenwood Cave (photo by P. A. McNany).

Crevice Filling

Crevice filling is one of the most subtle but probably the most ubiquitous form of cave alteration. This alteration to a cave surface involves the creation of level, unpocketed areas through the placement of limestone fill in crevices. In the Tiger Sandy Bay District, alterations made to caves in this manner are innumerable. One person could easily have manipulated many of the speleothems used in such modification without strain.

Examples of crevice filling were noted at Actun Ibach, where a complete *olla* was placed on its side in a deep niche in the wall, in a second level chamber. Under the *olla*, limestone fill had been delicately placed to snugly fill the crevice that dropped down inside the niche.

The predominate form of construction in Broken Rim Cave was crevice filling. Broken Rim is the only pass-through cave that leads from Tiger Valley to the larger, but more remote, Just Two Valley in the Tiger Cave District (Map Sheet 7). This passthrough shows no sign of ever having been walled. Instead, limestone fill was placed in the pits and crevices in the cave passage to aid in the navigation of the cave. Courses of small speleothem chunks were placed in pits, in an area of the floor dominated by natural rimstone dam steps, so that these crevices did not hinder traffic.

Ramp Construction and Tiling

Limestone fill was also used in creating ramps and even floors for easier passage between chambers. Ramp construction is only noted at Shoe Pot Cave in the Tiger Cave District, where a small, narrow entrance from the first chamber to the next was aided by the construction of a ramp of speleothems leading to the entrance (Figure 5.3) and the addition of speleothem boulders to the uneven floor. This construction was at first thought to be a broken down wall, but after multiple trips through this small hole, the significance of the speleothem additions became evident.



Figure 5.3 Ramped opening to the second chamber of Shoe Pot Cave (photo by P. A. McAnany).

Tiling or paving with semi-flat limestone boulders is another way to facilitate movement through a cave. An area with a tiled limestone floor was mapped in the first sub-chamber of the pit room in Glenwood Cave. Just before the crawl entrance to the second subchamber, a series of flat limestone slabs had been set into the floor at the back of a small overhung room. In Shoe Pot Cave, an uneven and pitted surface located at the base of a flowstone had been altered by construction of a rough limestone surface. The flowstone extending from this limestone-tiled floor contained a niche that housed two chert bifaces. Adjacent to this modification, a turret-like section of the chamber was created through crevice filling.

Stairs and Steps

Nearly vertical, often slippery slabs of rock constitute intimidating obstacles while navigating caves. Xibun Maya sometimes carved several steps or small niches in rock faces in order to aid their passage. Three caves recorded during the 1997 and 1999 XARP field seasons contained constructed stairs.

In the Thumb District of the Sibun-Manatee Karst, the labyrinthine Actun Ibach had multiple walled entries. Almost all of the entrances had walls that blocked access to the heart of the cave. Within the cave, four or five different layers of passages were mapped. An area of the second level of passages, which contained a cached *olla*, was reached via a flowstone easily accessible from the first level. A wall had been built under the flowstone on the first floor, which acted as a sort of step to the flowstone, and five steps that had been carved in the flowstone eased the remainder of the ascent. In another section of level two of Actun Ibach, a large precipice in the floor had a few indents on either side of it, to create footing above the drop-off, or perhaps even to rest poles in to create a bridge. In CA-1 of the Candelaria System of Alta Verapaz, Guatemala, Pope and Sibberensen (1981:20) noted a similar fissure between two ledges “passable only with the aide of a long pole or bridge.”

In a pass-through chamber of Metate Cave, a difficult descent down flowstones, from Just Two Valley into Usrey Valley, is aided by the accentuation of natural steps down the rock face. In Ek'Waynal, a long, sloping rock face that connects one section of the cave to another, is only passable by a series of natural-appearing niches in the wall, of which there are no others on the rest of the rock face. Another example of cut stairs is located in Glenwood Cave, at one end of the “Music Room” (Figure 5.4).

Vaulting

Only one example of vaulting was observed during the XARP seasons. In the Thumb District of the Sibun-Manatee Karst, Actun Ibach had multiple walled entries. One entrance, on the west face of the karst, was reached via a narrow passage where the natural cave walls had been slightly built up and capped with one rectangular stone, like a vaulted corridor that led into the cave's natural entrance. This structure visually accentuated the entrance into the chamber.

Modifications Blocking Cave Navigation

The majority of the construction in caves involved the sectioning, walling, and blocking off of large areas of the cave. Large speleothem boulders served, either individually or within wall constructions, to direct the flow of traffic through the caves. Different types of wall construction visually and physically blocked areas of the cave from use.

Speleothem Boulders

The removal and resetting of large (1 m long) speleothem boulders is an indicator of the effort that the Maya put into their cave alterations. Though these large-scale alterations involved a lot of effort, they were a common modification.

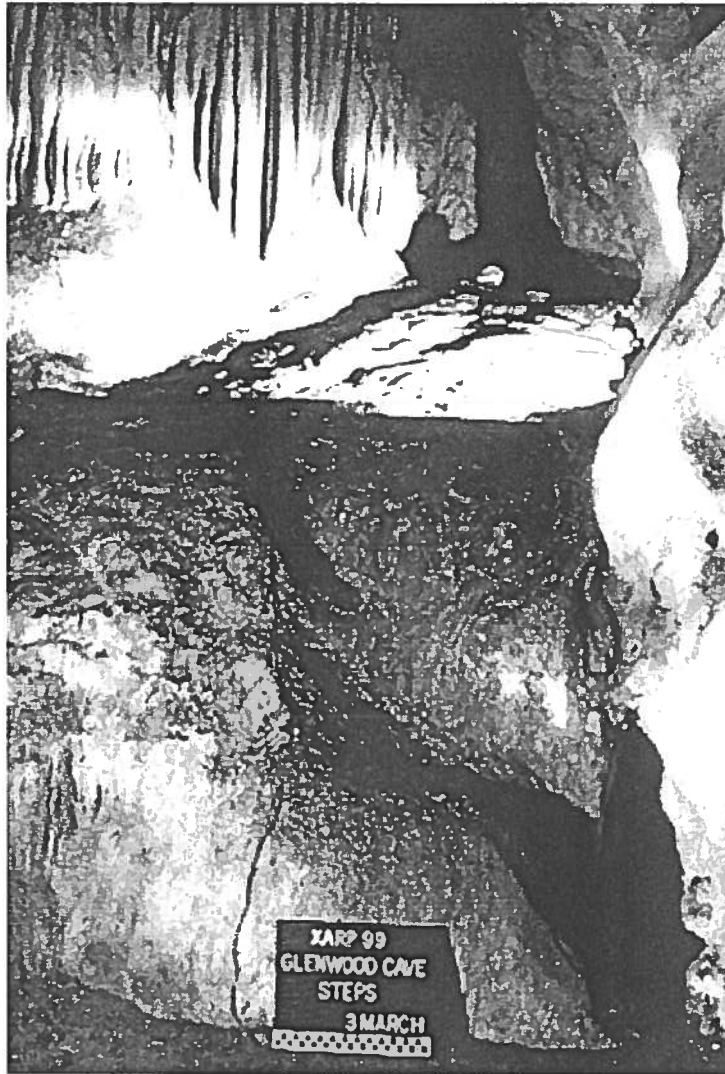


Figure 5.4 Steps in Glenwood (photo by P. A. McAnany).

The resetting of large speleothems was noted in Cueva del Rio at Dos Pilas (Brady et al. 1997:782). At the mouth of Tiger Cave, a one by three meter section of stalactite had been placed in the midst of the cave floor. The roof of this area displayed no remnant of a large broken speleothem. At the main entrance to Tiger Cave, from Foster's Road, there is a pile of limestone boulders skirting one section of the entrance. These were not the result of breakdown, since the ceiling and walls of the cave are unblemished. In the middle of one passthrough cave, Broken Rim, there is yet another

large stalactite boulder constricting the passage floor, with no signs of its origin in the proximity. This boulder may once have been used to cap a hole cut in the flowstone floor, which has been dug out in recent times, the fill strewn about the passage with a wooden pole. “In the Cueva de Sangre at Dos Pilas a large speleothem segment was strategically set to block an opening between formations and force visitors to follow a path around the formation” (Brady et al. 1997:782).

Walls

Walls were probably the most time-intensive construction within the caves. Every cave surveyed during the 1997 and ‘99 XARP field seasons showed evidence of wall building, albeit of different magnitudes. There are several different forms of wall construction that occur within the Sibun-Manatee caves which can be seen as one of three types: low, area designation walls, blocking walls, and sealing walls.

Low designation walls, one to three courses tall, appear to have defined certain areas visually, but did not necessarily serve to block access to them. In Actun Yax Tun (a tall, open pass-through cave opening onto Just Two Valley) two speleothem walls were constructed at one end of the passage, incorporating huge limestone boulders in conjunction with a multicourse speleothem wall (Figure 5.5). This wall was low enough to cross, but visually detoured travelers through the chamber. Walls that functioned to visually designate certain areas were noted within the Yalpemech Caves and the Candelaria System of Alta Verapaz, Guatemala (Pope and Sibberensen 1981:22).

Blocking walls served a variety of purposes. Walls that were high enough to impair the navigation of a passage served to block off that area from future access. Chrissy’s Crawl Through and the entrance to Tiger Cave from Chrissy’s Valley were both walled just beyond the entrance, blocking access to Chrissy’s Valley. No walls that completely blocked a passage were



Figure 5.5 Low designation wall in Actun Yax Tun (photo by P. A. McAnany).

discovered intact within the Middle Sibun Valley area. Walls that contained enough rubble to have completely blocked off an area were already dismantled while many walls appeared to lack sufficient stone to have completely covered the confines of their construction. There is no reason, therefore, to assume that any of the walls built within the Sibun-Manatee Karst ever completely cut off the area they blocked, and openings may have been left in them for further communication with the beyond.

One use of blocking walls actually served to aid in the safe navigation of certain cave passages. In Ek'Waynal, every misleading side passage had been walled off (Figure 5. 6). The labyrinthine passages and dangerous crevices that drop off of the pass-through section of Metate Cave were all once walled off. Most of the walls located during a survey of the Candelaria System, in Alta Verapaz, were found on ledges where they blocked the precipice (Pope and Sibberensen 1981:20).

Many walls served to close off side chambers and pass-throughs from future access, even if the wall did not completely seal the entrance. Some of these walls may have sealed off a cache chamber; much like a cache would be placed in a sealed context under a stela or temple dedication at a Maya city center.

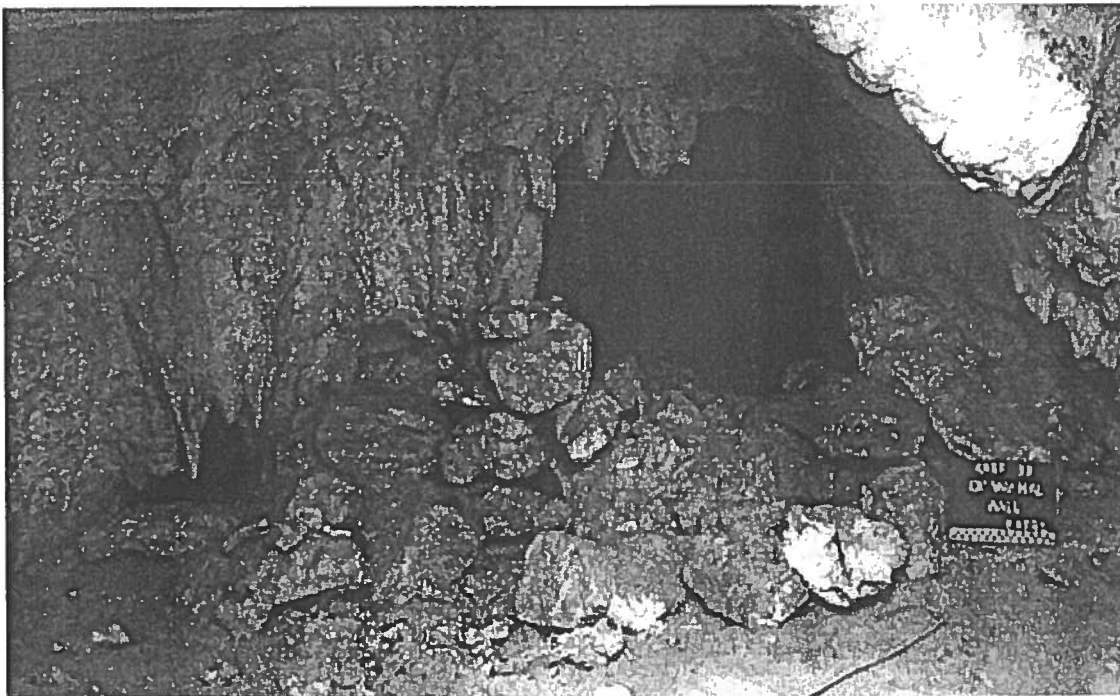


Figure 5.6 Blocking Wall in Ek' Waynal (photo by P. A. McAnany).

Aiding and Blocking as a System

Aiding and blocking passage through cave modifications created a ritual path through the cave as a unit, as well as through the caves as a system. "Ancient Maya sacred landmarks probably existed in some type of ranked system since modern Maya groups have hierarchies of sacred sites" (Brady et al. 1997:744). Reilly (1999:25) states that the goal of the Olmec who supervised the 500 years of construction that went into building Complex A at La Venta "...had been to define a ritual space with limited accessibility for elite use." It is possible that a similar ranking system was established among the caves of the Sibun-Manatee karst. This hierarchy may have been predicated upon degree of accessibility. Chambers within a cave were given varying degrees of access through construction. Parts of a cave and often entire caves were established as pass-through areas, where construction was used to increase the accessibility of the chambers. Broken Rim Cave is one such cave. No blocking structures were built within the confines of this cave, which served as the main access from Tiger Valley to the more remote Just Two Valley in the Tiger Cave District.

Just as the access to different chambers within a cave was manipulated by the karst crafters of the Xibun Maya, the access to and between the cave valleys was also directed. Just Two Valley and Tiger Valley both have very limited access, something which the Maya emphasized through modification. Only three caves serve as pass-throughs to Tiger Valley: Tiger Cave, Pass-through Cave, and Broken Rim. Both Tiger Cave and Pass-through Cave lead to the outside of the karst, and both were heavily walled. Pass-through Cave once had its tiny entrance to the outside world entirely walled off with huge limestone blocks.

The pattern of restricting access to caves is reminiscent of Central Acropolis palace structures at Tikal. Some of the plazas and rooms within the Central Acropolis had access limited by the construction of blocking structures (Peter Harrison, personal communication, 1998). This palace of Tikal was planned with constructions that directed the flow of traffic, just as the walls and alterations within the caves directed movement within these sacred precincts. Similar blocking and accessing construction that directed public access are noted at the central plaza of the Olmec site of La Venta (Reilly 1999:17).

Creating Pathways

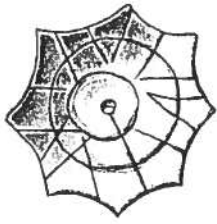
Xibun Maya modified the interior of caves for their use. Cave modifications on both a large and small scale served either to block off an area or to aid in its navigation. Such considerable modifications to caves shows that the use of them was a time-intensive activity, one which generated enough attention to inspire the construction of ritual pathways and visual illusions.

The caves, though each may have been used for certain specified and varied rituals, were not an isolated, inert environment. The Ancient Maya saw everything as possessing life and working within the matrix of a greater unified force of the cosmos. In a microcosmic way, the caves served as a pathway through an underworld that the Maya successfully navigated. By blocking and guiding passage through the system of caves in the Sibun-Manatee karst, the Maya created a ritual path. The way that ritual was to proceed in the caves was set by walls and dangerous and misleading areas

along the way were blocked. People had traveled to these realms before and the pathway was marked for those to come.

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Chapter 6

Terminal Classic Pictographs from Actun Ik

Marvin Rowe, Allan B. Cobb, Polly A. Peterson, and Patricia A. McAnany

Introduction

The ancient Maya believed that caves were the sacred realm of gods. Offerings of pottery, shells, and other items still remain as evidence of past ceremonies performed in many caves. Petroglyphs, or images carved into rock, occur in small numbers in caves throughout Belize. Less commonly, pictographs, or drawings, are discovered on the walls of caves. Actun Ik and Ek' Waynal, two caves containing charcoal drawings, were recently discovered in the Sibun-Manatee Karst. Only four other caves in Belize contain recorded pictographs: Actun Dzib, Roberto's Cave, Bladen 2 Cave, and Actun Uayazba Kab (Awe 1998:143-146; McNatt 1996:89-90; Stone 1995:57 map, 91-96).

Like Actun Uayazba Kab, Actun Ik contained handprints although the bright red stains on the underside of the sloping wall of Actun Ik differ from the negative prints found at Actun Uayazba Kab. The pictographs also include geometric shapes, branch-like motifs, and shapes that may be interpreted as zoomorphic. (See Figure 4.1 for a map of Actun Ik indicating the location of the pictographs.)

The difficulty of assigning dates to cave art lies in the fact that associated artifacts may not have been deposited at the time of painting. Dates are often given in terms of stylistic similarities to artistic conventions at surface sites. The charcoal drawings in Actun Ik represent the only scientifically dated pictographs in Belize. The Epiclassic Classic date of 1100 ± 50 years BP (about AD 900) is consistent with the ceramics in the cave and from nearby settlements. The style of the drawings is not typical of Classic-period imagery, and therefore the pictographs might have been loosely dated to the Archaic or Colonial periods had this date not been confirmed scientifically.

Actun Ik is a large pass-through cave located at the base of a tower karst locally referred to as "the Thumb." Most of the cave is sunlit and its shape is the classic phreatic type resulting from being carved by running water. Thus the ceiling is higher in the center and the sides lower to crawlspaces under low overhangs. The pictographs are located on the side walls and on the low ceilings. As a result, they are not readily seen. Reconnaissance of "the Thumb" by the 1999 field crew led to the discovery of the pictographs as well as two pass-throughs in the base of the karst that were soon discovered to be connected via a narrow crawl space. The lower pass-through chamber (dubbed "the assassin chamber" due to the large population of assassin bugs, *Apiomerus* sp., that guard the small room) yielded two artificial walls and several caches of pottery, stone tools, and crab claws in small niches and alcoves. The larger upper chamber contained pictographs in three distinct areas—near both entrances and in the center. A fourth area, below the main entrance to the cave, was the chosen locale from which to collect a small sample of the charcoal etching for AMS dating.

Experimental procedure

Sample Collection

With the permission of the Department of Archaeology in Belize, Allan Cobb removed a small sample from the rock paintings wearing rubber gloves and using a sterile scalpel blade. The sample was taken from a rock drawing located in a small alcove on the north side of Actun Ik near the eastern entrance (Figure 4.1 and 6.1). The rock drawing depicts a black triangular object that is an indeterminate form. The markings were drawn on a mineralized surface of the cave wall that is now eroding off the wall and exposing the underlying limestone. This is an example of case hardening (George Veni, personal communication 2000). This drawing was selected for sampling because the accretionary mineral matter was exfoliating from the wall of the cave. The sampling was simplified because loosened flakes of the accretionary mineral matter at the upper margins of the drawing could be removed with minimal impact to the remaining rock drawing (See Figures 6.1 and 6.2).

The 150 mg sample, which included underlying rock and accretionary mineral matter in addition to the charcoal pigment, was placed on aluminum foil, then wrapped and stored in seal-able plastic bags. The sample was taken to Texas A&M University (hereafter referred to as TAMU) where it was kept in a desiccator until ready for analysis. We examined the sample with an optical microscope to ensure that no extraneous material was included in the sample to be studied; none was seen. The rock drawing was processed for radiocarbon dating by plasma-chemical extraction of carbon (Russ et al. 1990) from the charcoal pigment.

Chemical Pretreatment

Rubber gloves were worn to avoid contamination during all handling of samples. Conventional procedures for chemically pretreating archaeological charcoal vary only slightly from laboratory to laboratory around the world; but all involve treatment with acid and sodium hydroxide (alkali) and acid again (a-a-a), NaOH (e.g., see Bowman 1990:23, 30 and Taylor 1987:41-42). In the a-a-a procedures, any limestone is dissolved with acid to remove ^{14}C -free carbonate carbon. Next, NaOH is used to dissolve the humic acid fraction that may be present. The sample is then re-acidified to prevent adsorption of atmospheric carbon dioxide (CO_2) by the remaining NaOH. In the archaeological chemistry laboratory at TAMU, we routinely eliminate the acid washes, as we have shown them to be unnecessary with our technique (e.g., see Hyman and Rowe 1997; Pace et al. 2000). Carbonate and oxalate carbon are not extracted by the plasma.

To remove potential humic acid contamination from the Actun Ik pictograph sample, it was placed in alkali (1 M NaOH) in an ultrasound bath ($50 \pm 5^\circ\text{C}$) for about an hour. The resulting supernatant liquid was clear. Humic acids appear brownish-yellow in NaOH. After another NaOH wash/ultrasonication treatment for another hour, the supernatant was again clear, ensuring all humic acids had been neutralized and removed.



Figure 6.1 Pictograph before sampling (Photo by Allan Cobb).

Since NaOH absorbs water and CO₂ from the atmosphere, the sample was then placed in doubly distilled, de-ionized water and put in an ultrasonic bath at $50 \pm 5^\circ\text{C}$ for about an hour. This water wash was repeated once more to thoroughly rinse NaOH from the sample. This lowers the amount of adsorbed CO₂ on the sample, adsorbed by unremoved NaOH. Adsorbed CO₂ and water do not affect the dating technique, but the subsequent sample extraction time is increased due to the number of argon plasmas necessary to remove those adsorbed species by vacuum pumping. Finally, the sample was filtered through binder-free borosilicate glass filters baked overnight at $\sim 600^\circ\text{C}$ to remove organic contamination. After drying overnight in a 100°C oven, the sample was ready for plasma extraction.



Figure 6.2 Pictograph after sampling (Photo by Allan Cobb).

Plasma-chemical Treatment

The plasma-chemical method, introduced over a decade ago (Russ et al. 1990), was used to extract organic carbon from the ancient rock painting sample from Actun Ik. The technique has been described and tested in detail elsewhere (e.g., see Pace et al. 2000; Hyman and Rowe 1997; and TAMU references therein), but will be discussed here briefly. Ultra-high purity bottled argon and oxygen (99.999%) were used for all plasmas; the gases were passed through a liquid-nitrogen cold-finger to remove organic contaminants and water from the transfer line before entering the system proper.

An efficient rotary pump has been found to be sufficient to maintain vacuum conditions ($\sim 10^{-4}$ torr). Low temperature oxygen plasmas were used to pre-clean the reaction chamber before introduction of each sample and were repeated until ≤ 0.001 mg carbon, as gaseous CO_2 , was generated. Once the chamber was clean, a vacuum integrity check confirmed that the vacuum had negligible pressure rise in 1 hour without pumping. Then the chamber was opened to the atmosphere at the sample port while argon (99.999%) flowed through the system and out of the sample introduction port to minimize back flow of atmospheric gas. The sample was introduced into the chamber via a copper-gasketed, stainless steel flange-sealed port under a flow of argon to prevent atmospheric

CO₂, aerosols, or organic particles from entering the system. After the chamber was resealed and the sample degassed under vacuum and heat, low temperature argon plasmas were used to desorb CO₂ molecules from the sample and chamber walls by inelastic collisions of the non-reactive, but energetic, argon species. Adsorbed CO₂ was thus reduced to ≤ 0.001 mg carbon.

Then, a low-temperature (<175°C), low-pressure (~1 torr oxygen) plasma oxidized the charcoal in the sample to CO₂. Decomposition of any inorganic carbon present (limestone and calcium oxalate) was prevented by running the plasmas at low-temperature. The oxidizing plasmas react only with organic carbon present in the samples, leaving any potentially present substrate rock and accretionary carbonates and oxalates intact as has been demonstrated in earlier publications from TAMU (Russ et al. 1992; Chaffee et al. 1994). The CO₂ from the sample was flame sealed into a glass tube cooled to liquid nitrogen temperature (-194°C), after the water had been frozen out with a dry-ice/ethanol slurry (-58°C). Approximately 0.40 mg of carbon was sent for radiocarbon analysis to the Center for Accelerator Mass Spectrometry at the Lawrence Livermore National Laboratory (CAMS).

Results

Table 6.1 shows the result of the oxygen plasma extraction for the Actun Ik pictograph sample. It also includes the 2 sigma calibrated AD age range using the OxCal program, version 3.5 (Ramsey 2000) and the uncalibrated AD age (simply 1950 minus 1100) for the image. Figure 6.3 shows the calibration curve for the radiocarbon date, 1100 ± 50 years BP.

Table 6.1. Results of plasma oxidation and the radiocarbon date for the *Actun Ik* charcoal rock drawing from Belize.

Motif	Carbon	CAMS#	¹⁴ C age, years BP	1σ age range(Cal AD)*	uncalAD age†
geometric	0.40 mg	54390	1100 ± 50	890 – 1030 AD	850
*Calibration obtained with the OxCal Calibration Program OXCAL version 3.5 (Ramsey 2000) using the data of Stuiver et al. 1998a.					
†Calculated as 1950-1100 = uncal A.D. 850.					

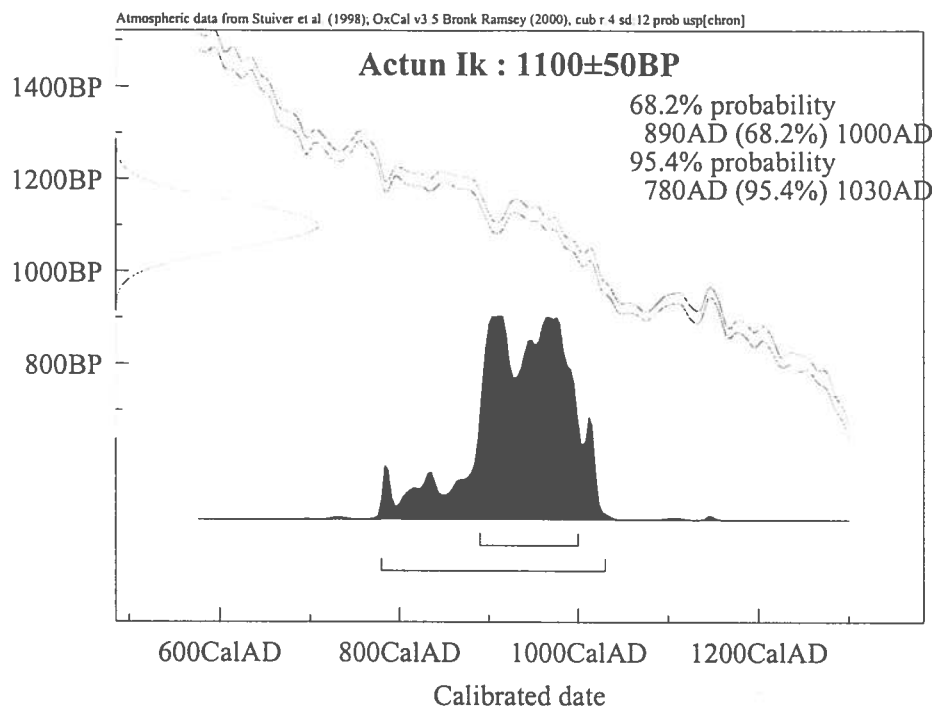


Figure 6.3. Calibration curve obtained with OxCal for the charcoal drawing motif in *Actun Ik* (Ramsey 2000; based on data of Stuiver et al. 1998 a, b).

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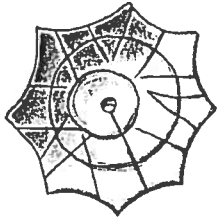
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Chapter 7

Pottery from the Caves of the Thumb District

Carolyn M. Audet

Introduction

Across Mesoamerica, cave sites have long been viewed as entrances to the underworld, the home of dreaded deities, and the location of events that occurred during the origins of humans (Brady 1988; Awe 1998). Ancient Maya shamans would perform rituals to communicate with the gods that inhabited caves (Brady 1988; Thompson 1975). Only a few specific gods lived in this watery underworld, including the rain god whom the Maya called Chak and the Aztec referred to as Tlaloc. For the agriculturally dependent Maya civilization, Chak may have been the focus of the many cave ceremonies. Rituals conducted in caves have long been of interest to Mesoamerican archaeologists, but detailed work in these sites has only recently begun.

Caves were perceived by the ancient Maya as portals to the underworld (MacLeod and Puleston 1978; McNatt 1996; Thompson 1975; Steele 1997). In the Yucatán, the underworld was known as *Metnal*, and in the southern Maya region, it was called Xibalbá (MacLeod and Puleston 1978). The Maya perceived their world in three levels; the top level was heaven, the middle layer was earth, and the lower level was Metnal or Xibalbá. Within this bottom layer, there were nine sub-levels, four descending to the fifth or Xibalbá/Metnal, and four ascending towards earth (Thompson 1975). For the K'iché Maya, Xibalbá was a place inhabited by gods and the spirits of ancestors. The souls of the dead had to make their way through each level of the underworld, passing a series of tests, before entering the heavens. These trials were seen as tests of wisdom and courage, where an individual could prove his/her worth to enter the heavens and become a god (McNatt 1996).

Ceramic Offerings

Ceramic analysis of vessels and sherds ritually deposited in caves, like that of cave research in general, has a short history. Lack of stratigraphy in cave deposits and the relatively small sample of cave ceramics studied presents a difficult job for those attempting to give type-variety classifications to cave ceramics. The law of superposition can not apply as artifacts discovered in caves generally are found on the surface (if the area has not been disturbed) and may represent multiple periods of deposition. Despite this difficulty, archaeologists are now striving to categorize the types of vessels the Maya were ritually depositing in caves. With the aid of type-variety information, caves can be tentatively dated and we can determine relative dates when the Maya began to perform cave rituals. One important reason for dating the caves is to test the hypothesis that the Maya turned to cave rituals as drought began to paralyze the civilization at the end of the Late Classic (Awe 1998). It is also important to look at the forms of pottery found in caves, to try and understand what purpose each vessel had in the context of cave ritual. Were the Maya offering food to the gods, and if so, were they cooking it in the caves? Were they collecting water from the caves

for rituals performed in their settlements or fields? Although these questions can not be definitely addressed through type-variety analysis of the cave pottery, perhaps we can begin to develop some tentative theories regarding this mysterious aspect of Maya religion.

Ceramics excavated from surface sites in the Maya lowlands provide the stratigraphic control needed to determine the age of distinct Maya vessel types. Using James Gifford's *Prehistoric Pottery Analysis and the Ceramics of Barton Ramie in the Belize Valley* (1976), Dorie Reents' *The 1978 Caves Branch Cave Archaeological Project Ceramic Analysis* (1981), and David Pendergast's *The Excavations at Actun Polbilche* (1974), a type-variety analysis was performed on ceramics collected from the surface of two caves. The author is aware of the problems associated with using a ceramic reports external to the Sibun area to determine the ceramic sequence of this area, however until a type-variety classification is constructed for the Sibun River Valley, this comparative information must suffice.

Data Base: Sherds from Actun Ik and Actun Ibach

The first cave to be analyzed is Actun Ik and the second is Actun Ibach. Both caves are in close proximity to each other and both are in the Thumb Cave District. Actun Ik is a small pass-through cave that is oriented east-west with six entrances. Located high on one of a series of karstic uprisings visible from the Western Highway (approximately mile 32), the cave receives a great deal of sediment influx from the jungle surrounding it due to the wind constantly gusting through it. Well known to local residents, Actun Ik has been frequently visited by hikers and campers. Sherds have been piled up on rocks at the entrances by explorers, and we are aware of people camping in the shelter of the cave (both through word of mouth and through the discovery of a tent spike and baggage tag found in the center of the cave). No excavations were done in the cave, but extensive surface collections occurred. Large quantities of sherds were removed for further analysis, and it is probable that more exist beneath the deep sediment.

Actun Ibach is a small cave with a web of chambers and passageways. Stone walls that the Maya once built to seal off certain chambers had been dismantled and cast aside. This destruction may have been effected by modern looters or perhaps the Maya themselves opened up the cave that was once shut off to the outside world. Four entrances lead into the cave and Actun Ibach contains numerous chambers. An intact olla was found in a small niche one level above the main floor and large sherds were discovered in many small chambers high above the main chamber. No excavations were done in this cave, only sample surface collections. The olla was left *in situ*, as we believed it to be well enough hidden to remain safe.

Methods

The ceramic analysis of Actun Ik and Actun Ibach are presented in the type-variety format, and each description includes the number of sherds from each cave. Determining type involved a careful process of collection and creation of a diagnostic sample. First the caves were mapped, marking the areas where sherds were collected. After the sherds were collected, they were placed in field collection bags labeled with their provenience, and were brought to the laboratory to be processed. Collections were made on the surface in areas selected by Polly Peterson, with attention

paid to separating niches within chambers and keeping each chamber distinct. Once in the laboratory, the sherds were washed with water and toothbrush, and left to dry before being labeled and bagged according to provenience. Three works were consulted to determine type-variety: Gifford (1976), Reents (1981) and Pendergast (1974). The assistance of Dr. Jaime Awe was also extremely important for the initial typing of the first group of sherds to give the author a small comparative collection. While determining type-variety, form was also determined, as rituals may have included the use of specific vessel shapes.

Problems that might skew the results presented below include my own inexperience with type-variety analysis. Although I was given a basic introduction, I lacked access to an extensive comparative collection. Another possible distorting factor is the heavy use of this area by tourists and locals. In both caves studied, only one intact vessel remained *in situ* and it is unknown whether more had been placed there in the past. We discovered evidence of recent camping in Actun Ik, and in Actun Ibach all walls built by the Maya had been dismantled. It is possible that those traveling through the area may have removed some of the “prettier” painted ceramics. One other decision that may skew my results was the decision to limit artifact collection to surface material.

Type-variety

The type-variety system of pottery classification is based on slip color, paint (both color and form of decoration), form (based primarily on rim shapes), impressions, appliqué, temper, and paste. Many sherds in a single field collection bag may not be “diagnostic” as there may not be the remains of a rim, or sherds retaining painting. Despite these potential obstacles, the preservation of the sherds in both Actun Ik and Actun Ibach was particularly good, as these caves are dry year-round, and the shelter of the caves afforded the ceramics some protection. The names given to each grouping of vessels is based upon surface characteristics, primarily color, and the following list gives the reader an idea of the types of pottery found in the caves of the Thumb district.

Actun Ik

Monochrome Red

- Minanha Red: Minanha Variety
- Mountain Pine Red: Mountain Pine Variety
- Dolphin Head Red: Dolphin Head Variety
- Roaring Creek Red: Roaring Creek Variety

Orange-Red

- Macal Orange-Red: Macal Variety

Dichrome Black on Red

- Yuhactal Black on Red: Variety Unspecified

Polychrome

- Dos Arroyos Orange Polychrome: Dos Arroyos Variety
- Saxche Orange Polychrome: Varieties Unspecified

Brown Striated

White Cliff Striated: Variety Unspecified (Brown)

Unslipped Striated

Striated Olla Sherds

Unslipped

Zibal Unslipped: Variety Unspecified

Hewlett Bank Unslipped: Hewlett Bank Variety

Daub-Striated

Duende-Daub Striated: Variety Unspecified (Orange-red)

Actun Ibach

Monochrome Red

Minanha Red: Minanha Variety

Minanha Red: Rio Frio Variety

Dolphin Head Red: Dolphin Head Variety

Garbutt Creek Red: Garbutt Creek Variety

Monochrome Brown

Zibal Unslipped: Variety Unspecified (Brown)

Monochrome Orange

Tzunuum Orange: Tzunuum Variety

Polychrome

Actuncan Orange Polychrome: Blancaneau Variety

Incised

Lucha Incised: Variety Unspecified

Lid (possibly for a tripod vessel)

Unslipped Striated

Striated Olla Sherds

Red Striated

White Cliff Striated: Variety Unspecified (Red)

Unslipped

Cayo Unslipped: Variety Unspecified (Buff)

Red Rimmed

Petroglyph Red Rimmed

Daub-Striated

Duende-Daub Striated: Variety Unspecified (orange-red)

Each ceramic group was placed within a time period during which those types of vessels were manufactured according to James Gifford (1976). Table 7.1 correlates Christian dates with archaeological periods, and indicates the name of the associated ceramic phase.

Table 7.1 Barton Ramie Ceramic Sequence (after Gifford 1976)

Time Period	Christian Dates	Barton Ramie Ceramic Phases
Early Classic	A.D. 300-550	Hermitage
Middle Classic	A.D. 550-650	Tiger Run
Late Classic	A.D. 650-800	Spanish Lookout
Terminal Classic	A.D. 800-950	Spanish Lookout

Each type within each class is discussed below, and sherds were illustrated and annotated with field numbers based on cave and location therein, e.g., Actun Ik = C10, Actun Ibach = C11. The number following the cave number is the cave component number, i.e., niche, chamber, or exact provenience. Drawings were done to scale by the author (unless otherwise specified) and are based on the practice established by Gifford (1976).

Table 7.2 Ceramic Complexes Represented at Actun Ik

Ceramic Complex	Number of Sherds
Hermitage	21
Tiger Run	15
Spanish Lookout	20
Nondiagnostic, multiple possibilities (i.e., <i>olla</i>)	287
TOTAL	314

Table 7.3 Ceramic Complexes Represented at Actun Ibach

Ceramic Complex	Number of Sherds
Hermitage	15
Tiger Run	27
Spanish Lookout	5
Nondiagnostic, multiple possibilities(i.e., <i>olla</i>)	505
TOTAL	552

Minanha Red: Minanha Variety

Sherd count : Actun Ik 4 rim sherds, 1 flange sherd
 Actun Ibach 7 rim sherds

Group: Minanha Ceramic group

Ware: Peten Gloss

Complex: Hermitage

Illustrations: Figure 7.1 G, H

Description:

Medium thick red slip on basal flange bowls. Slip is well smoothed and glossy and is found on the interior and only above the flange on the exterior of the vessel. The area below the flange is often roughly polished with no slip. In most cases, the exterior of the vessels is weathered to a greater degree than the interior. This type was established in the Barton Ramie collection (Gifford 1976:157). Gifford (1976:157) notes that the Minanha ceramic group appears throughout the Early Classic, and it is evident that as time passed, the basal flanges receded to basal ridges. This collection contains only flanged examples of Minanha Red. The only rim sherd collected indicates a 32 cm diameter.

Minanha Red: Rio Frio Variety

Sherd Count: Actun Ik 1

Actun Ibach 2 rim sherds

Group: Minanha Ceramic group

Ware: Peten gloss

Complex: Hermitage

Illustrations: Figure 7.1 I

Description:

Similar to Minanha Red: Minanha Variety, except the exterior of the vessel is unslipped and rougher. Bowls are the only known form represented in the Barton Ramie collection (Gifford 1976:159) and in Actun Ibach both sherds were from bowls. Often rough drag marks can be seen on the exterior portion of the vessel and large calcite inclusions protrude through the surface. Reents (1981:1) believes that similar sherds found in Caves Branch Cave are of Early Classic origin, but points to similar vessels found in San Jose in Phases II (Late Early Classic) and III (Late Classic). In Phase II, the vessels were flanged, but by Phase III, the flanges had receded to ridges only.

Mountain Pine Red: Mountain Pine Variety

Sherd Count: Actun Ik 3 rim sherds

Actun Ibach 0

Group: Mountain Pine Ceramic Group

Ware: Pine Ridge Carbonate

Ceramic Complex: Tiger Run

Illustration: Figure 7.1 A, B, C

Description:

Containing red slip on basal ridge dishes, these vessels feature exteriors that are generally unslipped, but when slipped, such decoration usually occurs above the basal ridge, and the color is consistently lighter in hue than the vessel interior. Gifford (1976:193) considers this type a transitional type between Minanha Red and Belize Red, because it contains attributes of both. The two rim sherds found in Actun Ik were in different niches, but connect, and have a diameter of 38 cm.

Dolphin Head Red: Dolphin Head Variety

Sherd Count: Actun Ik 1 rim sherd
Actun Ibach 1 rim sherd

Group: Dolphin Head Ceramic group

Ware: Pine Ridge Carbonate

Ceramic Complex: Spanish Lookout

Illustration: Figure 7.1 D, E

Description:

With a deep red slip, these shallow bowls and dishes tend to be slipped only partially down the exterior surface. Slipped vessel interiors are polished and smooth. Dolphin Head Red pottery breaks into small angular fragments (Gifford 1976:227). Pieces in this collection have a darker red, almost black slip on the interior. Diameters are 22 and 24 cm respectively.

Roaring Creek Red: Roaring Creek Variety

Sherd Count: Actun Ik 3 rims, 4 bases, 9 sherds(dishes); 2 sherds (jars)
Actun Ibach 2 sherds (dishes)

Group: Vaca Falls Ceramic group

Ware: Pine Ridge Carbonate

Ceramic Complex: Spanish Lookout (late facet)

Illustrations: Figure 7.2 A - H, Figure 7.2 D is a pedestal base

Description:

With a deep red slip on thick-walled dishes and thinner walled jars, these forms (dishes and jars) are slipped both on the interior and exterior. Dishes are characteristically large, with large flared-everted rims, basal break and ring bases or pedestal bases. Dish interiors and exteriors are polished to a high shine, while those sherds that are weathered lose luster quickly and the slip appears more orange. Jar diameter (the two pieces from different parts of Actun Ik fit together) is 10 cm, while dish diameters range from 32-38 cm. Gifford (1976: 242) tentatively places Roaring Creek Red into the Terminal Classic period, extending the time period the Maya were using the caves into a later phase.

Garbutt Creek Red: Paslow Variety

Sherd Count: Actun Ik 0
Actun Ibach 1 rim

Group: Garbutt Creek Ceramic group

Ware: Pine Ridge Carbonate

Ceramic Complex: Spanish Lookout

Illustrations: Figure 7.1 F

Description:

Bowl interiors are slipped orange, with exteriors unslipped and only lightly polished. Vessel walls are slightly thinner than Garbutt Creek Red: Garbutt Creek Variety, and the slip in the interior

is orange instead of red. This type was established by Gifford (1976:233) and is found widely in the Late Classic Period in the Lowland Maya region (Reents, 1981:9). This form is found (with some variation), in Actun Balam (Pendergast 1969: Figure 8) and in Eduardo Quiroz Cave (Pendergast 1971:38, Figure 9).

Macal Orange-Red: Macal Variety

Sherd Count: Actun Ik 11 sherds
Actun Ibach 26 sherds

Group: Macal Ceramic group

Ware: Unspecified

Ceramic Complex: Tiger Run

Illustrations: none

Description:

Red to orange slipped and very thin-walled with hard calcite temper, these “clinky” sherds are well-fired. Vessel interiors are never slipped, but are well polished. Bowl forms never occur, but form is indeterminable for the sherds under study. Gifford (1976:214) notes, however, that drum and jar shapes are the most common.

Zibal Unslipped: Variety Unspecified (Brown)

Sherd Count: Actun Ik 0
Actun Ibach 2 rims

Group: Zibal Ceramic group

Ware: Uaxactun Unslipped

Ceramic Complex: Tiger Run

Illustrations: Figure 7.3 G

Description:

Tan to brown jars, with thinner walls than the massive jars of Cayo Unslipped (Gifford 1976:223). The two sherds in this collection have appliquéd decoration. Fire clouding occurs on the outside of the sherds, and the paste is highly weathered.

Tzunuun Orange: Tzunuun Variety

Sherd Count: Actun Ik 0
Actun Ibach 1 rim

Group: Tzunuun ceramic group

Ware: Unspecified

Complex: Hermitage

Illustrations: Figure 7.3 F

Description:

Orange slip on medium-walled, basal-flange bowls, similar to Dos Arroyos Orange Polychrome. This bowl, however, only has an orange slip. The basal flange bowls are indicative of Early Classic Maya pottery, however examples of this form in Gifford (1976) are limited to

polychrome examples. Reents (1981:14) found such a vessel in Caves Branch Cave, and determined it to be, with some reservation, from the Early Classic period.

Yuhactal Black on Red: Variety Unspecified

Sherd Count: Actun Ik 4 body sherds
 Actun Ibach 0

Group: Palmer Ceramic group

Ware: Peten Gloss

Ceramic Complex: Spanish Lookout

Illustrations: Figure 7.6 A, B, E and F

Description:

Black linear designs, lines and curving elements on red slipped vessels. Surfaces are well polished and smooth, with a glossy finish. No rim sherds were found in this sample, rendering the form of the vessels unknown. Two sherds from different areas in the cave match together, and two sherds from the same niche fit together.

Dos Arroyos Orange Polychrome: Dos Arroyos Variety

Sherd Count: Actun Ik 1 rim, 4 flanges, 1 body sherd
 Actun Ibach 0

Group: Dos Arroyos Ceramic group

Ware: Peten Gloss

Ceramic Complex: Hermitage

Illustrations: Figure 7.5 A - D, Figure 7.6 D

Descriptions:

Red and black geometric and naturalistic designs are found on orange-slipped basal flanged bowls (4 sherds) and 1 rim sherd from a jar. Black and red lines of varying thickness, including wavy and horizontal lines, as well as naturalistic motifs. Included in this sample is the underworld scene polychrome, with 9 (assuming symmetry) "blood drips" coming from a "cave."

Actuncan Orange Polychrome: Blancaneau Variety

Sherd Count: Actun Ik 0
 Actun Ibach 1

Group: Actuncan Ceramic group

Ware: Peten Gloss

Ceramic Complex: Hermitage

Illustrations: none

Descriptions:

Red and black designs on orange slipped bowls with basal flanges. Designs tend to be geometric (the one sherd found in Actun Ibach has squares painted on the exterior above the flange. Below the basal flange the exterior surface is unslipped and smoothed. Gifford (1976:172) notes that no jar forms were found, and the majority of vessels are bowls and dishes.

Saxche Orange Polychrome: Variety Unspecified

Sherd Count: Actun Ik 1
Actun Ibach 0

Group: Saxche Ceramic group
Ware: Peten Gloss
Ceramic Complex: Tiger Run
Illustrations: Figure 7.6 C

Description:

Red and black designs are found on orange and light orange slipped bowls and dishes. Surface is glossy and well polished, and designs generally contain geometric, abstract, and naturalistic motifs. Interior of the sherd is orange, and less polished.

Lid (Incised)

Sherd Count: Actun Ik 0
Actun Ibach 2

Group: Unknown
Ware: Unknown
Ceramic Complex: Hermitage?
Illustrations: Figure 7.7

Description:

Deeply incised reddish-brown lid, possibly from a Teotihuacan-style slab-footed vessel. Nothing described in Gifford (1976), Reents (1981), or Pendergast (1974) is similar to this unique lid which, at this point in time, cannot be further classified.

Lucha Incised: Variety Unspecified

Sherd Count: Actun Ik 0
Actun Ibach 1 rim, 2 body sherds (all from one vessel)

Group: Balanza Ceramic group
Ware: Peten Gloss
Ceramic Complex: Hermitage
Illustrations: Figure 7.4 E

Descriptions:

These relatively thin walled black to brown slipped bowls feature orange to light tan paste with medium course texture and calcite inclusions. The exterior of the bowl is incised with geometric shapes (triangles and horizontal lines). The incisions begin 0.5 cm below the rim and end before the base of the bowl. The sides of the bowl are outcurved, recurving inward at the rim.

White Cliff Striated: Variety Unspecified (Red)

Sherd Count: Actun Ik 0
 Actun Ibach 2

Group: White Cliff (late) Ceramic group

Ware: Uaxactun Unslipped

Ceramic Complex: Tiger Run

Illustrations: Figure 7.3 C

Description:

Unslipped dull red to red brown jars with fireclouding and large calcite inclusions. Exterior surfaces are rough and uneven with drag marks from inclusions in the clay. Jar necks are smoother and jar interiors are often found with a clay wash to smooth the pores of the rough paste.

White Cliff Striated: Variety Unspecified (Brown)

Sherd Count: Actun Ik 1
 Actun Ibach 0

Group: White Cliff (late) Ceramic group

Ware: Uaxactun Unslipped

Ceramic Complex: Tiger Run

Illustrations: Figure 7.3 E

Description:

Unslipped brown to orange brown jars, with a dragged surface treatment (Gifford 1976:219). The interior of the vessel is smoothed, as is the exterior. The exterior however, is coated with charcoal. Surface color is medium brown, and the diameter for the one rim sherd is 16 cm.

Striated Olla Sherds

Sherd Count: Actun Ik 79
 Actun Ibach 108

Group: Unknown

Ware: Unknown

Ceramic Complex: Hermitage-Spanish Lookout?

Illustrations: none

Description:

Unslipped body sherds, with raked striations covering the exterior of the vessel. Many of the sherds are covered with charcoal, on both the interior and exterior. The majority of the sherds are thin (0.4-0.7 cm) and the paste ranges in color from tan to black. Huge body sherds suggest very large ollas were used in cave rituals or that the sherds themselves were used as incensarios.

Zibal Unslipped: Variety Unspecified (Buff)

Sherd Count: Actun Ik 2
 Actun Ibach 1

Group: Zibal Ceramic group
Ware: Uaxactun Unslipped
Ceramic Complex: Tiger Run
Illustrations: Figure 7.3 D

Description:

Unslipped tan to buff wide mouthed jars and with short to medium outcurved necks. Paste is brown to tan, and contains calcite inclusions of various sizes. Jar diameter ranges from 20-36 cm.

Hewlett Bank Unslipped: Hewlett Bank Variety

Sherd Count: Actun Ik 1
Actun Ibach 0

Group: Hewlett Bank Ceramic group

Ware: Unspecified

Ceramic Complex: Hermitage

Illustrations: none

Description:

Tan, orange-brown or brown unslipped bowls with a smoothed exterior and a very smooth interior. At Barton Ramie, the four restorable vessels are bowls with outflared sides, beveled-out lips and flat bases (Gifford 1976:191). The one recovered sherd from Actun Ik is a base, but at Barton Ramie the rim diameters range from 15-21 cm (Gifford 1976:191).

Cayo Unslipped: Variety Unspecified (Buff)

Sherd Count: Actun Ik 1
Actun Ibach 1

Group: Cayo Ceramic group

Ware: Uaxactun Unslipped

Ceramic Complex: Spanish Lookout

Illustrations: Figure 7.3 D

Description:

Unslipped buff medium-sized jars with coarse pastes and large calcite inclusions. Exterior surface is grainy and fire clouding is common. Just below the rim on the exterior of the vessel, there is an appliqué with circular fillets encircling the vessel.

Unstriated Olla Sherds

Sherd Count: Actun Ik 99 sherds
Actun Ibach 264 sherds

Group: Unknown

Ware: Unknown

Ceramic Complex: Hermitage- Spanish Lookout

Illustrations: none

Description:

Unslipped body sherds, with no striations. Some of the body sherds are huge, suggesting a large size for the *ollas* used for cave rituals. Most of the sherds are rough, with some appearance of drag marks on the exterior. Most of the sherds are rather thin, none with a thickness greater than 0.8 cm.

Petroglyph Red-Rimmed: Petroglyph Variety

Sherd Count: Actun Ik 1
 Actun Ibach 3
Group: Petroglyph Ceramic group
Ware: Uaxactun Unslipped
Complex: Tiger Run? (Reents 1981)
Illustration: Figure 7.4 A
Description:

Red slip on the rim, with the interior slip ending at the break between the neck and body, exterior slip extending onto the shoulder. Jars are vertically striated with no break between the red slip and the striations. Similar vessels span almost the entire Maya civilization, from Late Preclassic times to the Terminal Classic period. Reents (1981:30) believes that the vessels that can not be well dated should be considered contemporaneous with other vessels in the cave, however whether or not this vessel should be affiliated with the Early Classic or Late Classic is unknown. Elizabeth Graham (personal communication, 1999) suggests however, that these vessels date to no later than the Proto-Classic period from stratigraphic associations at surface sites. If this is the case, it is possible the caves in the Thumb district were being used much earlier than initially thought.

Petroglyph Red-Rimmed: Variety Unspecified (impressed)

Sherd Count: Actun Ik 0
 Actun Ibach 1 impressed sherd
Group: Petroglyph Ceramic group
Ware: Uaxactun Unslipped
Complex: Tiger Run? (Reents 1981)
Illustration: Figure 7.4 B
Description:

Red slipped on the rim, with the interior slip ending at the break between the neck and body; exterior slip extends onto the shoulder. Jars are vertically striated with a single ring of impressions separating the slipped rim from the striations. Interior and exterior received a clay slip before any surface decorations. Similar dating to Petroglyph Red-Rimmed: Petroglyph Variety.

Duende-Daub Striated: Duende Variety

Sherd Count: Actun Ik 11
 Actun Ibach 1
Group: Duende Ceramic group
Ware: Uaxactun Unslipped

Complex: Hermitage-Spanish Lookout

Illustration: Figure 7.4 C, D

Description:

Horizontally streaky orange to orange-red to dark brown slip extending to the rim interior and sometimes to the upper exterior body of medium-thin jars. The interior slip extends to the rim-body juncture, and sometimes the exterior slip extends no more than 1.5 cm below the rim. A few drips of slip sometimes appear on the outside of the jar rim. Jars have outflaring or erect rims, rim diameters range from 12-30 cm. These vessels are also found in Caves Branch Cave and Petroglyph Cave (Reents 1981:32; Reents-Budet and MacLeod 1997: Table 4c).

Vessel Forms

Although dating ceremonial use of caves is important, we also want to understand the types of rituals carried out. Based on the range of pottery types identified in this sample, no notable increase in cave use (within the Thumb district) from the Early Classic to the Late Classic period can be documented, as it has been for other lowland Maya cave sites (Reents-Budet and MacLeod 1997). In Actun Ik, many of the sherds were associated with charcoal and animal bones. Although it is possible that these bones and charcoal are recent, the room and niche are small, and not in the main pass-through chamber where people would be more apt to start a fire. Jars especially were seen as cooking vessels, and many from this area were covered in charcoal. Alternatively, they may have been used to hold incense during a ceremony. Each vessel type had certain uses in Maya culture, and we hope to use this information to better understand why certain vessels were used in cave rituals, although they may have served different roles in domestic and ceremonial contexts.

Jars

The most common vessel form found in Actun Ik and Actun Ibach is the jar, totaling 604 sherds and one complete vessel. Generally, these sherds are unslipped, and about one third of these unslipped sherds are striated. Of the diagnostic sherds, most are slipped around the rim and one is impressed with an appliqué. Reents-Budet and MacLeod (1997) suggest that jars were used as food storage containers, as cooking vessels, as holders of water and as receptacles to hold *zuhuy ha* (virgin water). *Ollas* may also have held offerings (both cooked and uncooked) for the gods, as charcoal is often found inside them. Residue analysis has yet to be completed on these sherds but would be a helpful source of information.

It has been suggested by Reents-Budet and MacLeod (1997) that *ollas* cached in crevices or niches in the cave were used to contain vision-inducing substances. Their theory is based on paintings on Late Classic polychrome vessels that show Underworld beings standing next to jars with flexible bags and tubular nozzles or dancing holding such jars. Although we did not collect any bone tubes from the caves, it is possible that they are either still buried in the cave dust, or those conducting the ritual removed them.

As mentioned earlier, it is suggested that shamans used jars to collect virgin water dripping from stalactites. Many of the sherds from Actun Ibach did have evidence of calcite, indicating they were under an active drip at some point since they were deposited. However, all of these sherds were broken into very small fragments, and the one full vessel found in Actun Ibach was not under

an active drip, nor did it contain evidence of calcification. I would suggest that ollas were not being used in these two caves for the purpose of collecting drip water.

Bowls

Although they are found in Actun Ik and Actun Ibach, there is no clear association between bowls and caves. In surface sites, bowls are assumed to have been used for eating, and we can only speculate that they were used for the same purpose (ritual feasts including *Pachychilus indiorum*, *Pachychilus glaphyrus* and *Pomacea flagellata*) in cave rituals (Reents-Budet and MacLeod 1997). Another possibility is that bowls may have been chosen for particular polychrome paintings on the surfaces. One sherd of a flanged bowl found in Actun Ik depicts what appears to be a stylized cave with drops of blood surrounding it. Others are decorated with geometric shapes that may have been seen by religious practitioners as ritually important, as polychrome bowls were probably more difficult to obtain than undecorated vessels.

Dishes

Roaring Creek Red and Minanha Red are common varieties in both Actun Ik and Actun Ibach. Both types of vessels are found without noticeable residue inside, and therefore probably were not used as offerings of foodstuffs. Usually these vessels are in very good condition, and show little sign of use wear. Minanha Red is the earlier form of Roaring Creek Red, so it is certainly possible that both vessels have the same significance in cave rituals. Why these two types of vessels are found so frequently in caves is unknown.

Tables 7.4 and 7.5 show the different forms of vessels and the frequency in which they were collected from caves. Clearly *ollas* are the most commonly found vessel in both caves, with bowls and dishes appearing much less frequently.

Table 7.4 Vessel Forms Represented at Actun Ik

Vessel Form	Number of diagnostic sherds
Plates	0
Bowls	18
Ollas	216
Dishes	13
Undetermined	67
Total	314

Table 7.5 Vessel Forms Represented at Actun Ibach

Vessel Form	Number of Diagnostic Sherds
Plates	0
Bowls	34
<i>Ollas</i>	388
Dishes	4
Undetermined	115
Total	541

Conclusions

As is evident from Tables 7.2 and 7.3, there are about the same number of Hermitage Ceramic Complex group sherds as Spanish Lookout Ceramic Complex sherds. However, as can be seen in Tables 7.4 and 7.5, the majority of the sherds are *ollas*, which are very difficult to place in a specific time period. *Ollas* changed so slowly over the Classic period that it is almost impossible to determine when body sherds were made. However, with the limited data that have been compiled, vessels from both Early and Late Classic periods are found in the Thumb Cave District. This information can be misleading however, because although we know when the vessels were made, we do not know when they were placed in the caves. Some may argue that the Early Classic vessels in the caves were already antiques when they were ritually killed. Whether or not this is the situation in the Thumb Cave District is unknown (without stratigraphic evidence). Although evidence for mend holes (an attribute of well-worn vessels) was not found in the Thumb Cave District, it is common at other caves in Belize and in other Sibun-Manatee caves. The preservation of these vessels is extremely good, so if they are antiques they were certainly treated well before the cave ritual finally ended the domestic use of the container.

Type-variety data also indicate patterns in vessel form. It is clear that the great majority of sherds are from jars (*ollas*). Bowls and dishes comprise the next largest group of vessels, and the majority of these are slipped and in good condition. Of the bowls and dishes, the majority of these are Early Classic in origin (with the exception of the large number of Roaring Creek Red dishes in Actun Ik). There was no visible residue in the bowls or dishes, but some of the jars showed evidence of burning. Perhaps the *ollas* contained ritual offerings, while the slipped vessels were an offering unto themselves.

Unfortunately, although we can date some of the pottery in the cave, we can not be sure when it was placed with a ritual offering. We are even less clear as to the specific ritual use of certain vessels that are placed in the caves. Partly, this lack of information is due to the deficiency of proper cave investigation in the Maya region. This scarcity of knowledge is also due to the ritualistic and exclusive nature of cave ceremonies. Ethnographic evidence on cave rituals can tell us the general nature of the ceremonies that took place there, but the specific importance of each and every object used in the various ceremonies is more difficult to ascertain.

As archaeological investigation in the Sibun River Valley continues, the local ceramic chronology and time depth of settlement will be established. Although most surface settlement data compiled to date indicate a strong Late-Terminal Classic occupation, it is possible that the remains of Early Classic settlement lies deeply buried and awaits discovery. It is also possible that some of the Early Classic vessels were antiques when they were deposited within the caves. Finally, only further research in the Sibun River Valley, at both surface and cave sites, will enable archaeologists to answer the question of who was performing rituals in these caves and why.

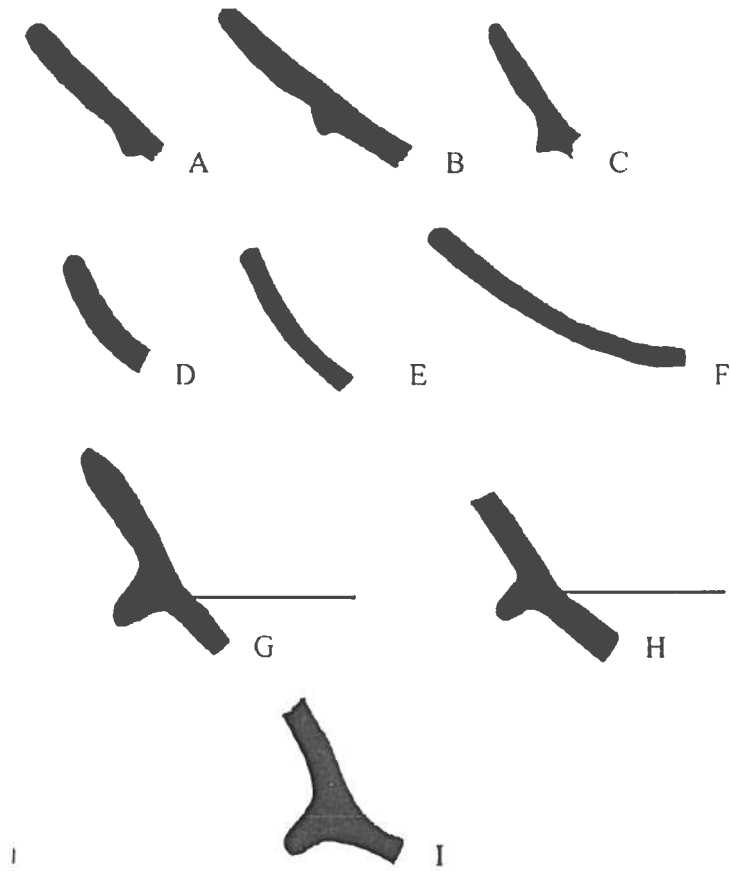


Figure 7.1 **A)** Mountain Pine Red: Mountain Pine Variety, C10-1; **B)** Mountain Pine Red: Mountain Pine Variety, C10:2; **C)** Mountain Pine Red: Mountain Pine Variety, C10:1; **D)** Dolphin Head Red: Dolphin Head Variety, C10:7; **E)** Dolphin Head Red: Dolphin Head Variety, C11:3:1; **F)** Garbutt Creek Red: Paslow Variety, C11:11; **G)** Minanha Red: Minanha Variety, C10:4; **H)** Minanha Red: Minanha Variety, C10:7; **I)** Minanha Red: Rio Frio Variety, C10:13

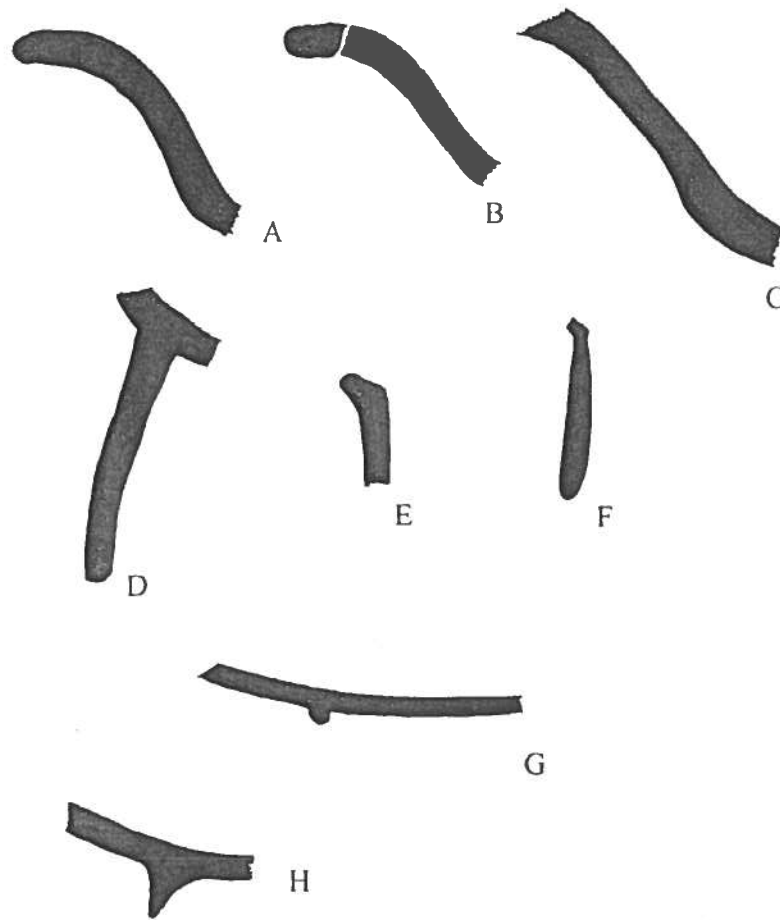


Figure 7.2 A) Roaring Creek Red: Roaring Creek Variety, C10-11; B) Roaring Creek Red: Roaring Creek Variety, C10-12; C) Roaring Creek Red: Roaring Creek Variety, C10-11; D) Roaring Creek Red: Roaring Creek Variety, C10-12-2; E) Roaring Creek Red: Roaring Creek Variety, C10-12; F) Roaring Creek Red: Roaring Creek Variety, C10-9; G) Roaring Creek Red: Roaring Creek Variety, C10-12; H) Roaring Creek Red: Roaring Creek Variety, C10-8

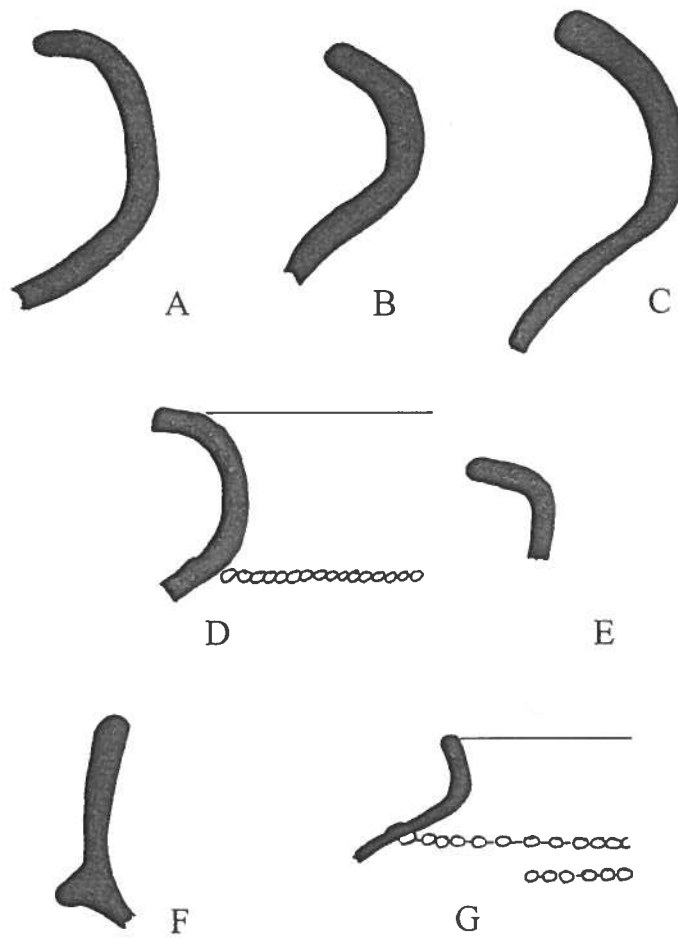


Figure 7.3 A) Tu-tu Camp Striated: Tzimin Variety, C10-2; B) Zibal Unslipped: Variety Unspecified, C11-4-1; C) White Cliff Striated: Variety Unspecified (Red), C11-11; D) Cayo Unslipped: Variety Unspecified (Buff), C11-10-1; E) White Cliff Striated: Variety Unspecified (Brown), C10-8; F) Tzunuun Orange: Tzunuun Variety, C11-12-1; G) Zibal Unslipped: Variety Unspecified (Brown), C11-3-1

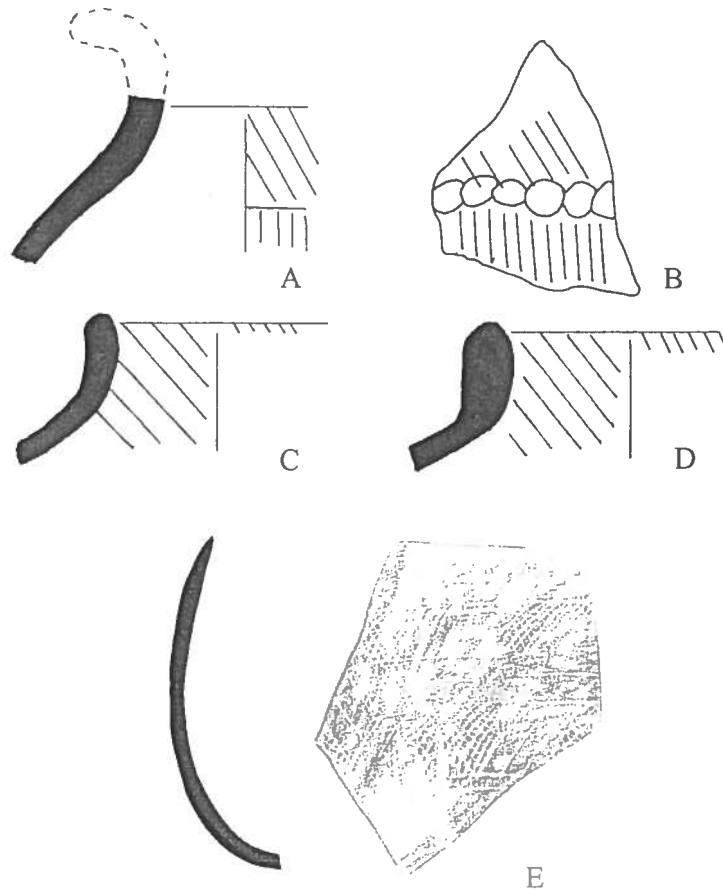


Figure 7.4 A) Petroglyph Red Rimmed: Petroglyph Variety, C10-3; B) Petroglyph Red Rimmed: Petroglyph Variety (Impressed), C11-4; C) Duende Daub Striated: Variety Unspecified, C10-4; D) Duende Daub Striated: Variety Unspecified, C10-5; E) Lucha Incised: Variety Unspecified, C11-9-1

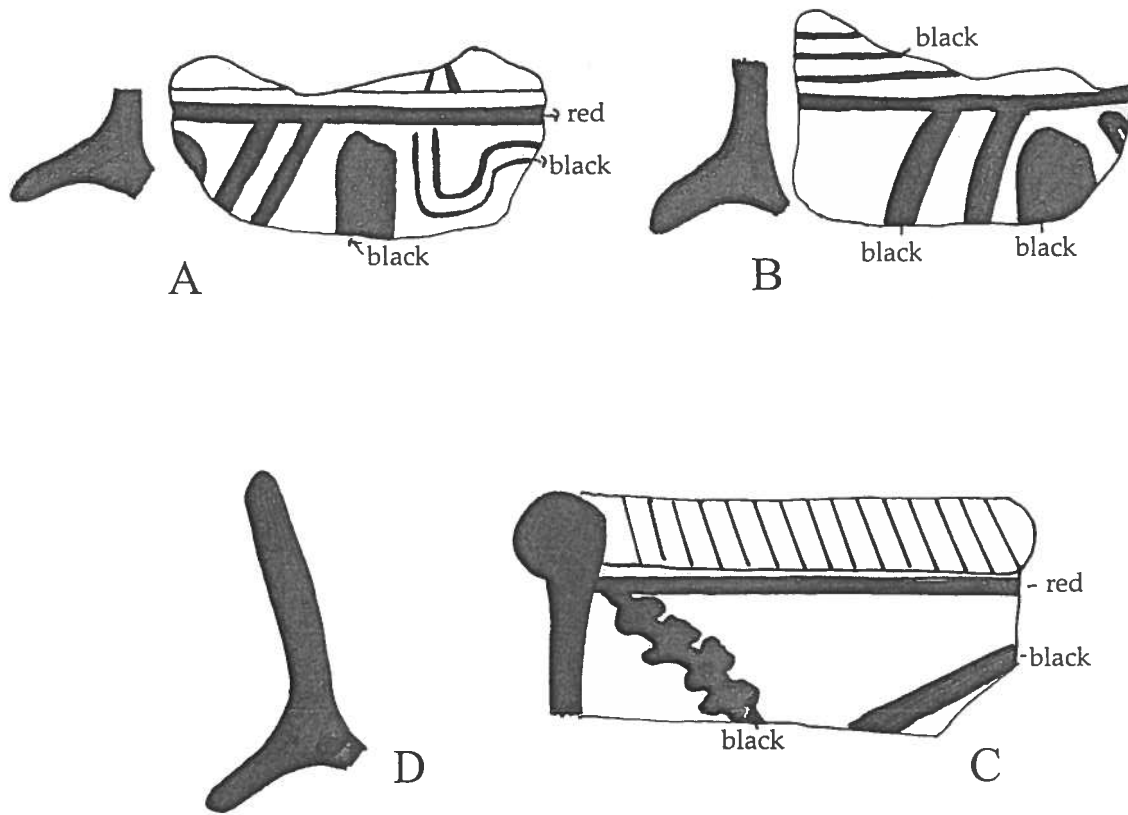


Figure 7.5 A) Dos Arroyos Orange Polychrome: Dos Arroyos Variety, C10-8; B) Dos Arroyos Orange Polychrome: Dos Arroyos Variety, C10-8; C) Dos Arroyos Orange Polychrome: Dos Arroyos Variety, C10-8; D) Dos Arroyos Orange Polychrome: Dos Arroyos Variety, C10-8

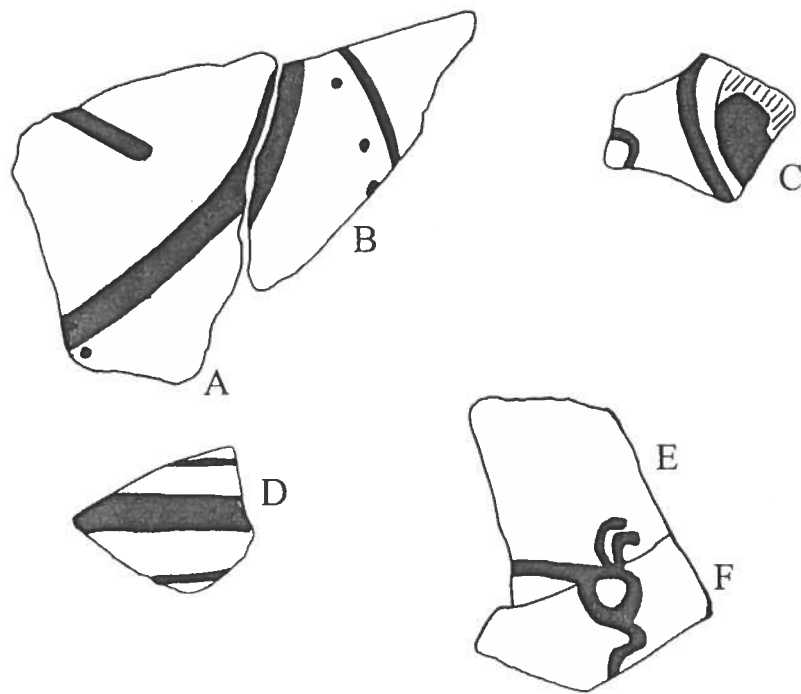


Figure 7.6 A) Yuhactal Black on Red: Variety Unspecified, C10-2; B) Yuhactal Black on Red: Variety Unspecified, C10-1; C) Saxche Orange Polychrome: Variety Unspecified, C10-3; D) Dos Arroyos Orange Polychrome: Dos Arroyos Variety, C10-3; E) Yuhactal Black on Red: Variety Unspecified, C10-5; F) Yuhactal Black on Red: Variety Unspecified, C10-5

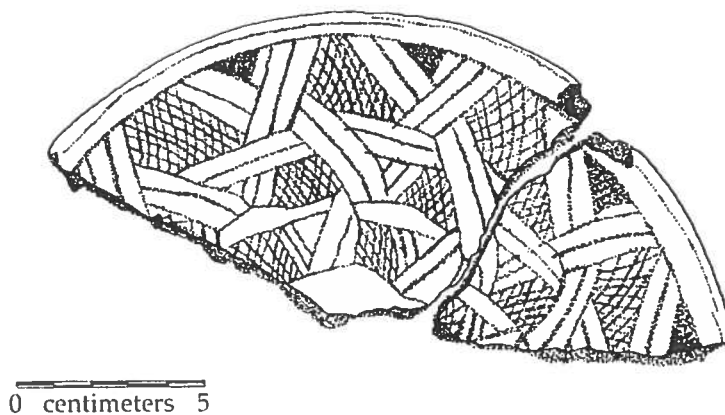


Figure 7.7 Incised Lid, C11-5

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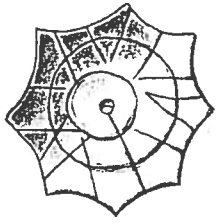
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Chapter 8

Ritual Feasting in the Twilight Zone: Mollusca from the Caves

Justin Ebersole

Introduction

The Sibun-Manatee Karst was once a mystical and ritual landscape for the Maya. Today it remains enigmatic and fantastic—a veritable catacomb of caves. Caves have long intrigued the humanity, prompting curiosity and fear. Such formations no doubt had a similar impact on the Maya, as attested to by artifacts and archaeology. In Maya cosmology, the ancient water-worn, subterranean worlds were the gateways to the realm of Xibalba: a place equivocal to the Christian hell. Caves held a dual purpose, for they were also the abode of Chak—the lord of the rains to whom an agrarian based society would be much indebted (Sharer 1994: 531-532). In this light, mollusks comprise a relevant body of material because shells are quite common in the caves of the middle reaches of the Sibun. Both local and imported shells can be found in these karstic formations. What reason did the Maya have for utilizing these shells? Hopefully, the evidence from three cave districts—the Thumb, Tiger Sandy Bay, and Glenwood—will reveal patterns of shell use by the Maya. The intention of this paper is to discern whether the Maya truly practiced the ritual eating of mollusks, and if so, how and where the mollusks were consumed. Any additional patterns and notions will be presented to better understand the use of these small creatures with respect to Maya cave ritual.

Research Methods

With something as mundane and numerous as shell, there arises a question of how the study should be undertaken. What technique is appropriate for the questions posed? Clearly, the sheer multitude of not only shells but also the caves that contain them could provide for years of research. Therefore, the sample must be limited to those caves addressed in the 1997 and the 1999 Xibun Archaeological Research Project (or XARP) field seasons. Even this selection yields nineteen caves as a sample, far too many for the present study. In the end, the scope was restricted to Pottery Cave, Metate Cave, Kate's Whistle Cave, Actun Yax Tun, Broken Rim, and Shoe Pot Cave from the Tiger Sandy Bay district. From the Thumb district, Actun Ik and Actun Ibach were chosen, and from the Glenwood district, Glenwood Cave itself was picked. These caves were purposely chosen because they represent the extent of XARP's current focus and would perhaps yield consistent patterns of shell uses—something that would reveal if cave rituals were in fact similar throughout the sample region.

With the caves selected for study, they were then investigated. Floors, alcoves, niches, and chambers were searched and the presence or absence of shells noted. *Pomacea* sp. (apple snail) and *Pachychilus* sp. (*jute*) were most frequently observed along with marine shell and carved-shell artifacts. These mollusks are foreign to cave environments and therefore introduced by humans.

Thus, these two species were the major focus. In the study, shells collected and counted from the surface of one area of each cave. Whenever possible, cached deposits of shell were utilized for the counts, otherwise, the shells were sampled from a larger collection zone.

In the process of studying the shells, a standard method of description was used. Following Morris (1975:xxvii-xxviii) univalve shells such as *Pachychilus* and *Pomacea* were measured from their apex to their base (which is usually the bottom of their aperture) to determine the height of the specimen. Bivalve length, on the other hand, was measured from the posterior to the anterior portions of the shell. Other physical attributes in addition to length and/or height were noted. These attributes included the presence or absence of the apex in univalves and the color quality of the shell as best it could be described. Color quality took on the scale of “poor” (shells lacking all color, calcified, and/or not glossy), “fair” (retaining some color and/or partially calcified), “good” (color is present and generally reminiscent of the species’ living members and there is little or no calcification), and “excellent” (in which color is vivid without calcification). This method was used in hopes of revealing information about the behaviors involved in cave rituals, feasting, and transport of mollusks.

Though *Pachychilus* and *Pomacea* provide the bulk of information considered herein, they are not the sole gastropods present. An unbiased collection procedure quickly provided at least six other common terrestrial and arboreal species of shell. Two of the six are known as *Orthalicus princeps* (a species inhabiting trees) and *Euglandina cylindracea* (a gastropod confined to the earth); others are more difficult to identify (Figure 8.1). These local shells are quite abundant around cave entrances and at first appear to be caches, but these deposits are actually natural in origin. Furthermore, live specimens of these common mollusks have been witnessed in the caves’ entrances and around the karst.

Of the species not naturally inhabiting the caves, *Pachychilus* is the most abundant (Figure 8.2). Next is *Pomacea flagellata* — colloquially referred to as the apple snail. *Nephronaias sp.* can also be encountered in cave deposits. Finally, three spectacular examples of marine mollusks were discovered. Two are Fighting Conch (*Strombus pugilus*) and the third appears to be the Pink Conch (*Strombus gigas*; Figure 8.2). *Pachychilus* is commonly found in active, riverine and streams environments, including the Sibun River, the largest and closest source for these cave districts.

Pomacea tends to favor calmer waters but does live in rivers, streams, mangrove swamps, and other bodies of standing water such as ox bows, ponds, and drainage ditches. This may mean that the Maya had ready sources of shell from ox bows and *aguadas* adjacent to their settlements. Seasonality is difficult to determine, but it seems that *Pachychilus* propagate in February and March (basically the beginning of the dry season). On the other hand, Fighting Conch and Pink Conch inhabit shallow coastal waters along the Caribbean shoreline and can likely be acquired on a year-round basis. The three specimens recovered would have required extensive transport from the coast to this inland cave region.

With a methodology and purpose established it was possible to collect and analyze data. The culmination of this effort is herein presented for each cave by district.

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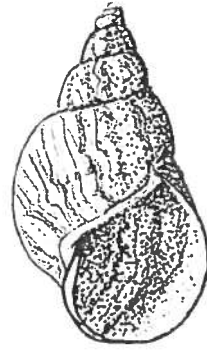
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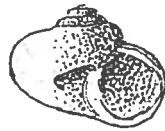
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Euglandina cylindracea

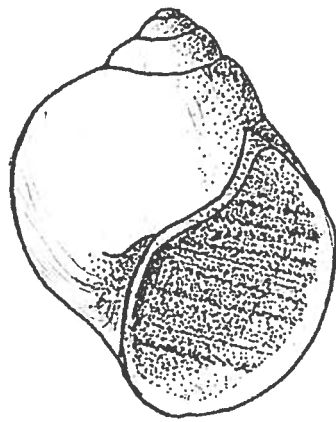


Orthalicus princeps

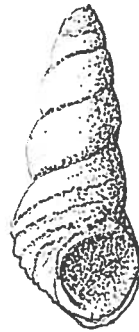


unidentified species

Figure 8.1 Common naturally occurring local species



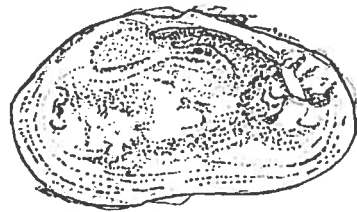
Pomacea flagellata



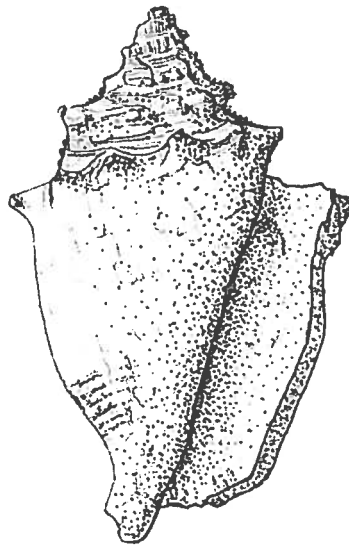
Pachychilus sp.



Operculum to the *Pomacea*



Nephronaias sp.



Strombus pugilus

Figure 8.2 Imported species.

Tiger Sandy Bay Cave District

Pottery Cave

Though previously examined during the 1997 field season due to its wealth of artifacts and modifications, this cave of the Tiger Sandy Bay District was re-examined this season with shells in mind. An in-depth search of the cave produced no imported shells. While local species such as *Euglandina cylindracea* could be witnessed in multitudes, neither *Pachychilus* nor *Pomacea* were found in the entrance or otherwise. The absence of such material coupled with the presence of many whole vessels and two possible altars makes one realize that the lack of these shells is critically important information. Why are there no shells in such a ritually significant context? Alternatively, why do some caves have only shell caches and no vessels? One explanation may lie in a difference in ceremonial function.

Kate's Whistle Cave

Located in the Just Two Valley of the Tiger Sandy Bay Cave district, this cave has moderate amounts of *Pachychilus* and exceptional amounts of *Pomacea* when compared to the other caves of this survey. The mean size for *Pachychilus* is 2.8 cm, while for *Pomacea* it is 3.22 cm. All of the examined specimens lacked an apex, thereby indicating human modification. Their shells retained good color quality, indicating excellent preservation and a comparatively quick deposition in the cave. Most of the shells were observed right at the entrance. None, in fact, extended beyond the reach of direct light or twilight. Therefore, all chambers beyond the entrance and principle chambers lacked imported shell material. Two shell caches were also noted — one previously discovered by Allan Cobb (Figure 8.3). These caches were not particularly large but both contained an above average amount of *Pomacea* in them.

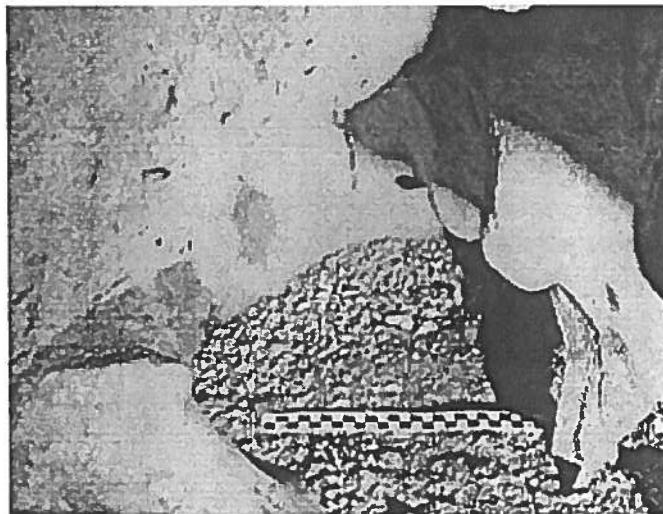


Figure 8.3 Cache of Shells in Kate's Whistle Cave (photo by P. A. McAnany)

The first cache, located at the cave's entrance, was placed in a niche with six visible *Pomacea*, a scatter of *Pachychilus*, and hundreds of local terrestrial and arboreal shells (which may have naturally accumulated there). The other cache had roughly twelve visible *Pomacea* scattered around and under rocks and shell. The imported shells generally tended to be located adjacent to the cave walls and usually with associated sherds. A check of niches and alcoves above floor level produced no *Pachychilus* or *Pomacea*.

Broken Rim

Broken Rim Cave provides a clear pass between Tiger Valley and Just-Two Valley of the Tiger Sandy Bay district. A collection of twenty-five shells was examined at both entrances. This count proved difficult to achieve as, based on surface observations, *Pachychilus* were sparse in number and *Pomacea* were non-existent. The mean size of the *Pachychilus* shells was 2.69 cm for the cave. Just as in Kate's Whistle, the imported shells are clustered around the two entrances and always within the light or twilight. The central portion of Broken Rim—a region of complete darkness—has no shell whatsoever. Imported shells tend to be found adjacent to walls and were never observed above floor level in any cave feature. Furthermore, *Pachychilus* often are associated with sherds. One interesting feature is an apparent cache of shells in a niche at the entrance to the Just-Two Valley side. This niche contains hundreds, if not thousands, of shells of the common cave variety with the flared lip.

Actun Yax Tun

Actun Yax Tun is yet another pass-through cave. It provides an easy tunnel from Just-Two Valley to Yax Valley. The entire cave is well lit and contains a large number of imported shells. Once again, *Pachychilus* dominated the imported shell counts. The actual count was based upon a well-defined cache centrally located in the cave. The mean size for *Pachychilus* from the cache is 3.22 cm, based on a count of 113 shells, which comprised the entire measurable cache. From this cache, the removed apices also are present. Charcoal and complete *Pachychilus* (i.e., with the tops intact) were also found with the cache. Finally, many of the *Pachychilus* retained good-to-excellent color quality. Some even had pink to red hues while others had yellowish tones. Like other caves in the survey, we found most of the imported shells of Actun Yax Tun to be located adjacent to walls, rock fall, and stalagmites; but some shells were found in more open locations. *Pachychilus* was also observed in and around the artificial wall near the Yax Valley entrance. As for *Pomacea*, only three examples were located, all along the southern wall.

Shoe Pot Cave

In another cave of Just Two Valley, a shoe pot was found from which the cave takes its name. Its principle chamber is well lit and it is here, and only here, that *Pachychilus* and *Pomacea* are found. The extensive chambers beyond this brighter zone are accessed by a narrow crawl space that effectively prevents the entry of light into the chamber containing the shoe pot. Of the *Pachychilus* incorporated into this sample, all lacked an apex and colors comprised fair quality. Like Actun Yax Tun, Shoe Pot Cave contains a large number of *Pachychilus* that are scattered across the soft sediment. *Pachychilus* can be seen in abundance around the junction of the floor and the walls, especially in the back of the cave. Some *Pachychilus* were noted on shelves less than a meter above the floor, but beyond that, they could not be found. The *Pachychilus* had an average size of 2.73 cm.

Only three *Pomacea* were noted, two of which were complete enough to see that their apices had been removed. These shells often were associated with sherds; shells also were found associated with a large blue-green chert flake from a tool and the stem of a macroblade. Few foreign shells were collected from the immediate entrance; most likely their visibility was compromised the presence of rock fall and thick deposits of organic matter.

Metate Cave

This cave is a complex system of interweaving tunnels and pass-through chambers, so named because of the presence of a *mano* and *metate*. *Pachychilus* and *Pomacea* were very few in number here. In fact, the entire twenty-five count of *Pachychilus* came from the small chamber containing Vessel 43, a flanged polychrome bowl. The mean size was 3.07 cm. Most of the *Pachychilus* was placed in tiny floor-level niches under a low basal ledge. Other *Pachychilus* came from the flowstone that encompassed the central column. No imported shell was directly associated with Vessel 43. Additionally, *Pomacea* were absent from the chamber. However, one was noted but unable to be examined due to its inaccessible location in a narrow chamber in a pass-through high above. As with the other caves of the Tiger Sandy Bay district, the only imported shells observed came from the chambers that were well lit or in twilight. Furthermore, the dimly lit chamber with the *metate* and *mano* contained one observable *Pachychilus* shell in addition to a large marine mollusk situated adjacent to the grinding stone. Although a positive identification is lacking for the shell, it is most likely a juvenile conch: either a Pink Conch (*Strombus gigas*) or the Fighting Conch (*Strombus pugilus*). As expected, local shells are present in multitudes around the entrances to Metate Cave; at the Usrey Valley entrance to the cave, they are intermixed with some *Pachychilus*.

Thumb Cave District

Actun Ik

Consisting of two large pass-through caves connected by a narrow passage, Actun Ik dominates the tower karst formation known locally as “the Thumb.” Both pass-through chambers are well lit and quite windy, hence the name that translates as “Wind Cave.” There are multiple entrances on the east and the west sides of “the Thumb.” These caves have a moderate amount of *Pachychilus* and a relatively high amount of *Pomacea* (just as in Kate’s Whistle Cave). The mean size for *Pachychilus* is 3.57 cm. Of the specimens observed, nearly all exhibited good color quality with some even displaying reddish hues. One observed *Pachychilus* retained its apex and many detached apices were observed. Unlike the majority of the caves previously considered, the *Pachychilus* did not cluster near the walls but were rather frequently encountered in the walkway spaces. A collection of four *Pomacea* was discovered between two large rocks on the southern side of the larger upper pass-through. Their apices were absent. The eastern entrance had much more *Pachychilus* than the western side owing to the manner in which the drip line protects it more from organic matter and the fact that a ledge separates the cave floor from the ground level several meters below.

No imported shells were noted in the niches and alcoves above floor level in either pass-through. The only exception came from the lower pass-through. Here, a small culturally rich

chamber opens in the southern wall. The entrance is slightly elevated above the floor. This entrance was modified by an artificial wall near which some *Pachychilus*, *Pomacea*, and a single specimen of *Nephronaias* sp. (a freshwater bivalve) were discovered. Within this lit chamber, many examples of *Pachychilus*, *Pomacea*, and *Nephronaias* lined the walls and were scattered about the floor.

Actun Ibach

Actun Ibach is a labyrinthine cave within a section of karst adjacent to the Thumb. It has many entrances, only four of which are readily accessible. Three entrances converge in a very well lit region. Four caches in this well-lit area contained the largest quantity of *Pachychilus* observed in this study. A sample of fifty shells was examined, providing a mean size of 3.5 cm. Large adult *Pachychilus* seemed prevalent reaching sizes of over 5.3 cm. Color quality generally is poor but red once again was present. Something of an anomaly also appeared—five noticeably complete *Pachychilus*, with many more likely awaiting discovery. The majority of these shells are right at the entrance and not just along the walls and columns but deposited directly in the path of travel. They remain primarily in bright to twilight areas, though one *Pachychilus* was discovered in complete darkness. Only one example of *Pomacea* was visible, which surprisingly had its apex. No shells were found above floor level nor in association with the complete olla deep inside the cave.

Glenwood Cave District

Glenwood Cave

Completing the survey of caves is Glenwood — the most extensive cave yet mapped. Its entrance is relatively small through the chamber within broadens considerably. A large number of *Pachychilus* interspersed with artifacts covers the floor, gradually decreasing as one proceeds away from the light. Beyond the twilight, no *Pachychilus* can be found. The shells appear haphazardly scattered, however, several areas of greater *Pachychilus* concentration can be delineated. One of these zones, very likely a cache, served for the *Pachychilus* count. The mean size is 2.67 cm. Color quality generally was fair and there were examples of complete *Pachychilus*. Furthermore, apices were noted, continuing to support the notion of on-site *Pachychilus* consumption.

The only *Pomacea* collected came from deep within Glenwood Cave. One was collected during surface collection from a niche in cave component 10. All imported shells were located at floor level only. Local shell could be observed all around the entrance, in niches, and above floor level.

Discussion

General observation in combination with the collection of hard data revealed patterns in Maya use of shell in caves. The overwhelming pattern witnessed within the sample area was that the imported shells almost always occur around the cave entrances and rarely extend beyond the twilight into darkness. Therefore, whatever function the shells served, it was apparently necessary that it occurred in the presence of natural light or prior to further entry into the caves for other ritual

practices. The presence of shells near entrances may also suggest that these shell rituals were perhaps more public and observable than those rituals that were shrouded by the walls of the cave and the darkness within. The few imported shells that do appear amidst the darkness may feasibly be considered anomalies resulting from natural processes such as animal disturbances.

Another interesting pattern is the tendency of *Pachychilus* and *Pomacea* to lie adjacent to walls and formations in the Tiger Sandy Bay district, whereas for the Thumb and Glenwood districts, the shells are predominantly along the path of travel. How much of this shell material, though, was randomly scattered by the Maya, and how much was intentionally placed? Later transformational processes have no doubt altered the evidence somewhat, but the shell placement resembles the so-called sacred pathways considered by MacLeod and Puleston (1978:74). In the Tiger Sandy Bay cave district, shell scatters at Shoe Pot Cave, Metate Cave, and Broken Rim Cave may delineate sacred space and possibly even a pathway. The pathway theory applies to Broken Rim Cave as the path-through feature connects two valleys that likely formed part of a sacred landscape. In Metate Cave, the chamber with Vessel 43 had *Pachychilus* sparsely lining the base of the walls, thereby establishing a sacred space. Furthermore, in all the caves studied, the *Pachychilus*, *Pomacea*, and even the worked shell items were found at ground level. Even when imported shells were located above the floor, they were never any higher than a meter, and niches, alcoves, and caches above this level contained no *Pachychilus*, *Pomacea*, or conch.

Ritual Feasting

These patterns indicate the locations of shell-oriented rituals. A close examination of the shells themselves provides clues as to how the shells actually functioned in Maya rituals. Observations in every sampled cave revealed that almost every *Pachychilus* and *Pomacea* lacked an apex, or top of the shell's spire. According to Graham et al. (1980:158), the Maya consumed *Pachychilus* by cracking off the tops and sucking up or blowing out the mollusk. The edibility of *Pachychilus* is supported by modern-day delicacies that include *Pachychilus* soup. Several Belizeans confirmed that *Pachychilus* is still cracked and then sucked. Experimental archaeology on freshly boiled *Pachychilus* revealed that boiling enables the creature to be easily blown or sucked out of the shell. The presence of severed snail apices in many of the shell deposits suggests that visitors to the cave may have consumed *Pachychilus* and *Pomacea* within the twilight of the caves as part of a ritual meal. Such a meal seems precursory to the main ritual, owing to its location at cave entrances, but may also have followed the interior rituals.

The question remains as to whether the mollusks were consumed raw or cooked in some fashion. Based on physical evidence, it appears the *Pachychilus* and *Pomacea* were cooked prior to consumption. The presence of charcoal (such as at Actun Yax Tun) and the knowledge that at the ancient Maya site of K'axob in northern Belize, *Pomacea* were apparently cooked in small, sherd-lined pits supports the notion of cooking the shells (Bobo 2003). Because many of the shells retain excellent color quality (vibrant pinks and yellows), it is known that the shells were deposited not long after collection and use. Live shells will remain colorful until death, when they begin to decompose. A fresh shell, if left in direct sunlight and subject to weathering for long periods will begin to bleach, but because caves are generally dark, the shell and its color will be protected—even in twilight—for hundreds of years. But even then, pinks and yellows are odd colors for *Pachychilus*. So were they cooked? An attempt at boiling live *Pachychilus* had a noticeable affect on the shell's color. Due to heat exposure, the shell was noted to change to a reddish or purple tinge despite the

presence of brown periostracum that covers the living *Pachychilus* shell. Conditions in the caves apparently cause the periostracum to disintegrate over long periods of time, thus revealing the lighter hues that lie beneath. It also could have been practical to cook the shells prior to initiating a pilgrimage to the caves; boiling *Pachychilus* prolongs their “shelf” life. Maya pilgrims could then have easily transport mollusks (previously cooked at the residence or near the river) to the caves where they would crack the shells and consume the flesh. The presence of *Pachychilus* apices in many caves alludes to the on-site consumption.

The three large conch shells, on the other hand, were not feasibly intended as food (despite the culinary associations of the one with the *mano* and *metate* in Metate Cave). The long distance transport of these marine mollusks would cause them to spoil unless they were somehow preserved. Rather, they seem intended as symbolic gifts. Questions have also risen as to whether the local snails were subject to consumption or use. In terms of food use, they were most likely not used, for they lack the characteristic apex removal. Moreover, they are too small to provide significant nutrition. Nevertheless, their shells may have been utilized in the symbolic rituals. According to MacLeod and Puleston (1978:74), even local snails were collected and deposited in caves along with imported ones for the purposes of symbolism. They do, in fact, provide a ready and abundant shell source. Every cave in the survey naturally contained these shells in their entrances. The Maya, however, may be responsible for the large collections of shells in niches at cave entrances. Broken Rim has one such “cache” with hundreds of snails in a niche at the Just Two Valley entrance—a collection size not present any where else in a confined space in the caves.

Seasonality

While the sources for the local mollusks are the environs immediately outside the cave entrances, imported shells required transport. But the gathering of *Pachychilus* and *Pomacea* was selective. The Maya of the Sibun River Valley had not only the Sibun River but also its tributaries and standing water from which to acquire snail shells and bivalves. They had access to those mollusks throughout the year; moreover, the size of these animals correlates with their stage in an annual life cycle. *Pachychilus* from the selected caves averaged in size from 1.9 cm to roughly 3.9 cm. Such sizes delineate the small to medium range of what could be considered the juvenile to subadult age group for these shells. Nevertheless, there are also large adults present that reach sizes of 5 cm and more. For the purpose of comparing the size of recent *Pachychilus* with cave *Pachychilus*, I conducted a study at the Sibun River. Initiated during the dry season on the morning of 4 April 1999, this study resulted in two collections, both of which revealed that the *Pachychilus* had recently propagated. All of the live specimens were smaller than 4 cm and a majority of those were, in fact, babies under 1 cm in height. The river at this time was shallow and the calmer waters facilitate mollusk breeding and shell collecting, easy even in the open water. Results of this experiment imply several things:

- 1) *Pachychilus* are far too small in size and number during the early dry season to be beneficial for ritual eating.
- 2) Prime *Pachychilus* collecting seems to fall between the beginning of the wet season (planting time) and harvest time.
- 3) Collecting the *Pachychilus* is easiest and most productive when the river is still low but the mollusks are larger (as at the end of the dry season when the rains are just about to come).

- 4) Regardless of when the shells are collected, there are never enough to act as a staple, which implies ritual use of the shells. This seems to be supported by the lack of such shells at surface sites like Pechtun Ha and Pakal Na.
- 5) Small *Pachychilus* are hard to spot in the deeper water. The general findings in the caves support the notion that the sizes larger than 1.5 cm are easiest to see and collect.

Based on these results, the shells seem to be ritually linked to the seasonal changes. Recalling that caves are linked to Chak, the imported shell may be related to practices involved with that deity. Farmers dependent on Chak for rain may have performed rituals prior to the wet season in order to ensure water for crops at the start of planting. Perhaps, then, the mollusk meals occurred at the end of the dry season in caves as part of a ceremony to Chak. Juveniles and young adults, which represent the majority of *Pachychilus*, may furthermore have symbolic fertility (crop or otherwise) connotations. Perhaps, then, Metate Cave with its *mano*, *metate*, and conch relates directly to crop fertility.

Shells, however, have also been interpreted as symbols of death (MacLeod and Puleston 1978:74). God N, an underworld deity, is often represented as issuing forth from a conch (Schele and Mathews 1998:415). Conch shells have been observed in Metate Cave, Ek'Waynal, and Just Two Cave. Furthermore, Xibalba, which can be reached via caves, is a watery, dark realm infested with fearsome creatures. The presence of aquatic mollusks in caves bolsters the association with Xibalba. Additionally, crab claws and a turtle carapace (freshwater variety found in the Sibun and other rivers) have been discovered in Actun Ik, and two caves not included in this study (Ek'Waynal and River Cave). So, were the meals of mollusks intended as rituals geared towards Xibalba? Were they some form of devout ancestral veneration — a meal in honor of departed individuals? It is very possible that the shell functioned in this way, though evidence has yet to fully verify this view.

Finally, several unique shell pieces have emerged from the Sibun caves. An incised, eight-pointed, star-shaped pendant of conch shell came from Actun Ik. Several tinklers have also been found (collected by representatives of the DOA from caves in the Tiger Sandy Bay district and by XARP members from Actun Hub in the Glenwood Cave District). Both types of shell artifacts have connections to elite authority and there exists many iconographic examples of similar pendants adorning royalty. These artifacts may not be linked to Chak and fertility symbolism. Rather, they may merely represent lost items or devout offerings. If they are lost items, they may conceivably be from the costumes of the practitioners of the rituals.

For the Maya, caves brought connotations of both death and fertility. Somehow, mollusks played a crucial role in cave rituals and in this duality of thought and belief. This survey has left much to be considered and likely contains some inherent bias. For instance, by narrowing the sample universe and selecting only certain caves, a bias was introduced. In addition, the use of small numbers of shells may have reduced the accuracy of the results. The selection of sample areas within each cave likely generated discrepancies. The largest constraint effecting the study was lack of time. Future work, hopefully, will be undertaken to unravel the mystery of these shells. The remarkable patterns now realized are only the beginning of a long road to a finer understanding of what the Maya had in mind when they incorporated shells into their rituals. The evidence supports ritual feasting, though archaeology has yet to reveal what purpose this practice served.

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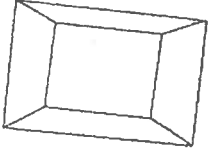
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STRUCTURE 113



STRUCTURE 109

POSTHOLE
TRANSECT #2

OPERATION 9

STRUCTURE 110

OPERATION 8

OPERATION 12

Part II: Settlements and their Material Remains

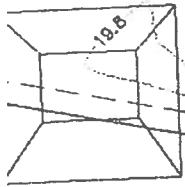
STRUCTURE 101

OPERATION 3

OPERATION 11

OPERATION 10

OPERATION 2



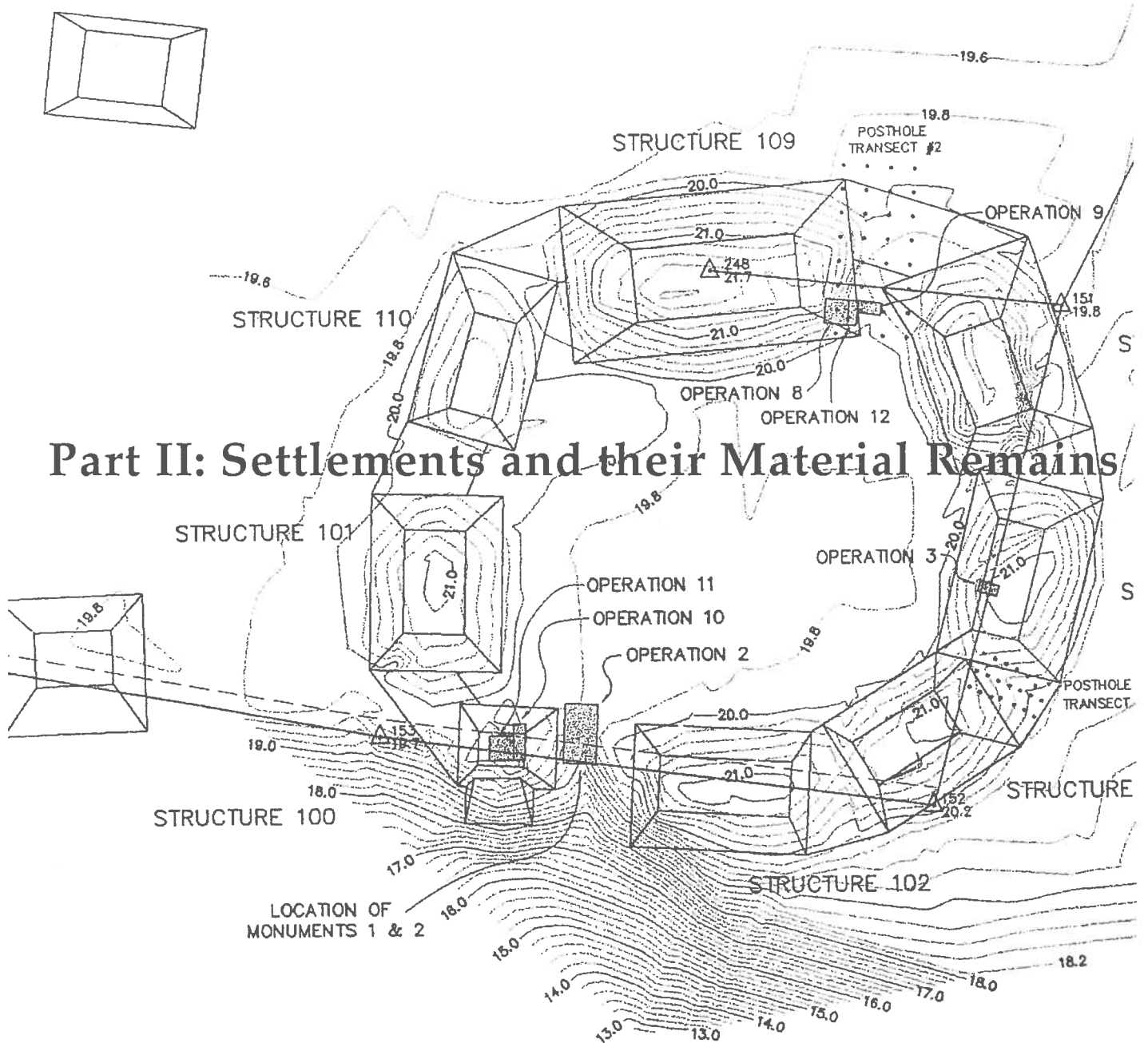
POSTHOLE
TRANSECT

STRUCTURE 100

STRUCTURE

STRUCTURE 102

LOCATION OF
MONUMENTS 1 & 2





Chapter 9

Settlements in the Middle and Lower Valley

Ben Thomas and Corlyn Secchiaroli

Introduction

In 1999, the Xibun Archaeological Research Project (XARP) located and mapped six ancient Maya settlements along the Sibun River of Belize (Map Sheets 1, 2, and 3). Following the river, west to east, these sites are Pakal Na, Underfoot and those in the Freetown district, Oshon Site, Sak Tzimin, Neal's Site, and Obispo's Site. Two of these, Pakal Na and Oshon Site, were mapped and excavated for the first time in 1999. Most of the other sites will be tested during the 2001 field season. In addition to the work at these "new" sites, the Project also conducted further investigations at Pechtun Ha (see Harrison and Acone this volume) and located another site, Hershey, close to the mountains and the upper reaches of the river. Survey and mapping of this site is also planned for 2001.

The survey team, Steven Morandi, Brian Norris, Lewis Bowker, Tamarra Martz, and several of the students mapped the various sites using a Sokkia Total Station. This survey and mapping effort produced the maps that are included with this report (Map Sheets 1-13). In addition to the general maps, separate forms were completed for each structure. On these "structure" forms we recorded the length, width, height, and orientation of each mound. We also recorded the location of the structure, its association with neighboring structures, and described the general topography and vegetation surrounding each mound.

Preliminary findings made by XARP indicated that the ancient Maya settlements were built on high ridges above the floodline of the river. Several of the sites were located near oxbows. Through our investigation we hope to determine whether these oxbows were part of the active river when the sites were settled or whether settlers chose to live close to the more static oxbows. Other sites, such as Underfoot and Yax P'otob, are near large ravines that are waterless in the dry season. All of the sites are located within easy walking distance of the river, which the inhabitants doubtless exploited for its many resources. Physical differences in the size, layout, and complexity of the sites indicate that they may have had different functions and roles within the valley. Some of the sites are simple arrangements of mounds strung along a ridge, while others are complex concentrations of civic-ceremonial buildings and housemounds (Table 9.1). Excluding Underfoot and the Obispo sites, all the sites are located on the north side of the river, possibly due to the steeper bank that may have prevented flooding during the rainy season.

Table 9.1: Known Sites along the Sibun detailing history and plan of investigation.

Site	Structures	Type	Status	History/Plan of Investigation
Pedro's Mound	1	Isolated mound	In pasture	One large test excavation was conducted in 1997.
Pechtun Ha	13	Plaza group with two stone monuments and outlying single platforms	In bush	Mapped and tested in 1997, including cleaning of monuments. Two more excavations in 1999.
Yax P'otob	10	Linear arrangement of low, single platforms	In bush	Mapped and tested in 1997.
Churchyard	15	Plaza group	Destroyed after 1997	Mapped in 1997.
Underfoot	3	Linear arrangement, low single platforms	In bush within flood plain	Mapped in 1999
Balam Ha	30	Linear arrangement, low single platforms	Destroyed	Mapped and tested by Abrams in 1986.
Pakal Na	21 or 23	Plaza groups and low single platforms	In citrus orchard	Mapped and tested in 1999. We will return to finish one excavation and to conduct remote sensing research for potential cacao drying platforms in 2001.
Oshon	36	Plaza groups with two stone monuments and outliers	Partially in bush and partially under cultivation	Mapped and tested in 1999. We will conduct further test excavations at the site during 2001.
Sak Tzimin	20	Informal clusters of low, single platforms	In pasture	Mapped in 1999, will be tested in 2001
Neal	1	Isolated platform	Used by present landowner	None
Obispo	7	Plaza group and outliers with two stone monuments	In orchards	Mapped in 1999, will be tested in 2001
Hershey	16	Two pyramidal plazas with large plaza groups and outliers	In cacao orchard, but structures are under bush	Test excavations and mapping planned for 2001.

Pakal Na

The site of Pakal Na is located on land that is currently owned by BGMC. The land is under citrus cultivation. There are three oxbows close to the site. It is possible that these were part of the active river when the Maya first settled the area. The structures at Pakal Na, like those at Yax P'otob (Thomas et al 1998) and Balam Ha (Abrams 1987), are laid out in a linear arrangement that follows a high bank along the river. This linear arrangement is unusual for the Maya area where most sites feature a more radial arrangement of structures. Other sites along the Sibun, such as Pechtun Ha and the Oshon Site, have a more traditional radial arrangement of structures focused around plaza groups.

Pakal Na is dominated by a large plaza group which is located in the northeastern part of the site. This group is made up of Structures 130 (the largest structure at the site), 131, 132, 133, and 140 (Map Sheet 8). Structure 130 is a two-terraced mound that faces east. Test excavations at this structure revealed multiple phases of construction. An earlier earthen structure was covered by at least two later construction events. A little further to the north is a smaller group made up of Structures 136, 137, 138, 139, and 147. Extending to the southwest from these groups, there are a series of paired mounds, Structures 134 and 135, 141 and 142, 143 and 144, and 145 and 146 (Map Sheet 2). Two small unnumbered mounds discovered across the river may be part of this pattern. The paired groups are between 30 and 60 meters from one another.

Approximately 400 meters from the main plaza group is a smaller patio group consisting of Structures 126, 127, 128, and 129 (Map Sheet 2). Surface collection activities at Structure 127 revealed a tubular greenstone bead (see Figure 11.2) in association with five obsidian blades. This appears to be the remains of a cache deposit that was destroyed by land clearing activities prior to the planting of citrus trees. Through excavation, it was determined that this caching activity took place in the eastern corner of the structure (see Harrison, Chapter 11).

Underfoot

Underfoot is one of two sites discovered on the southern bank of the Sibun River (Map Sheet 1); the other is the Augustine Obispo site. Underfoot is a small group of three mounds located on a relatively high ridge about 150 to 200 meters south of the river and is covered with fairly dense bush. The density of the vegetation prevented us from discovering the site until well into the season. This was the case despite the fact that we had been walking next to the mounds for weeks (hence the name). Although it is on a ridge, the site is flooded in the rainy season. The three mounds are higher than many of the mounds at other sites and may have been high enough to avoid flooding. It is more likely that this site was only seasonally occupied. There is a dry oxbow to the north of the site and a stream to the south.

Samuel Oshon

The Samuel Oshon site, along with the other sites in the Freetown District (Map Sheet 3), is about 20 miles east of the previously mentioned sites. The site contains two large plazas arranged in

a “dumbbell” shape. Plaza A is a large flat plaza surrounded by Structures 401, 402, 403, 404, 405, and 437 (Map Sheet 9). Our test excavations at this site showed that the surface of the plaza floor was made of limestone cobbles. It is possible that this floor was covered with either plaster or earth. To date we have not found any plaster remains. The surface of Structure 402 had a large quantity of stone on it and two stelae in front of it. This structure is similar in layout and construction to Structure 100 at Pechtun Ha (see Harrison and Acone, Chapter 10). Both these “stone mounds” are smaller than other rectangular structures and are distinct in construction material and style. We believe that these structures were not residential but rather had a ritual function.

Plaza B (Map Sheet 9) is cardinally oriented and appears to have a layout similar to Late Classic plazas seen in the Petén and other Lowland Maya areas. The largest structure (Structure 409) is located on the north side of the plaza. Structure 409 is flanked by long, low mounds to the east and west and faces another low mound to the south. Behind Structure 409 there is an *aguada*. Visible on the surface of Structure 409 are large limestone blocks that form a retaining wall around the base of the mound. The mounds flanking Structure 409 and the one facing it are long, low platforms with one or more structures on them.

The difference in layout between Plazas A and B suggests that the core area was probably constructed over a long period of time and in several building episodes. Excavations at the site have shown that the basic construction technique is the same as that seen at sites like Pechtun Ha, Pakal Na, and Yax P’otob. Most of the mounds seem to be earthen structures with stone retaining walls. The walls are usually made of rectangular limestone blocks. Structure 401 had two or three tiers and each had a cobble surface but the substructure was earthen. The earth used to create these structures is fine silty clay that forms a hard surface when dry.

Sak Tzimin

Sak Tzimin is a small site located within a pasture bordered by dense bush, a dry oxbow, the river, and a road (Map Sheets 10 and 11). The site has twenty-one mounds arranged in informal clusters. It is 300 meters to the east of the Oshon Site and lies along the road that leads to the town of Freetown Sibun. The site does not have any plaza groups or any monumental construction. It is very likely that this site was under the jurisdiction of the Oshon Site, which probably controlled local civic affairs. The largest mound at the site, Structure 463, appears to have been damaged by a bulldozer.

During 1999, a site map of Sak Tzimin was created and this site is a potential candidate for excavation activities during 2001. A major focus of the investigation would be to understand the relationship between Sak Tzimin and the Oshon site.

Augustine Obispo

The sites called Augustine Obispo and Underfoot are the only two we have found on the south side of the river. Augustine Obispo was surveyed and mapped at the very end of the 1999 field season. Seven mounds were found at the site (Map Sheet 13). One of the mounds, Structure 479, has a preponderance of stone, similar to the structures at Pechtun Ha (Structure 100) and Oshon

(Structure 402). There are two stelae at this site in association with Structures 479 and 480. The site is approximately 450 to 500 meters south of the river and is 300 to 350 meters southwest of a dry oxbow. Currently, the site is separated by what appears to be a modern drainage ditch. The ditch, however, was not dug by the landowner, Augustine Obispo. Structures 475, 476, 479 and 480 appear to form a small platform group. We did not conduct any excavations at this site.

Neal's Site

The last site that is considered in this discussion is composed of a single, isolated mound located east of Sak Tzimin and about 100 meters north of the river (Map Sheet 12). We did not find any other mounds in proximity to this large mound. The area around the mound is heavily utilized by modern settlers and it is possible that most of the smaller mounds were destroyed by cultivation and clearing activities.

Conclusions

Our work in 1999 added to the general knowledge of ancient Maya settlement along the Sibun River by locating and mapping six sites that had never before been mapped or studied. In addition, we continued to work at Pechtun Ha, a site first mapped in 1997. Several strong patterns emerge for the settlements along the Sibun River. From the location of the sites it is clear that the ancient Maya wanted to be close enough to the river to exploit its resources but were wary about its potential for destruction. Because of this factor, settlements were located on high ridges and on top of steep banks. Construction techniques across the area are comparable. Most structures are earthen platforms with stone retaining walls. These structures sometimes have cobble surfaces and it is highly likely that these cobble surfaces once were covered with earth or plaster. There are a few exceptions to the earth and stone construction style. These exceptions are the structures referred to above as "stone mounds" which are found at the sites of Pechtun Ha, Samuel Oshon, and Augustine Obispo. These structures generally were smaller than other mounds although relatively more stone had been used in their construction. We do not believe that these structures were residential. Instead they seem to have been special function buildings, likely shrines. The few stone monuments that we have found seem to be associated with these stone mounds, further adding to the idea that these structures may have had a ritual focus. As work continues in 2001, we will no doubt be able to understand even more about the ancient Maya who lived along the Sibun River.

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Chapter 10

Further Investigations at Pechtun Ha: Feasting and Mass Importation of Cave Speleothems

Eleanor Harrison and Kevin Acone

Introduction

The site of Pechtun Ha (Map Sheet 6) is located on a high escarpment overlooking the Boat-billed Heron pond, an oxbow that was probably an active river channel when the site was occupied by the ancient Maya. The site, situated adjacent to the Monkey Bay Wildlife Sanctuary, is about 500 meters west of the confluence of Ventura Creek with the Sibun River and roughly 250 meters north of the Sibun River itself (Map Sheet 1). In total area, the site of Pechtun Ha covers 250 meters (east-west) by 100 meters (north-south). The site is focused around a group of eight structures, which form an octagonal plaza. The eight structures are perched on top of a basal platform, and vary in size and shape (Thomas et al. 1998:Table 3.2). There are six satellite platforms to the west of the main plaza group and one to the northeast.

Investigations during the 1999 field season focused on excavations at Structures 109 and 100 of the main group in an effort to better understand the methods and phases of architectural construction and the time depth of occupation. Operations 8, 9, and 12 were positioned near the southeastern corner of Structure 109 where a midden deposit was identified through a systematic shovel test-pitting operation. Operations 10 and 11 were focused on Structure 100, which revealed signs of a special-purpose building, possibly functioning as a shrine for the ancient inhabitants of Pechtun Ha. Map Sheet 6 shows the location of the five excavations, along with Transects 1 and 2, the two locations where shovel test-pitting was performed prior to excavation.

Previous Investigation

Very little research had been undertaken in the Sibun River Valley prior to the Boston University research in 1997 and 1999 (McAnany 1998 and McAnany, Chapter 1). In 1986, Elliot Abrams (1987) surveyed and mapped a Sibun settlement that he named Balam Ha, which is located along the middle reaches of the river about a thousand meters to the northeast of Pechtun Ha. His preliminary report presents an overview of a three-week survey of a small area along the Sibun River, known as Tiger Sandy Bay. The small settlement of Balam Ha, as well as a nearby cave, known as Tiger Cave, was recorded.

Abrams mapped roughly thirty mounds and performed a limited surface collection of the settlement of Balam Ha. He noted that only a small number of artifacts were visible, even after plowing, on mound surfaces. The 1997 survey of Pechtun Ha revealed a similar trend. Few artifacts remained visible on these low mounds. Excavation of Operation 3 on Structure 104 at Pechtun Ha,

performed by the Boston University team during the 1997 season, revealed a similar paucity of artifactual material in the construction fill of the earthen mound. The evidence, or lack thereof, may indicate that these mounds were not constructed in an accretional fashion; they were more likely built in a single construction phase. Further excavations performed at Pechtun Ha during 1997 and 1999 provided a window into the construction of these platform structures (see below). While subsurface investigations did yield more artifacts than surface collection, the relative scarcity of artifacts suggests that these structures were occupied for only a short period of time, which likely was also the case for nearby Balam Ha.

Abrams (1987) surmises that the site of Balam Ha served as a small agricultural village, housing no more than 150-300 individuals. The same function could be said for Pechtun Ha, as well as Pakal Na, another site located in the middle reaches of the Sibun River (McAnany, Chapter 1: Figure 1.2 and Harrison, Chapter 11). The placement of well-spaced household mounds indicates that these settlements were positioned with respect to surrounding agricultural fields. A linear settlement pattern for Balam Ha, paralleling the riverbank on either side, shows no signs of a civic-ceremonial core. In contrast to numerous other sites in the Maya area, the settlement configuration suggests a greater emphasis on agricultural productivity, and less focus on centralized ceremonial events.

While public ceremonial structures were not identified at either site, evidence from the 1997 and 1999 field excavations at Pechtun Ha indicates that one particular structure (Structure 100) held a special purpose, possibly functioning as a sacred shrine. Unlike the other earthen mounds with stone retaining walls found at Pechtun Ha, Structure 100 is made entirely of stone. Excavations by the Boston University team in 1997 revealed a plain stela and altar positioned in the vicinity of Structure 100, further suggesting a ritual, rather than domestic function (Thomas et al. 1998:32-35). Investigations entailed excavating buried portions of the two stone monuments. According to the 1997 report, the unworked stela and altar were fragmentary, yet appeared to be roughly *in situ*.

Field Methods

Excavation techniques

From February 1 to March 17 of the 1999 field season, five operations were excavated at Pechtun Ha. Excavations entailed the intensive investigation of Structures 100 and 109. In both areas, horizontal exposure was expanded through additional operations, critical for better understanding the architectural construction and, in the case of Structure 109, its adjacent midden deposit. One hundred percent of all excavated soil was screened through a quarter-inch screen. Trowels were used primarily in the excavation, with picks and shovels being used infrequently. Trowels (and dental tools when necessary) were utilized to define the surface of architecture and *in situ* deposits.

¹ The series of STPs, grouped by transects, are labeled on Map Sheet 6 as either Transect 1 or 2, but are also referred to in the notes as operations. Transect 1 was labeled Operation 6 and Transect 2 was labeled Operation 7. Due to problems with computer data entry, these groups of STPs were later given the names Transects 1 and 2 and are referred to here as such.

Systematic test-pitting operations

Prior to excavation, a systematic test-pitting operation was performed at Pechtun Ha, consisting of a series of shovel test pits (STPs) within two transects (Transects 1 and 2 on Map Sheet 6) located in the saddles between mound structures¹. The purpose of the test-pitting operations was to determine the locations of possible midden deposits within the site of Pechtun Ha. Typically, refuse deposits are situated in the back of structures or in between structures, as was the case at Pechtun Ha. Test-pitting entailed the use of a posthole digger that created STPs that were roughly 35cm in diameter. Depth of each STP was dependent on soil composition; many times limestone cobbles were encountered and prevented further excavation. The maximum depth that could be achieved with the posthole digger was around 125cm (measuring from ground surface). Levels were taken down in zones consisting of arbitrary increments of roughly 25 cm, with a maximum of 4 or 5 zones per posthole. This method of investigation, using a systemic series of STPs, offered a quick and efficient way of probing the off-mound areas for potential middens. The ultimate goal of the test-pitting operations was to identify refuse containing diagnostic sherds that could be used for dating site occupation.

The test-pitting operation of Transect 1 (Map Sheet 6) was positioned in the saddle between Structures 103 and 104 and was oriented to magnetic north, falling more in line with the orientation of Structure 104. The transect was 6 meters long on a roughly east-west axis, with STPs spaced at 1m intervals. The width of Transect 1, running roughly north-south, was 3 meters; STPs were placed 1.5 m apart. There were a total of twenty-one STPs, three in each row and seven in each column. All twenty-one STPs were excavated, however, several large roots from nearby trees and limestone cobbles evident on or just below the ground surface prompted a minor re-orientation of five of the STPs (4, 6, 7, 9, and 12).

In general, STPs positioned in the outside columns of the transect were more likely to hit limestone cobbles, presumably collapse from Structures 103 and 104. River cobbles and fire-cracked rock were encountered in almost every STP and the matrix generally consisted of a silty-clay soil. About 50-75 cm below ground surface, the matrix contained higher clay content. An extremely compact clay matrix was encountered between 75 and 100 cm below ground surface, possibly indicating an earthen platform surface located between the two mounds. A similar “platform plug” was not found in Transect 2, situated between Structures 105 and 109, supporting the notion of an entry way into the plaza from this location.

Ceramics from Transect 1 consisted mostly of small, eroded sherds, but several STPs yielded potentially diagnostic sherds, including STP 11 (Zones 3 and 5) and STP 5 (Zone 3). Other notable artifacts included several grinding stone fragments (manos and metates), a number of obsidian blade fragments, and a relatively high density of lithic debris. In addition, two C-14 samples were collected, one from Zone 5 of STP 5 and another from Zone 3 of STP 11, which also contained fire-cracked rock and burned ceramics. STPs from Transect 1, however, yielded a generally low artifact density and no further excavation was performed in this area.

The test-pitting operation of Transect 2 was positioned roughly on a cardinal axis, directly in the middle of the saddle between Structures 105 and 109, falling more in line with the orientation of Structure 109 (Map Sheet 6). There were a total of 32 STPs, four in each row and eight in each column. Although 32 STPs were laid out, only the southern half of the transect, or the first 16 STPs,

were excavated. The transect was 7 m long north-south, with STPs spaced at 1 m intervals. The width of Transect 2 was 3 meters, and STPs were placed 1m apart along the east-west axis. In general, STPs positioned in the outside columns of the transect were more likely to hit limestone cobbles, presumably collapse from Structures 105 and 109. Like Transect 1, river cobbles and fire-cracked rock were encountered in almost every STP and the matrix generally consisted of a silty-clay soil. A concentration of artifacts (including sherds, lithics, and obsidian) and evidence of burning was identified within the southeastern corner of the transect, especially evident in STPs 2, 5, and 6. This area eventually revealed a rich midden deposit (see descriptions of Operations 9 and 12 below). Artifact densities tapered off outside of this area.

The STPs excavated in Transect 2 yielded a far greater density of artifacts than Transect 1. A heavy density of artifacts occurred in a relatively localized area and was suggestive of a midden. Thus, excavation was carried out in this area. Operations 9 and 12 were positioned near STPs 2 and 5 where the greatest density of artifacts and burning was identified. Around STPs 7 and 8, Operation 8 (just to the west of Operations 9 and 12) was positioned over an alignment of stones, which ultimately exposed the southeast corner of Structure 109. No STPs were performed in the vicinity of Structure 100, but its anomalous stone masonry prompted us to place two excavation units at this structure (Operations 10 and 11). The following presents the details of these five excavations.

Structure 109 and its Household Midden

The goal of Operation 8 (Figure 10.1), a cardinally oriented 2-x-2 m unit, was to expose a portion of the exterior of Structure 109, the largest of the structures within the octagonal plaza, in order to better understand the methods and phases of architectural construction at Pechtun Ha. The unit was placed on the southeast corner of Structure 109, identified by an alignment of stones that were visible on the surface prior to excavation. The alignment of stones represents an upper terrace that was defined in Operation 8. A lower terrace with a facing wall comprising over five courses of stone was exposed in Operations 8 and 12. Operations 9 and 12 aimed to expose a large portion of an associated midden deposit identified during the shovel test-pitting operation, as a means of dating the extent of site occupation. Operations 12 and 9, situated east of Operation 8, revealed a rich midden deposit that had accumulated against the eastern side of Structure 109. Excavations exposed both the midden deposit and two terraces making up the southeast corner of Structure 109. Below is an overview of the zones excavated in Operation 8, followed by a description of the midden deposit found in Operations 9 and 12.

Operation 8

Zone 1 of Operation 8 consists of a humic layer about 3-5 cm in depth. The matrix consists of a fairly loose, dark brown, clayey silt filled with roots and other organic material. The matrix contains a light density of inclusions, mostly river pebbles, ranging in size from 0.5 – 2 cm. Artifact density is light and includes debitage and ceramic sherds. There are nine large roughly cut stones forming the upper terrace along the southeast corner of Structure 109 (Figure 10.1), which were further exposed in Zone 2. A significantly more compact clayey soil signifies the bottom of Zone 1, around 5 cm below ground surface.

Zone 2 consists of a semi-compact matrix and is probably alluvium that washed down from the top of Structure 109. The matrix contains a light density of smooth and angular limestone cobbles ranging in size from around 5-15 cm. The limestone debris is likely collapse from Structure 109. In addition, there is a high density of reddish-brown baked clay nodules found throughout Zone 2, possibly the remains of daub from a perishable structure once perched on top of the Structure 109 platform. There is a greater artifact density in Zone 2 as compared to Zone 1. Artifacts include debitage, chipped stone tools, groundstone tools, obsidian fragments, and ceramic sherds. These

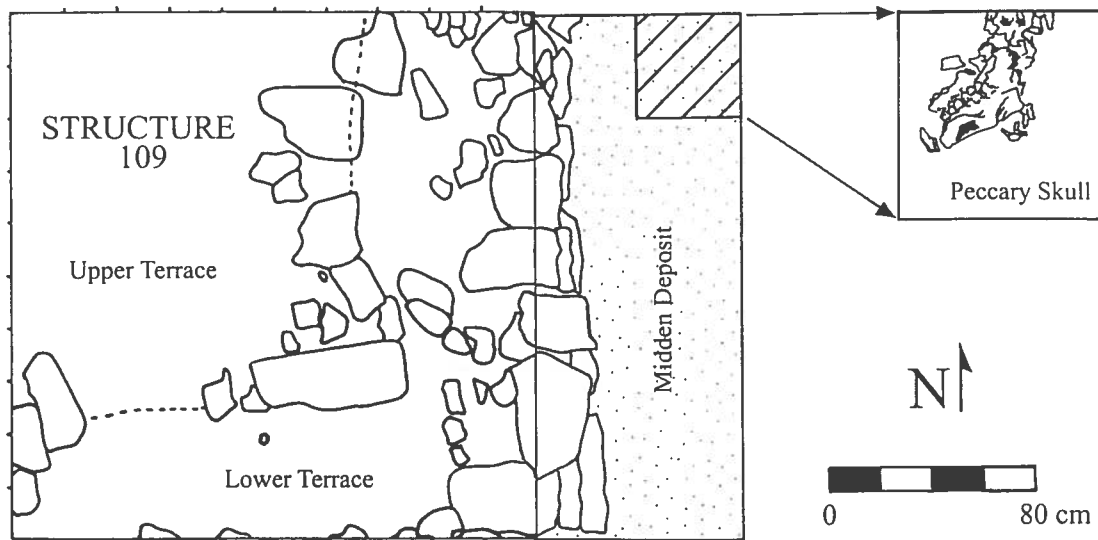


Figure 10.1 Planview of Operations 8 and 12 showing the terrace construction on the southeast corner of Structure 109, along with a portion of the associated midden packed against the east side of the structure. Note the peccary skull remains in the northeast corner of Operation 12.

artifacts may not be *in situ* deposits, but possibly were washed down from the top of Structure 109 during periodic flooding events. Due to the slope of the mound, the elevation is highest in the northwestern corner of the unit. Therefore, this area was taken down more than other areas in an effort to remove the collapse debris and expose the surface of the upper terrace (Figure 10.2). At the base of Zone 2, the soil is increasingly compact and represents collapse debris directly above the upper terrace surface (Zone 3 described below). A slightly darker clayey matrix surrounds the south and east sides of the excavation unit. This area appears to be the collapse debris overlying the lower terrace surface of Structure 109. This surrounding collapse debris was removed separately as Zone 4.

Zone 3, a roughly 1.30 x 1.30 m area, is confined to the upper terrace area in the northwestern section of the excavation unit. The zone consists of further collapse debris lying directly over the top of Structure 109. The matrix consists of a slightly more compact, clayey soil than was found in Zone 2, and contains a light density of river pebbles ranging in size from 0.5 – 4 cm and limestone cobbles ranging in size from 5 – 7 cm. The zone is about 20 cm at its deepest point in the northwest corner before it interfaces Zone 5, which is a more compact, culturally rich surface that is most likely a packed living floor (see Figure 10.1 and Zone 5 below). At the interface between zones 3 and 5, there is a higher density of cultural material, including debitage, obsidian, ceramics, baked clay material, charcoal, and, most notably, a fragment of a hematite mirror. Hematite is not a local

resource, but is found in more distant regions, such as the Oaxaca Valley, and suggests that the inhabitants of Pechtun Ha, namely those living on Structure 109, had some degree of access to an extensive, long-distance trade network.

Zone 4 consists of the tumble lying around the edges of the upper terrace, overlying the lower terrace surface of Structure 109. The matrix of the collapse appears slightly darker in color than Zone 3 and is a semi-compact silty clay with a light density of river pebbles and a light to medium density of limestone cobbles. Limestone cobbles, likely collapse debris from Structure 109, are both smooth and angular in shape and range in size from 5 – 10 cm. One cobble in particular is evidently battered and appears to be a hammer stone. Excavation of Zone 4 entailed defining the line of stones that were partly visible on the surface prior to excavation as well as a second course of stones; together, they form a two-course wall that retains the upper packed terrace surface (Zone 5) of Structure 109. The two-course wall is better preserved on the eastern side of Structure 109 (Figure 10.1). The wall was only partially intact along the south side and was more difficult to define. At the base of Zone 4, soil became increasingly compact and the color changed to orange, due to the higher content of baked clay material in the matrix. The baked clay material may represent the remains of a wattle and daub perishable structure that likely once stood on the top of the Structure 109 platform. Directly below the second course of stones, the edge of an ashy layer, running underneath the packed surface of Structure 109, was defined. This marked the level of the lower terrace surface, which was considerably deteriorated and difficult to discern during excavation (see Figure 10.2). The ashy lens represents either an earlier living surface or the remains of a construction sequence that stabilized the packed earth as the mound was built up during the construction process. Two more ashy layers underlie this one, the edges of which were defined in zones 4 and 6.

As noted above, Zone 5 consists of the packed living surface of the upper terrace identified at the base of Zone 3. This zone was left intact during the excavation of Operation 8 (Figures 10.1 and 10.2). The surface of Zone 5 is roughly 40cm below ground surface in the northwest or deepest portion of the unit. The area is culturally rich and artifacts are found lying flat on the surface, further suggesting its function as an exterior terrace floor.

Zone 6 consists of a compact, silty-clay matrix that lies directly below Zone 4, defined as further collapse outside of the Zone 5 terrace surface, but is likely the remnants of the lower terrace construction. A light density of limestone cobbles and river pebbles were noted in Zone 6. Artifact density is low, and includes debitage, ceramic sherds, several obsidian blade fragments, and burned clay material. Notably, a number of large sherds were recovered along the eastern edge of the unit in Zone 6. The majority of recovered sherds, however, are extremely eroded and lack diagnostic features. Zone 6 extends about 5-10 cm in depth and interfaces with the intact remains of the lower platform surface. The lower terrace extends about 80 cm to the east and south before meeting the retaining walls of the lower terrace. At the east wall of the excavation unit (Figure 10.2), the tops of large, roughly cut facing stones of the lower terrace were defined. The edges of two additional ashy layers were identified in Zone 6. These gray, ashy lenses appear to run underneath the upper and lower terrace surfaces. They probably functioned as construction layers, rather than earlier occupation levels in Structure 109. Levels of packed mud appear to have been built up and periodically burned in order to solidify and secure the mound surface, facilitating the build-up of a relatively large earthen structure, which was retained by limestone walls. The lower retaining wall

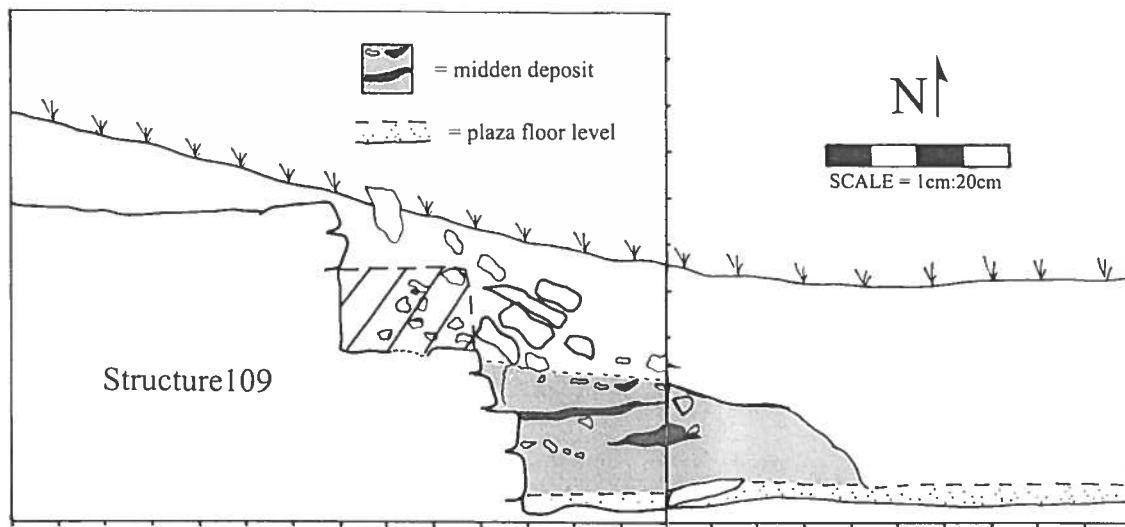


Figure 10.2 North wall of Operations 8, 9, and 12 (respectively). Note the two terraces and the adjacent midden deposit heaped against the eastern side of Structure 109.

on the south side of the excavation unit was not defined because it was cut off by the limits of the unit. The facing of the lower, eastern retaining wall was revealed in Operation 12, an adjacent unit to the east of Operation 8. The north wall cross-section of Operations 8, 12, and 9 respectively (Figure 10.2), illustrates the two platform terraces encountered in Operation 8, along with the adjacent midden deposit heaped against the eastern side of Structure 109 (see Operations 9 and 12 below).

Zone 7 consists of the two-course retaining wall of the upper platform surface of Structure 109. No further courses were identified in the excavation of Operation 8 and the two-course wall was left intact.

Zone 8 underlies Zone 6 and consists of the earthen construction fill of the lower terrace surface. This zone confirmed that the Zone 7 retaining wall was limited to two courses of stones and also further exposed the two ashy layers that appear to be part of the construction process for Structure 109 (see above). The construction fill is primarily a silty-clay matrix which contains only a light density of limestone cobble fill, both smooth and angular stones ranging in size from 5 – 15 cm. The artifact density is light to medium, and includes debitage, ceramic sherds, fire-cracked rock, some baked clay, and one human tooth. In addition, charcoal was noted in the matrix and a C-14 sample was taken from the southeastern corner of the unit (also the southeastern corner of Structure 109). Also from this area, a large slab foot of a tripod-footed cylindrical vessel was identified (see Cockerell, this chapter, Figure 10.8). The slab foot closely resembles Early Classic Teotihuacan-style vessels (see Sharer 1994:689). It is conceivable that this foot was part of an Early Classic vessel, saved as an heirloom piece and brought to the site at a later date. Zone 8 is the last zone excavated in Operation 8. The excavation of Zone 8 confirmed that no further courses of stones existed for the upper platform tier and that the roughly cut stones found on the lower platform surface were aligned to form a lower retaining wall, excavated in Operation 12.

Operation 9

The goal of Operation 9, a 1 m (north-south) x 2 m (east-west) unit, was to expose a portion of a midden deposit recognized during the shovel test-pitting operation. Diagnostic ceramics collected from the midden could shed light on the time depth of site occupation. The excavation unit is located adjacent to Operation 12, 80 cm to the east of Operation 8, and is positioned roughly in the center of the saddle between Structures 109 and 105. The location was chosen because STPs 5 and 6 indicated a spike in cultural material around 75-100 cm below ground surface. The following presents the details of the excavation.

Zone 1 comprises the first 15 cm of topsoil, which appears relatively devoid of cultural material, containing only extremely eroded sherds. The semi-compact, silty-clay soil is probably a recent alluvial deposit caused by repeated flooding of the plaza area. Periodic flooding at Pechtun Ha has been noted in recent times by the landowner Alec Estrada (Thomas et al. 1998:27-28). There is a high density of small and large roots, but little to no inclusions in the matrix. There was no distinct change in soil color or texture at the base of the zone Zone 1, and the zone change after 15 cm was arbitrary.

Zone 2 is an earthen layer, likely alluvial in origin with a characteristic silty-clay composition. The zone extends about 10 cm in depth and contains a light density of limestone inclusions. The artifact density is light, and included debitage, one small flake of obsidian, and eroded pottery sherds. It is probable that artifacts found in the alluvial deposits of Zones 1 and 2 are the result of run off caused by past flooding events.

Zone 3 is an earthen layer that is about 15 cm deep and is a continuation of the alluvial deposit noted in Zone 2. The silty-clay soil is semi-compact and contains a slightly higher density of limestone inclusions, ranging in size from 5-12 cm, and river pebbles, ranging in size from 0.5 – 5 cm. Artifact density is light, but is significantly higher than previous zones. Utilitarian debris, including debitage, chipped stone tool fragments, pieces of groundstone, obsidian, pottery sherds, and baked clay material suggest that Structure 109 functioned in antiquity as a large domicile.

Zone 4 is a compact earthen layer that is roughly 15 cm deep. The matrix is a silty-clay, but has a higher clay content than zones 2 and 3. The zone is mostly alluvium mixed with layers of tumble from both the eastern side of Structure 109 and perhaps the northern side of Structure 105. At the base of Zone 4, the surface of the midden deposit was identified. The deposit appears to have been packed against the eastern side of Structure 109 since it slopes to the east toward the plaza floor between structures 109 and 105. Artifact density is medium, but very high compared to previous zones in Operation 9, and includes debitage, eroded sherds, chipped tools (e.g., a small stone biface), obsidian, and charcoal (sampled from the southwestern corner of the unit). The western half of the unit contains the highest density of artifacts in Zone 4, where the slope of the midden heap is at its highest point (Figure 10.2).

Zone 5 represents the bulk of the midden deposit, a dark organic-rich matrix with limestone cobbles (2 – 15 cm in length). There is an evident spike in cultural material in Zone 5. There is a yellow-orange colored matrix that was defined in the northeast corner of the operation that appears to be tumble from Structure 105, sloping down in a westerly direction. This matrix overlays the tumble and midden which has a darker soil coloration. At the base of Zone 5, the artifact density rises

significantly and sherds are lying flat, as if deposited on a living surface (Figures 10.2 and 10.3). This surface is possibly the remains of a mud-packed plaza floor (Zone 6). A high density of charcoal and sherds are scattered throughout the midden of Zone 5. There are clusters of several partially reconstructible vessels at the base of Zone 5. A total of four C-14 samples were collected and a burned, organic specimen that looked woven was also recovered. In addition, a highly deteriorated bone specimen was collected.

Zone 6 appears to be the remains of a pebble-filled clayey construction fill of the plaza floor, measuring approximately 10 – 15 cm in thickness (Figure 10.3). The floor appears roughly 80cm below ground surface and consists of small limestone pebbles and is most concentrated in the southwestern corner of the excavation unit. Most likely, the plaza floor is preserved in this area due to the overlying midden and collapse debris from Structure 109 that protected this portion of the floor.

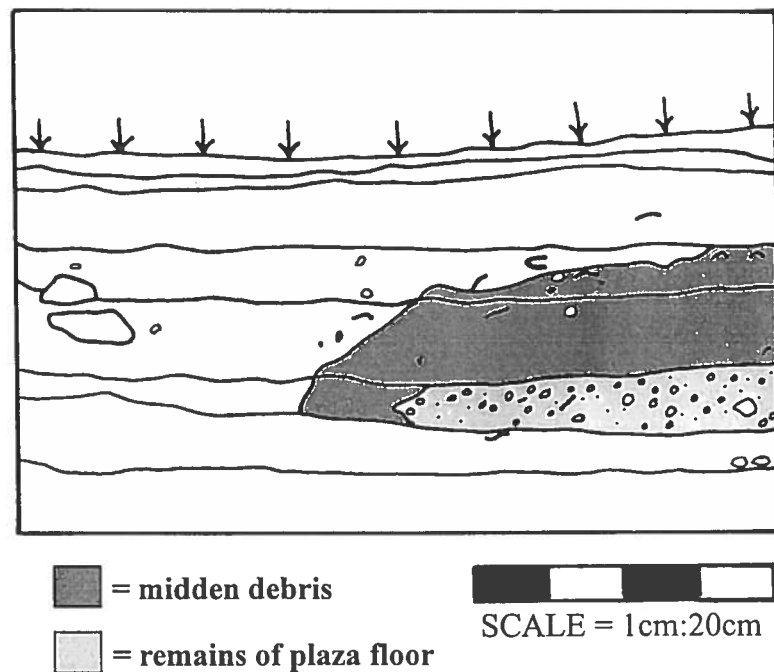


Figure 10.3 South wall of Operation 9 showing plaza floor and overlying midden.

Zone 7 is the construction fill for the floor surface and is located directly underneath the Zone 6 pebble floor. The compact, clayey matrix is orange-brown in color and contains little to no limestone inclusions. Only about 10 cm of the fill was excavated. The matrix is quite similar in color and texture to the alluvial deposits found in the upper zones of Operation 12. Artifact density taper off at about 10 cm below the plaza floor surface, consisting of a small number of eroded ceramic sherds. Excavations stopped at around a meter below ground surface.

Operation 12

Operation 12, an 80 cm (east-west) x 2 m (north-south) unit, is cardinally oriented. It is adjacent to the western side of Operation 8 and the west side of the unit abuts the east side of Operation 9. The goal of excavation was to not only further clarify the eastern exterior terrace wall

of Structure 109, but also to expose more of the rich midden found in Operation 9. Excavations revealed the front façade of the eastern lower terrace of Structure 109, a five-course, limestone retaining wall over a meter in height, with the sloping midden deposit contacting the structure wall (Figure 10.2). The midden in Operation 12 contained a wealth of artifacts, including the remains of tapir and peccary skulls. The following presents the details of excavation.

Zone 1 consists of a dark humic layer that contains a relatively high density of root mass. The zone extends about 10 cm before encountering a clay-filled alluvial deposit (Zone 2), also found in Operation 9. There is light density of small limestone cobbles (2 - 15 cm in length) and river pebbles (0.5 - 2 cm in length), which are likely collapse from the eastern side of Structure 109. Artifact density is significantly higher than topzones from other excavation areas at Pechtun Ha, and includes debitage, obsidian, ceramic sherds, fire-cracked rock, and baked clay material.

Zone 2 is a compact clayey-silt earthen layer, filled with a light density of small and medium sized limestone inclusions. There are several larger limestone cobbles (5 – 25 cm in length) that appear to be collapse from the retaining walls of the platform terraces of Structure 109. There is not a high density of stone because the construction is mostly packed clay material, with the larger stone masonry restricted to the retaining walls.

Zone 3 (Figure 10.4) is a semi-compact silty-clay matrix and appears to be the surface of the midden deposit, detected in Zones 4 and 5 of Operation 9. Several courses of roughly cut limestone

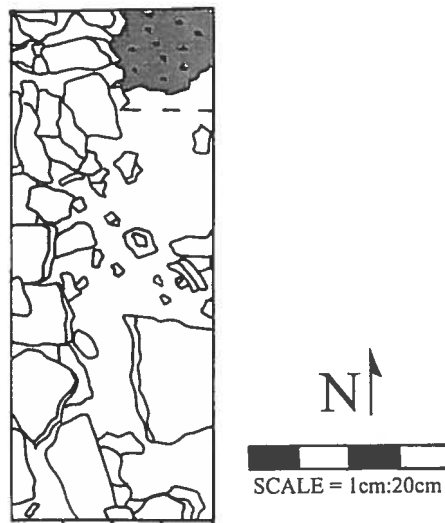


Figure 10.4 Planview of Operation 12 showing Zones 3 and 4. Zone 4 is the burned area in the northeast corner of the unit, which is part of the midden deposited against the eastern side of Structure 109.

blocks were exposed in Zone 3 along the western side of the unit and represent the upper portion of the eastern wall of Structure 109. The facing stones of the eastern wall are cut, but the backs of the stones (partially exposed in Zone 8 of Operation 8) are jagged and unworked (Figure 10.4). Tumble from the retaining wall is noted in both the north and south sides of the unit, and inclusions range in size from 5 to 10 cm. A burned area in the northeast corner of the unit was identified in Zone 3, but

was excavated separately as Zone 4.

Zone 4 (Figure 10.4) is a 40 x 40 cm area in the northeast corner of the unit. The matrix is a semi-compact silty-clay with a light density of smooth limestone cobbles that are less than 4 cm in length. The organic-rich area, located roughly 40 cm below ground surface, is about 30 cm in diameter and about 20 cm deep and is part of the midden deposit found in Operations 9 and 12. Artifacts, including pottery sherds and lithics, were found in Zone 4. Additionally, a very high density of animal bone, found *in situ*, also was identified in this concentrated burned area. At the base of Zone 4 a complete mandible and skull fragments of a tapir and portions of a peccary skull were exposed (Figure 10.1). Once defined, these were removed separately as part of Zone 7. The dark, organically rich soil contains a considerable amount of ash and charcoal. The intensive burning may have come from either a hearth dumping or periodic burning of the trash heap. Some of the soil was collected for analysis and several C-14 samples were taken at the surface of the zone (146 cm below datum).

Zone 5 covered the entire unit of excavation, with the exception of the edge of the eastern wall running along the western side of the unit. More of the midden deposit was exposed in Zone 5, along with several large, cut limestone blocks that represent residual collapse debris from the terrace retaining walls. The area of the midden can be seen in the cross-section drawing of the north wall of operations 8, 12, and 9 (Figure 10.2). The matrix is somewhat darker and there is a significantly higher density of artifacts evident in the profile of the north wall (mainly ceramic and burned/baked clay material). There is a medium to high density of tumble evident in the north wall cross-section that clearly had fallen from the eastern wall of Structure 109. The debris suggests that there were additional courses of stone on the lower terrace of the eastern wall (Figure 10.2).

Zone 6 consists of another 20 cm of the rich midden material. There is a high density of charcoal in the matrix, perhaps indicating periodic burning of the trash and/or the dumping/cleaning out of hearths. The northern end of Zone 6 featured a particularly heavy charcoal density with two distinct ashy carbon lenses evident in the walls of the unit (Figure 10.2). Artifact density is heavy, and includes a high density of animal bone representative of a number of different species, predominantly peccary. In addition, debitage, chipped stone tool fragments, a possible groundstone tool, obsidian, ceramic sherds, baked-clay material, and fire-cracked rock were recovered from Zone 6. Notably, the zone revealed several nicely preserved slipped sherds, some with polychrome designs, which are likely diagnostic (see Cockerell, this chapter).

Zone 7 is a 40 x 40 cm area, underlying the same location as Zone 4 (Figure 10.4). The matrix is a semi-compact, silty-clay with a medium to high density of limestone pebbles (0.5 – 7 cm in length) and a light density of river pebbles (0.5 – 2 cm in length). There is a medium density of artifacts in Zone 7, including ceramic sherds and a high density of animal bone consisting primarily of peccary and tapir skulls. In the center of the zone, a large mandible was relatively intact, with at least nine teeth in a row. In general, the skulls contain both mandible and maxilla and are relatively intact, but were very delicate and appear crushed in a number of places. Together, the faunal analysis from Zones 4, 5, 6, and 7 of Operation 12 reveals a total of four peccary and one tapir are represented in the midden deposit (see Graver, this chapter). A smashed, partially reconstructible vessel surrounds the skulls. A C-14 sample also was collected from this zone, which displays evidence of burning similar to Zones 4, 5 and 6.

Zone 8 consists of the bottom portion of the midden deposit that contacts the underlying plaza floor and the eastern side of the base of Structure 109. The zone is about 10 cm deep and is a compact, silty-clay with a light density of limestone pebbles (0.2 – 5 cm in length) and smooth river pebbles (0.2 – 2 cm in length). Artifact density is medium and consists of animal bone and ceramic sherds. Burning is still evident at the base of the midden right above the floor and a C-14 sample was collected from this zone as well. The retaining wall of the lower terrace appears to have originally held as many as seven courses of stone, but the top one or two courses have since collapsed. One or two additional courses of stone would have provided the appropriate height to be flush with the remains of the lower terrace surface, which extends back about 80cm to the base of the second, upper terrace retaining wall (Figure 10.2). Zone 8 exposed the bottom course of the exterior terrace wall that rested on the surface of the plaza floor. Excavations in Operation 12 did not continue below the plaza surface.

Structure 100: A Speleothem-covered Shrine

Operation 10

Operation 10 is a 3 m (north-south) x 1 m (east-west) excavation unit positioned on the eastern half of Structure 100 (Figure 10.5). The goal of this operation is to better understand the architectural construction and function of Structure 100 at Pechtun Ha. Structure 100 is the only platform at Pechtun Ha built entirely of stone, consisting of large cut stones with a solid cobble fill. The small size of the structure and the differentiation in construction methods could indicate a ritual versus residential use for Structure 100. Notably, speleothems are evident on the surface of the structure. These stone formations were extracted from caves, the nearest of which are the Thumb and Tiger Cave Districts several kilometers to the south and southeast, respectively. Caves were seen as doorways to the underworld that housed the gods and the ancestors. The use of speleothems in construction lend further support to the notion of a ritual function for Structure 100, perhaps meant to physically and spiritually link the settlements and the living world with the caves and supernaturals of the underworld. The following presents the details of excavation of this unique mound at Pechtun Ha.

Zone 1 consists of the topsoil or humus that overlies large limestone boulders, some of which appear to be cut facing stones. Several of the large cut stones noted in Operation 10 on Structure 100 were identified as speleothems and were subsequently drawn and photographed. There is a high density of active bioturbation caused by ants and termites within the topsoil. The matrix in the southern end of the unit was significantly looser due to root action and a 10 - 15 cm dip caused by a past tree fall that significantly disturbed this area. There is a large cohune palm tree still standing in the vicinity of the northwest corner of Operation 10, evident in the west wall cross-section of Operation 11. The humic layer includes a high density of cohune nuts and decomposing vegetation. The exposed limestone blocks show evidence of weathering and erosion, possibly due to past flooding events (Thomas et al. 1998:27-28). The limestone is of various colors, including shades of pink, which suggest some of the limestone underwent extreme heat some time in the past.

Zone 2 is tumble consisting of a layer of loose soil with multiple limestone inclusions; evidence of extensive bioturbation continues into this zone. Clusters of ceramic sherds were found

around and underneath limestone boulders in the construction fill of Structure 100. Zone 3 consists of limestone tumble intermingled with a light density of smaller river stones. The soil is silty with some clay and has been disturbed by trees, which have contributed to the collapse of the architecture of Structure 100. A light density of artifacts was found intermittently throughout the unit, mostly underneath the collapsed limestone blocks. Artifacts recovered from Zone 3 include animal bone (6 vertebrae of a snake), obsidian, ceramic sherds, and unworked shell. The limestone on the top of the zone is considerably disturbed by root activity, while stones at the bottom of the zone appear better preserved and exhibit relatively intact architecture. Zone 3 entailed removal of the disturbed stones in the upper portion of the zone to better define the *in situ* architecture of Structure 100.

Zone 4 is a packed earthen layer containing limestone cobble and pebble fill, located north of a line of stones that form either a wall or stairs on the front or northern face of Structure 100 (Figure 10.5). The earthen and pebble-filled layer represents the plaza floor, which appears to run underneath Structure 100 but is not well preserved. The floor seemingly pre-dates Structure 100, but may have been partially destroyed when the structure was built over the top of it. The sandy silt matrix of the plaza floor is semi-compact and contained a number of flat-lying sherds on its surface. There were a number of limestone cobbles overlying the plaza surface. Under one of the large stones, a cluster of sherds was found, possibly representing two partially reconstructible vessels. The Zone 4 soil is mixed with a relatively high density of sherds and appears darker than the construction fill of Structure 100, found in the southern portion of the unit behind the exterior retaining wall.

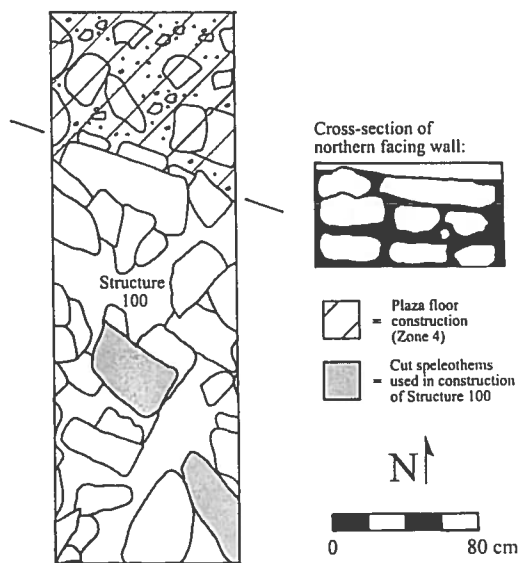


Figure 10.5 Planview of Operation 10, showing the northern wall and fill of Structure 100. Note the cross-section of the northern facing wall, showing the alignment of stacked stones that represents the exterior wall or stairs of Structure 100.

Zone 5 is a layer of construction fill, approximately 10 – 15 cm deep that appears to be part of the plaza floor. The matrix consists of a cobble fill intermixed with a gravelly sand. Zone 5 is the same dimension as Zone 4, occupying an area to the north of a line of stones seen in Figure 10.5. This northern wall is three courses in height and may have functioned as a retaining wall or a set of steps built along the northern side of structure 100. The wall is seated on a layer of small cobbles and suggests the construction of a preliminary plaza surface prior to the raising of Structure 100.

The poorly preserved sandy pebble plaza surface (Zone 4), however, interfaces the northern wall midway up the first course of stones and may indicate that the floor was re-surfaced at a later time following the building of Structure 100.

Operation 11

The position of Operation 11, a 2 x 2 m unit adjacent to the western wall of Operation 10, exposed limestone cobble construction fill and two arching lines of stone running roughly east to west through the unit (Figure 10.6). The arching configuration indicates that Structure 100 is circular and lends further support to the notion of a special-purpose building. The set of arching walls may represent a series of terraces leading up to a platform or possibly a thick wall with later inner construction fill. In the case of the latter, the layout would suggest that Structure 100 contained an interior room. A faced-wall in Operation 10, running in a northeast-southeast direction, may represent a doorway, opening to the northeast into the main plaza (Figure 10.5). Limited horizontal exposure, however, limits a solid reconstruction.

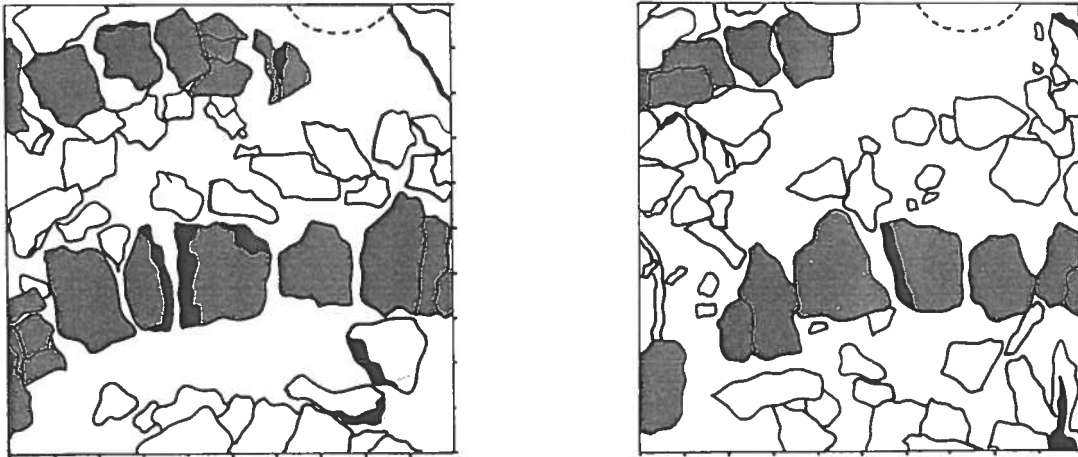


Figure 10.6 Planview of two arching lines of stone in Operation 11, exposed in Zones 4 and 2, respectively.

The top zone in Operation 11 represents a thin humic layer overlying collapse debris. Zone 1 entailed the clearing of smaller, looser stones that signified more obvious collapse debris. Zone 1 consists of numerous limestone inclusions, possibly the result of collapsed wall units or, more likely, the remains of the inner construction fill of a thick wall that enclosed an interior room of Structure 100 (Figure 10.6). Roots, fallen trees, and other forms of bioturbation are the major contributors to physical disturbances of Structure 100. A large cohune palm, growing along the western edge of Operation 11, caused a high density of roots to infiltrate this area of the unit. A light density of artifacts, including several potentially diagnostic sherds, was noted in this zone. Like Zone 1 of Operation 10, limestone inclusions show obvious signs of deterioration due to weathering and burning.

Zone 2 is loose, clayey silt with an abundance of collapsed limestone and dense cobble construction fill. There is very little differentiation across the zone, except in the southwest and northeast corners where a darker soil color is noted, probably owing to the abundance of

decomposing organic matter and extensive bioturbation. The artifact density is light, with some pottery sherds (including several diagnostic rim sherds), unworked freshwater shell, and a large rodent tooth. Collapse versus construction fill was difficult to discern, therefore, excavation entailed drawing each layer that was removed. Walls and construction fill was better identified through later examination of cross-sections and planview maps (e.g., Figure 10.6). The two arching stones exposed in Operation 11 were constructed with a series of large cut limestone blocks and consisted of at two courses. The central line of stone was more clearly defined than the northern line. This central line of stone appears roughly hewn on the northern side, but nicely faced on the southern side, adding further support to the notion of a building wall which enclosed an interior room, rather than simply a multi-terraced platform construction. Root action has highly disturbed the architecture of Structure 100, but further excavation could reveal more intact architecture and provide a clearer understanding of the layout of this important structure.

Zone 3 consists of relatively intact construction fill. Limestone blocks are abundant, as are limestone cobbles and river pebbles. The loose pebbles and cobbles fill in areas between lines of cut blocks, which appear to be two walls retaining an inner fill. Due to limited horizontal exposure, it remains inconclusive whether the two arching lines of cut limestone, also noted in Zone 2, functioned as a series of terrace walls or were part of a single wall that enclosed a central room. Two colors of clayey silt are noted in Zone 3. The primary soil was dark brown while the secondary soil was a yellowish brown. Despite the extensive bioturbation, many of the large limestone blocks in Zone 3 appear to be relatively *in situ* (Figure 10.6).

Zone 4 is about 40 cm deep and contains increasingly larger cobbles in the fill within the interior of the two walls exposed in Operation 11. The matrix of the zone is comprised of a loose, clayey silt soil. A second course of stones in the same arching configuration as the first were defined in Zone 4 (Figure 10.6). There is a slightly darker soil to the south of the central east-west line of arching limestone blocks. It is unlikely that this is further construction fill retained by another wall further to the south. Rather, the faced stones along the south side of the central arching wall suggest that this area was more likely an interior room, which contained some collapsed limestone debris removed as part of Zone 4. While large limestone cobbles are abundant throughout the zone, they appear as part of the *in situ* fill to the north of the central wall. A smaller number of large limestone blocks were recovered to the south of the central wall, where the interior room is thought to have been located. Primarily, river pebbles were found in this area. A high density of burned limestone also was noted throughout the zone.

Zone 5 is a layer of large limestone boulders with an underlying layer of smaller limestone cobbles, located to the south of the central wall in the area thought to represent an interior room. The construction layer containing larger boulders may represent the remains of an underlying platform on which the building was constructed. The underlying fill containing smaller limestone cobbles is thought to signify the plaza surface running underneath Structure 100. A similar consistency of fill occurring at a similar elevation was recorded in Zone 5 of Operation 10. The matrix of Zone 5 consists of a semi-compact gravelly-sand within distinct layers of large and small limestone cobbles. An earthen layer (Zone 6) was found underlying the layer of small limestone cobbles.

Zone 6 is an earthen layer located below the cobble fill that appears to be associated with the plaza floor. The earthen layer likely represents a formally prepared construction fill layer that

leveled the area prior to the construction of the plaza floor surface. The construction layers, identified in Operation 11, seemingly confirm the construction sequence, indicating that the plaza pre-dates the construction of Structure 100. The earthen matrix of Zone 6 is a densely compact layer of sediment containing a light to medium density of ceramic sherds and lithic debris. Notably, a lithic core and a groundstone disc (15 cm in diameter) were found in Zone 6. The density of artifactual material associated with the Zone 6 fill suggests that the earthen layer is perhaps an artificial construction or perhaps a modified natural layer occupied for sometime prior to the construction of the plaza group. A small amount of charcoal also was collected from this zone and may provide a date for the initial occupation of Pechtun Ha. Excavation did not continue beneath the earthen fill.

Architectural Reconstructions at Pechtun Ha

Structure 109: A Residential Construction

Structure 109, measuring roughly 21 m long (east-west) and 8 m wide (north-south), is the largest of the eight structures in the octagonal plaza group at Pechtun Ha and presumably the household of the leading member of the community (Figure 10.7). Excavations from the 1997 and 1999 seasons suggest that the platform structures at Pechtun Ha, which likely held perishable structures, were built in a single construction episode. Limestone retaining walls form several terraces around the exterior of Structure 109 and simulate, on a smaller scale, the masonry buildings found at larger centers in the Maya area. Materials used in the construction of Structure 109 include fine-grained clay, river cobbles, and roughly hewn limestone blocks. The river cobbles and clay were part of the construction fill and most likely came from the Sibun riverbed. The larger limestone blocks would have been quarried from the nearby river to the south where the karst system of the Sibun River Valley begins. The soft limestone is relatively easy to carve into blocks, which facilitated the stacking method used in the creation of tiered retaining walls. The river clay is easily compacted and appeared to function as mortar between stones. The compact clay also was used to create flat living floors, like the terrace surfaces exposed in Operation 8.

Most of the structures at Pechtun Ha are earthen mounds with limestone retaining walls. This construction technique appears to have maximized use of local material (alluvium) and to have restricted the use of limestone to the exterior façade. Limestone had to be transported from the south side of the river and thus required a good deal of labor power; thus, it is not unreasonable that it was used primarily to retain the earthen fill. The size differential in platform structures suggests that there was a central elite group at the site who appear to have acquired enough wealth and status to direct the construction of the site core.

The limestone was worked into roughly cut blocks, presumably where they were mined. Two limestone slabs positioned along the southern edge of Structure 109 were centrally located and appear significantly larger than the stone blocks used for the eastern terrace retaining walls. It is possible that these two large stone slabs served as monuments, similar to those found in the vicinity of Structure 100 (Thomas et al. 1998). Alternatively, they may simply represent efforts to create a more monumental effect on the façade of Structure 109 that faced the central plaza. In either case, the movement of exceptionally large stones to this locale indicates the central role of Structure 109. Stone monuments and monumental architecture are elements associated with the main plaza of a

civic center and demarcate areas reserved for elite residence, ritual worship and religious ceremony performed by the elite members of society. Evidence of at least two stone monuments, the scale of the masonry construction, and the presence of a small circular shrine structure suggests elite occupancy at Pechtun Ha, with its leading members likely housed in Structure 109. Presumably, both the single and clustered mounds that surround the main plaza reflect a small supporting population. The structure of the Pechtun Ha community simulates, albeit on a smaller scale, the political, economic and religious activities found at larger sites within the Maya area.

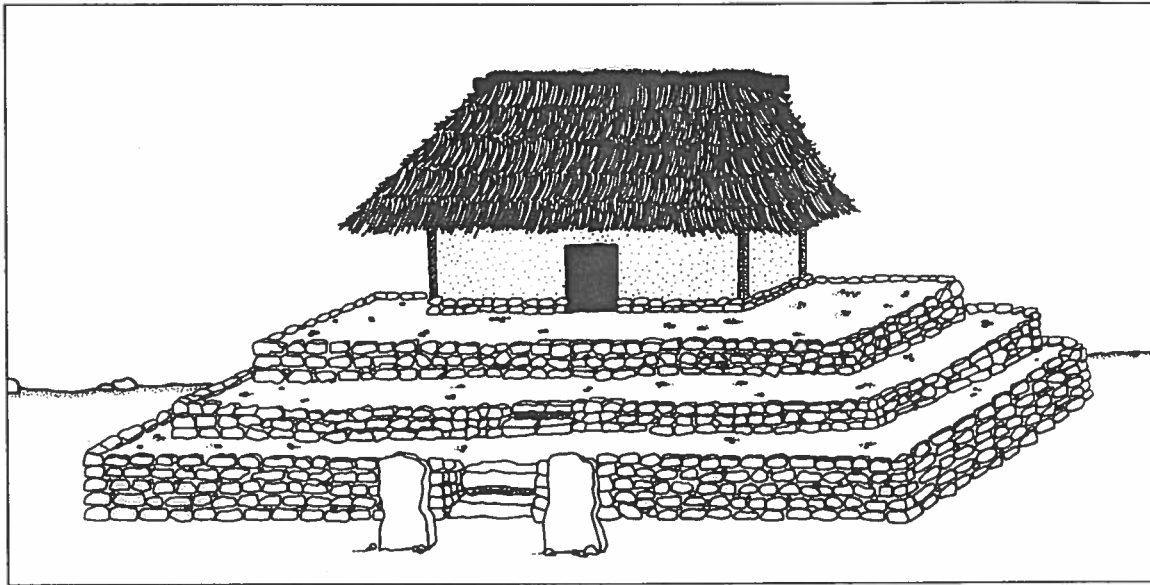


Figure 10.7 Idealized reconstruction of Structure 109 (drawing by Kevin Acone).

Structure 100: The Construction of a Shrine Structure

Structure 100 stands as the most unique and enigmatic of the eight structures in the main group at Pechtun Ha. It was made entirely of stone and appears circular in shape. As with Structure 109, across the plaza to the north, the construction of Structure 100 required the transport of large limestone blocks across the Sibun River. Limestone blocks range in size from 30 - 70 cm and outsize those uncovered in Operations 8 and 12 on Structure 109, which range from 20 - 40 cm in length. The most notable and intriguing feature of Structure 100, however, is the use of large speleothems or cave formations in addition to limestone. At least five large cut speleothems, ranging in size from 40 - 85 cm in length, were found associated with the architecture of Structure 100. To date, this is the only confirmed example of such cave formations appearing in such great size and abundance on a mound in the Sibun River Valley. The caves, located in the karst to the south, were seen as the home of the ancestors and gods and were the sources of water and fertility. They were an important place of worship and ritual for the Maya who believed that the caves were gateways into the dark underworld of Xibalba. To haul the heavy cave formations from the caves, at least several kilometers away, would have involved a considerable labor investment. The importation of speleothems suggests they symbolized an important aspect of the ancient religious ideology. The incorporation of the cave formations into the architecture of Structure 100 perhaps effectively imbued the building with the supernatural power and elements of water and fertility associated with cave systems.

Another special feature of Structure 100 is a possible ramp that descends from the top of a steep embankment down into an oxbow, a now inactive stretch of the Sibun River (Structure 100, Map Sheet 6). The river most likely served as a critical source of water for the ancient Maya, and water-related worship may have been carried out at this locale, metaphorically associated with the water-related properties of the caves. As noted earlier, Structure 100 is proximate to two stone monuments that are about 4 meters east of the apex of Structure 100, both showing a north-south orientation (Thomas et al. 1998: 28). Taken together, the evidence strongly suggests that Structure 100 functioned as a shrine and held a special religious significance in the community of Pechtun Ha throughout its occupation.

Discussion

Of the five excavation units, Operations 9 and 12 were the most artifact-rich because of the midden deposit located on the eastern side of Structure 109. There was a great deal of fauna recovered within the midden, including a tapir and four peccary skulls (see Graver, this chapter). The bulk of the faunal remains were found in a concentrated area of the midden, one on top of the other, and they appear to have been deposited roughly at the same time. These deposits could arguably be the remains of a feasting event led by the elite inhabitants housed in Structure 109—presumably the leading members of the Pechtun Ha community. The concentrations of burning found throughout the midden heap could be the result of hearth dumping or possibly indicates that the midden was periodically burned much like modern Maya household middens in Belize.

Excavations in Operations 9 and 12 yielded a large artifact base with several pieces of ceramic that appear diagnostic. Preliminary analysis links the ceramics to the Late and Terminal Classic periods and excavation suggests that the site was constructed in a single building episode. Further analysis of the ceramic data and the investigation of a number of other structures at the site may shed more light on the length of occupation at Pechtun Ha.

Structure 100 yielded some of the most provocative data concerning the ritual life of Pechtun Ha and an ideology that appears to be associated with water-related worship. The active use of caves throughout the middle reaches of the Sibun Valley (see Peterson, Chapter 4) suggests that this belief system involving water and caves was an important aspect of religious life among the river valley settlements. Future investigations of both the caves and settlements will likely offer further information regarding the belief systems of the Sibun Maya and the relationships between these culturally modified areas of the sacred landscape.

Artifact Analyses

The following presents a preliminary analysis of the ceramic material, chipped stone tools, and debitage, and the faunal remains recovered from the Pechtun Ha excavations.

Pottery

Katie Cockerell

This study had three major goals. The first was to determine the types of ceramic vessels that were being utilized at Pechtun Ha: jars, *ollas*, plates or bowls. (For this analysis a jar is defined as a vessel in which the height is larger than the diameter. A plate is defined as a vessel in which the height is less than 1/5 the diameter, and a bowl is a vessel in which the height is larger than 1/3 the diameter.) The second goal was to determine whether these sherds were once part of utilitarian or serving/ceremonial vessels. Serving and ceremonial vessels commonly are incised or decorated in some way, often with slip and/or paint. A high concentration of these vessels would suggest the more formal feasting and ceremonial activities took place at Pechtun Ha. If vessels were less decorated and built for heavy use, such as thick-bodied containers with little to no decoration, then daily food preparation activities likely were the dominant activities. Comparisons also were made between the excavations as to the type of vessels used at each structure. The third goal of the project was to classify the vessels according to the type-variety classification system presented by Gifford (1976) for the site of Barton Ramie in the Belize River Valley.

Methodology

Data collection began by sorting the sherds collected from every zone of Operations 8, 9, 10, 11, and 12 at Pechtun Ha. All sherds smaller than 1.5 cm were eliminated from the analysis. The remaining sherds were examined and classified according to surface treatment: slipped, unslipped, striated, painted, or unidentifiable. Total counts and weights were recorded for each zone. The numbers of rim sherds and base sherds were counted and entered into a database that is summarized in Table 10.1. Profiles were drawn for selected diagnostic sherds according to their state of preservation and unique stylistic qualities. It was observed that many zones had a significant number of sherds that had been shaped into triangular forms. These sherds may have been used as tools as López-Varela, McAnany and Berry (in press) and others have noted for the site of K'axob.

Table 10.2 records the average weight of the sherds that was calculated by taking the total weight of sherds from the zone and dividing by the total sherd-count for the zone. The percentage value for each type of surface treatment category was calculated by dividing the number of sherds within each category by the total number of sherds from the zone. Table 10.3 presents information on the rim profiles. If identifiable, each sherd was classified as a jar, *olla*, bowl, or plate and was identified according to the type-variety classification.

Results

The results of the sherd analyses are recorded in Table 10.1. Every sherd from Operations 8 - 12 was examined and its surface treatment was recorded. The results of the surface treatment analysis are summarized in Table 10.2. A large number of the sherds were unidentifiable. The overall average weight of a sherd was 5.2 grams. This breaks down by operation as follows: 3.1 grams for Operation 8, 2.7 grams for Operation 9, 9.8 grams for Operation 10, 5.9 grams for Operation 11 and 4.6 grams for Operation 12. The total average sherd-weight varied considerably between structures. Structure 100 was 7.9 grams and for Structure 109 it was 3.5 grams, indicating the large size, albeit smaller numbers, of sherds from Structure 100.

Table 10.3 provides a record of rim profiles and vessel form when discernible. When possible a type-variety identification was made. Forms identified include the following: 8 jars, 10 bowls, one *olla*, and one plate. One spindle whorl and one slab foot of the type found on Teotihuacan-style cylindrical vessels (see Sharer 1994:689) were identified. Few type-varieties were identified due to the small size and poor preservation of the sherds which are highly eroded due to acidic soils and frequent flooding events.

Summary of Profiles

Numbers correlate to profiles illustrated in Figures 10.8 and 10.9.

- 1) Rim from a bowl, no preserved slip. Type-variety unknown.
- 2) Rim from a bowl with slightly out-flared sides. Diagnostically thickened rims that are slightly rounded. Type-variety unknown.
- 3) Rim of a very thick vessel with dark red slip. Vessel form and type-variety unknown.
- 4) Rim of a very thin-walled jar with red slip. Type-variety unknown.
- 5) Rim of a small bowl with diameter of 4 cm. No preserved slip and type-variety is unknown.
- 6) Rim of a bowl with a diameter of 42 cm. Red slip on outside of bowl and painted black line around inside just below rim. Type-variety unknown.
- 7) Rim of a jar with a diameter of 12 cm. Sides of vessel flare out and the outside of vessel has a red slip. Type-variety unknown.
- 8) Rim of a bowl with a diameter of 24 cm. Inside of vessel has red slip. Type-variety unknown.
- 9) Rim of a small jar with a diameter of 12 cm. No slip preservation. Type-variety unknown.
- 10) Rim of an *olla* with a diameter of 27 cm. Red slip preserved on inside of rim. Type-variety unknown.
- 11) Rim of a jar with a diameter of 32 cm. Red slip over striations on inside and outside of vessel. Type-variety unknown.
- 12) Rim of a bowl with an unknown diameter. Red slip preserved on inside and outside of vessel. Small mending hole on inside wall. Type-variety unknown.
- 13) Rim from a small jar with a diameter of 9 cm. There is no evidence of slip preservation but forms suggests Roaring Creek Red Type.
- 14) Rim of a plate with a diameter of 34 cm. Red slip on inside and outside of vessel and a mending hole on outside wall. Roaring Creek Red Type.

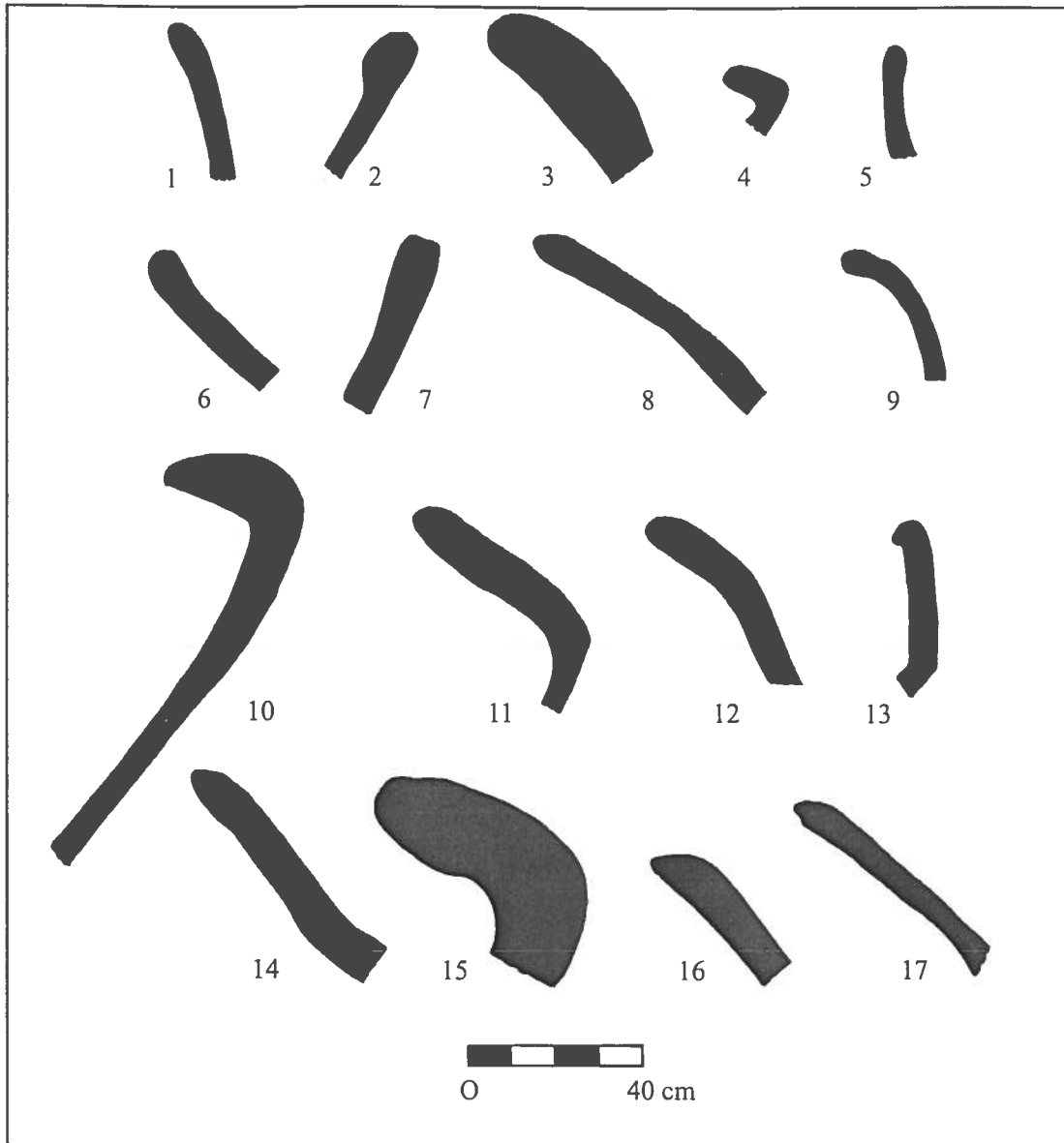


Figure 10.8 Rim profiles of Pechtun Ha pottery

- 15) Rim of a very thick vessel with an unknown diameter. Red slip on inside and outside of vessel. Vessel type and type-variety unknown.
- 16) Rim of a bowl with a diameter of 36 cm. No slip preservation and type-variety unknown.
- 17) Rim of a plate with a diameter of 38 cm. Red slip on inside and outside of vessel. Type-variety unknown.
- 18) Rim of a thick-walled jar with a diameter of 20 cm. Red slip on top of rim. Type-variety unknown.
- 19) Rim of a bowl with an unknown diameter. Red slip with black painted design located just below the rim on the outside of vessel. Type-variety unknown.
- 20) Possible spindle whorl with red slip.
- 21) Ring base for a bowl. Diameter for the ring is 10 cm and there is red slip preserved on inside of vessel. Type-variety unknown.

- 22) Ring base for a bowl. Diameter of base is 8 cm. No slip preservation and Type-variety is unknown.
- 23) Two views of Teotihuacan-style slab foot of a cylindrical vessel.
- 24) Two views of clay ring with a diameter of 14 cm. Exact purpose is unknown.

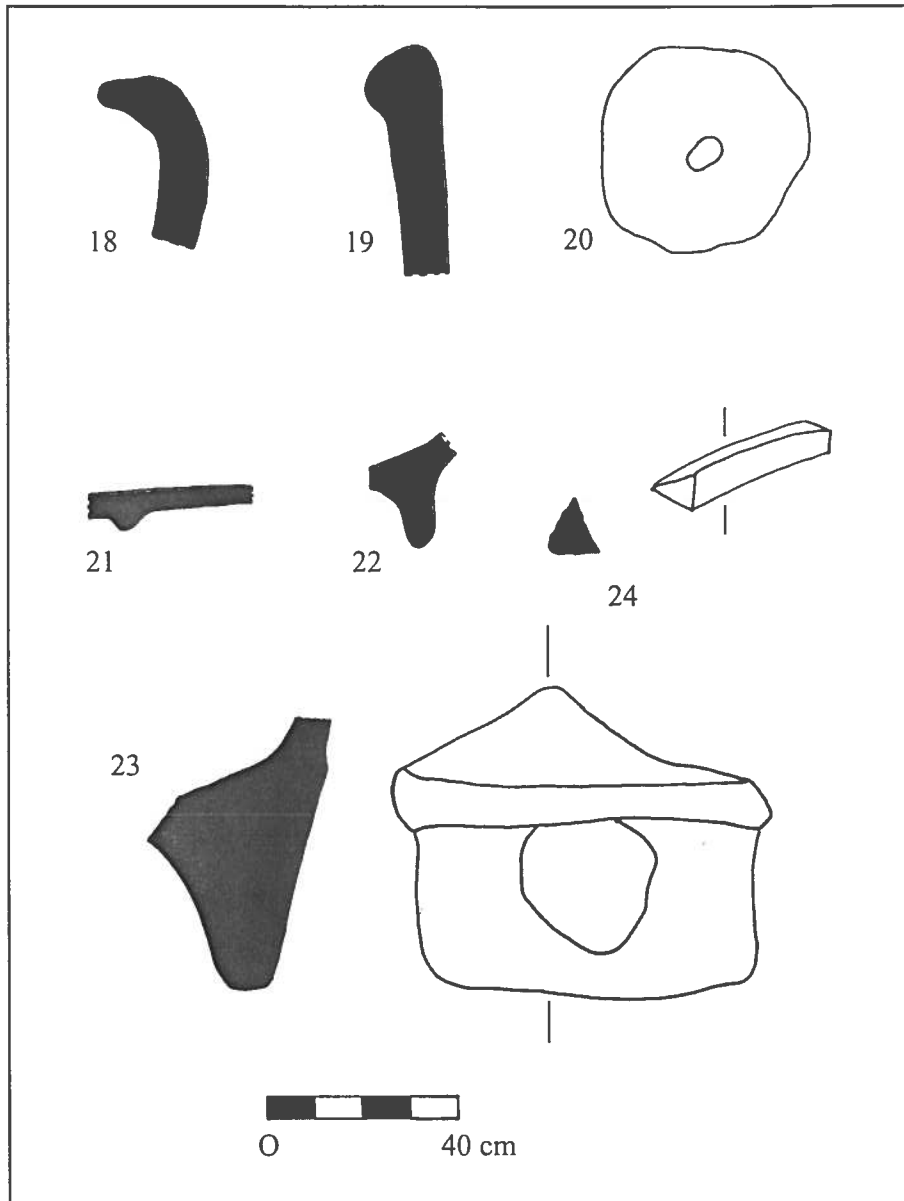


Figure 10.9 More rim profiles of Pechtun Ha pottery

Discussion

An analysis of Table 10.1 shows an increase in numbers of sherds as zone depth increases. The spike occurred at a cultural surface that was located below the collapse debris (in Zone 5 of Operation 9, for instance, where the bulk of a midden was exposed). This was followed by a decrease in sherds until ultimately sterile soil was encountered. The unevenness of the distribution may be due to the poor preservation conditions at the site. The frequent flooding and acidity of the

Op.	Zone	Number	Weight (g)	Slipped	Unslipped	Striated	Painted	Unidentified	Rim	Base	Triangles	Comments
8	1	5	10.0	2	0	0	0	3				
8	2	234	707.3	79	6	4	13	132	19		4	1 incised
8	3	156	421.7	49	6	3	5	93	4			
8	4	30	75.6	17	0	0	0	13	1			
8	6	100	304.2	23	6	1	0	70	12		1	
8	8	55	298.9	23	1	0	1	30	5	1		1 incised, 1 Teotihuacan style slab foot
9	1	1	1.1	0	0	0	0	1				
9	2	11	37.7	1	6	0	0	4	1			
9	3	109	268.8	7	61	1	2	38	3		1	
9	4	488	708.0	29	318	1	3	137	31	2		
9	5	618	1685.3	110	188	7	5	308	20	2	3	spindlewhorl, 3 incised
9	6	311	1219.0	88	39	27	15	142	21	2	5	
9	7	17	37.3	0	0	7	0	10				
10	1	12	241.2	5	1	0	0	6	3			
10	2	19	227.9	3	4	0	0	12	2	1	1	1 ridged body sherd
10	3	81	452.6	11	1	4	0	65	13	3		
10	4	142	1152.7	64	4	3	0	71	10		5	1 false base, 2 flanges, 1 applique decoration
10	5	20	55.6	5	0	2	0	12	1			
11	1	19	259.6	7	0	4	0	8	3		1	
11	2	28	219.7	12	1	6	1	8	6		3	
11	3	19	172.3	7	1	6	0	5	1		2	3 flanges
11	4	89	507.5	25	2	20	1	41	4		3	1 incised, 1 flange
11	5	7	18.5	2	0	3	0	2				
11	6	139	375.2	27	0	38	3	71	13		3	possible applique decoration, 1 incised
12	1	48	115.9	4	0	0	2	40	3		5	
12	2	27	97.8	6	0	0	0	21	3		4	
12	3	212	707.4	63	12	8	33	96	14	4	10	2 incised
12	4	37	97.1	17	2	3	0	15	6			
12	5	174	1654.8	116	4	15	2	37	38		11	1 incised with weave, 1 flange
12	6	368	1860.3	115	5	39	3	206	35	1	12	3 false bases
12	7	286	1633.9	62	11	4	3	175	14	1	6	7 incised, 2 flanges
12	8	56	251.1	19	0	1	0	36	4		1	1 finger swiped
Totals		3918	15876	998	679	207	92	1908	290	17	81	

soil may have destroyed many sherds. It is also likely that the zones with the highest number of sherds may indicate a time when the site had reached its maximum population size.

The acidic soil of Pechtun Ha adversely effected the preservation of surface treatment, thus making an analysis of surface treatment nearly impossible. Of the sherds recovered, very few retained any paint or identifiable incisions. As noted earlier, a significant number of triangular-shaped sherds were found in the ceramic assemblage. A total of 79 triangular-shaped sherds were recovered from the five excavations. The straight edges and sharp points on the sherds give the appearance that that they had been worked into their present shape and possibly were used as tools. The frequency of such tools may suggest a regular work activity taking place at the site and perhaps future use-wear analysis will elucidate the function of these worked sherds. Lopez Varela , McAnany, and Berry (in press) present data from K'axob, a Maya site in northern Belize, where similar forms have been found in the context of a kiln. They suggest that such sherds were fashioned into different shapes so as to shape and decorate pottery during ceramic production. It is conceivable that the 79 triangular-shaped sherds from Pechtun Ha served a similar purpose.

Table 10.2 records the average weight of each sherd, which is found to be significantly different between the two structures excavated. For Operations 10 and 11 (Structure 100), the average sherd weight is 7.9 grams which is significantly higher than the 2.5 grams averaged from

Operation	Zone	Avg. Wt. (g)	% Slipped	% Unslipped	% Striated	% Painted	% Unidentifiable
8	1	2	40				60
8	2	3	33.8	2.6	1.7	5.6	56.4
8	3	2.7	31.4	3.8	1.9	3.2	59.6
8	4	2.5	56.7	0	0	0	43.3
8	6	3	23	6	1	0	70
8	8	5.4	41.8	1.8	1.8	54.5	0
9	1	1.1	0	0	0	0	100
9	2	5.3	9	55	0	0	36
9	3	2.5	6.4	56	0.9	1.8	34.9
9	4	1.5	5.9	65.1	0.2	0.6	28.1
9	5	2.7	17.8	30.4	1.1	0.8	49.8
9	6	3.9	28.3	12.5	8.7	4.8	45.7
9	7	2.2	0	0	41.2	0	58.8
10	1	20.1	41.7	8.3	0	0	0
10	2	12	12.5	16.7	0	0	0
10	3	5.6	13.6	1.2	4.9	0	80.2
10	4	8.1	45.1	2.8	2.1	0	50
10	5	2.9	26.3	0	10.5	0	63.2
11	1	13.7	36.8	0	21.1	0	42.1
11	2	7.8	42.9	8.3	21.4	3.6	28.6
11	3	9.1	36.8	5.3	31.6	0	26.3
11	4	5.7	28.1	2.2	22.5	1.1	46.1
11	5	2.6	28.6	0	42.9	0	28.6
11	6	2.7	19.4	0	27.3	2.2	51.1
12	1	2.4	8.3	0	0	4.2	83.3
12	2	3.6	22.2	0	0	0	77.8
12	3	3.3	29.7	5.7	3.8	15.6	45.3
12	4	2.6	46	5.4	8.1	0	40.5
12	5	9.5	66.7	2.3	8.6	1.1	21.3
12	6	5.1	31.3	1.4	10.6	0.8	56
12	7	5.7	21.7	3.8	1.4	1	62.2
12	8	4.5	33.9	0	1.8	0	64.3

Operations 8, 9, and 12 (Structure 109). These data are supported by Weller's paper on sherd density (Chapter 4). The sherds preserved from Operation 10 are larger and much thicker than those recovered from other operations. Even so, over 50% are still unidentifiable. Table 10.3 is a list of the 24 sherds that are profiled in Figure 10.8. These consist mostly of rim sherds and unique forms. The rims were profiled to provide examples of the types of vessels found at the site. Along with the rims profiles, a Teotihuacan-style slab foot, a possible spindle whorl, and a partial clay ring are shown.

There was a lack of decorated sherds, among those identified. This suggests that either the majority of vessels recovered at Pechtun Ha were utilitarian or that preservation conditions have skewed the record. The discovery of the triangular-shaped sherds and the spindle whorl suggest some level of production at the site. The preliminary sherd analysis indicates primarily utilitarian activities, possibly textile and ceramic production, but perhaps ceremonial activities relating to feasting rituals also took place at Pechtun Ha. A majority of the vessels profiled were bowls and jars, which would suggest the storage of food and water and perhaps the serving of meals during ritually-related feasting activities. Type-variety classification was made for two of the vessels. Both appear to be of the Roaring Creek Red variety, popular in Tepeu 3 or Terminal Classic times. Since

this was the only variety identified, it can be speculated that the site was only inhabited for a short period of time in the Late Classic. This is also supported by the small size of the site and the low to medium density of sherds. When compared with vessel profiles from the caves there were no specific matches, although Roaring Creek Red vessels were found in the surrounding caves.

Operation	Zone	Profile #	Jar	Olla	Plate	Bowl	Comments
9	4	1				X	
9	4	2				X	
9	4	3					
9	4	4	X				
9	5	5				X	
9	6	6				X	
9	6	7	X				
10	1	8				X	
9	6	9	X				
10	4	10		X			
12	6	11	X				
12	7	12				X	
12	5	13	X				Roaring Creek Red
12	6	14			X		Roaring Creek Red
12	5	15					
12	5	16				X	
12	7	17			X		
10	3	18	X				
12	5	19				X	
9	5	20					spindlwhorl
9	6	21				X	ring base
9	4	22				X	ring base
8	8	23					Teotihuacan-style slab foot
10	3	24					ring

Chipped Stone Tools and Debitage

Adam Weik

This section examines the chipped stone tools and debitage (flakes, shatter, and other debris associated with the manufacture and maintenance of stone tools) recovered from the site of Pechtun Ha. Stone tools or lithics were utilized in many aspects of daily Maya life: farming, food production, and hunting being just a few. The analysis of the lithics from a specific site provides a picture of how these tools were used and also indicates methods of production and maintenance of the tools.

Methodology

A total of 567 pieces of debitage and 5 chipped stone tools were recovered from the five operations at Pechtun Ha. Separate analyses were conducted for the debitage and the tools and different aspects of the two groups were examined, including provenience, context, lithic type and

material. The pieces of debitage were first categorized by the provenience (Operation and Zone) and context (specific deposit) from which they were excavated. Contexts include surface, domestic architecture, cache, vacant terrain, non-domestic architecture, midden, intrusive pit, sherd-lined pit, and unknown. The debitage was then classified by type. These types include the following: quarry blank (macroflake >10 cm in width or >10 cm in length), core, core tool, flake (containing a bulb of percussion, platform, and smooth ventral surface), flake fragment (broken flake lacking flake features), fire shatter (debris that does not show signs of flake features but rather signs of burning and cracking), and angular debris (angular chunk instead of a flake). Categorizing the debitage by raw material was the next step. Materials include quartz, chalcedony, Colha chert, an unknown chert source, and chert that is unidentifiable due to subsequent alteration, such as burning or patination. Chert is fine grained, cryptocrystalline stone, usually opaque. Dark bands in the stone distinguish the Colha variety from other chert. Chalcedony is a coarser cryptocrystalline material that occurs in translucent or semi-translucent nodules and is generally considered an inferior lithic source compared to finer-grained materials such as Colha chert.

Alterations to chert, such as exposure to fire or weather, render some of the pieces unidentifiable. These types of alterations were further categorized by analyzing the condition of the debitage. The conditions noted were burning, patination, a combination of burning and patination, modern damage, or no alteration. Signs of burning are characterized by fire cracking, crazing (superficial cracks), pot lidding (circular craters on the surface), and oxidizing (reddening of the surface). Patination occurs when a lithic is exposed to the effects of weather for an extended period of time. This type of chemical alteration is marked by an opaque white layer on the surface of the lithic material. Modern damage comprises scratches or breaks caused by plows or shovels.

Another attribute by which the debitage has been sorted is by the presence of cortex. Cortex is the original surface of the chert nodule, and is usually a brownish-white chalky material. Cortex was subdivided into four categories: no cortex, less than 50%, greater than 50% but less than 90%, and greater than 90%. The next attribute examined was platform characteristics. If there was indeed a platform (the surface where the lithic was struck when it was detached from the original tool), it was then categorized as simple or bifacial. Bifacial platforms occur on flakes that were taken off bifacial tools, and have more acute angles than simple ones and generally multiple platform scars.

The presence of sheen, or polish, on the debitage was also recorded. Polish occurs on the surface of flakes that have frequently come into contact with soft materials containing silicates, such as plants and soft soils. The debitage was further classified by evidence of having been retouched. Small flakes taken off the edges of a flake are indicative of this type of knapping technique. Flakes may have been retouched in order to sharpen a cutting edge. The final attribute by which the debitage was sorted was the presence or absence of edge wear. Small nicks and scratches along the cutting edge of the flake suggest edge wear. The maximum length, width, and thickness of each lithic were measured using calipers. Finally, the combined weight of debitage from each zone was recorded using a triple beam balance.

Almost identical methods of analysis were followed with the chipped stone tools. The only difference was that two variables were added to the analysis. The first was completeness of the tool. The sub categories of completeness include non-diagnostic, complete, proximal fragment, medial fragment, and distal fragment. The second additional variable was tool type. The list of possible tool types includes the following: preform (thinned and regularized flake), oval biface, chunky

biface, non-diagnostic biface, reworked biface (modified by flaking into another tool type), blade, macroblade (<10 cm in length), non-diagnostic blade, reworked blade (modified by flaking into another tool type), tranchet-bit, hammerstone, burin, sidescraper, adz, and uniface.

Results

Operation 8, a 2 x 2 m excavation unit, was located on the southeast corner of structure 109 (see Harrison and Acone, this chapter). This structure was the largest at Pechtun Ha, and was located on the north side of the plaza. The excavation revealed two terraces edged by stone retaining walls (Figure 10.2). Roughly half of the debitage from this operation was classified as flakes, while smaller percentages were recorded for flake fragments, fire shatter, and angular debris. Most of the raw material was classified as “unknown” chert, meaning the source has not yet been identified. Over half of the debitage in this operation exhibited no alteration, although a small percentage of the pieces were burned or patinated. Most of the debitage lacked cortex; only 10% of the sample exhibited any cortical rind. Sixty percent of the pieces were missing platforms, 35% had simple platforms, and 5% of the platforms were bifacial. Sheen, retouch, and edge wear were all generally absent from the Operation 8 lithic assemblage.

Operation 9, a 1 x 2 m unit, was located in the saddle between structures 109 and 105. The excavation revealed a midden deposit containing domestic debris from the eastern side of Structure 109. Most of the debitage from this operation consisted of flakes, with flake fragments, fire shatter, and angular debris each sharing roughly equal percentages. Again, the raw materials from this operation were mostly “unknown” chert. Most of the debitage was unaltered, while small percentages were burned or patinated. Like Operation 8, most of the pieces did not have any cortex. Over half of the debitage had simple platforms, and 3% were bifacial. Polish was present on 40% of the pieces indicative of use-wear, whereas edge wear and retouch were relatively absent. Two stone tools were found in this operation as well. The first tool was classified as an adz, or fluted axe. Its raw material was classified as “unknown” chert, and it had no alterations. Both polish and edge-wear were present on the tool. The second tool from this operation was the medial fragment of a non-diagnostic blade. It too was classified as “unknown” chert, and had no alterations. Polish and edge wear were both present on the tool.

Operation 12 was located between operations 8 and 9. This operation was undertaken in order to expose the facing stones of the retaining wall of the lower terrace of Structure 109. The excavation also exposed more of the midden from Operation 9 that was packed against the eastern side of Structure 109. Most of the debitage (87%) was classified as flakes. The same percentage of raw materials could be identified as “unknown” chert. A rather significant percentage (72%) of the debitage was patinated, while most of the rest was unaltered. Again, most of the debitage from the zone did not have any cortex. About 91% of the debitage had simple platforms, while the remainder had none. Polish was present on approximately 50% of the pieces, 28% exhibited signs of retouch, and 40% showed signs of edge wear. Along with the debitage, two stone tools were excavated. Both were classified as non-diagnostic bifaces, though one was complete enough to categorize it as a medial fragment. One tool was heavily patinated, and contained cortex on one end. This tool showed signs of edge wear, but had no polish. The other had both polish and edge wear.

Operation 10, a 1 x 3 m unit, was located on Structure 100. This structure was an stone mound with cobble fill and a curved retaining wall indicative of a circular structure. Evidence suggests this structure served a non-domestic function (see Harrison and Acone, this chapter). The majority of debitage from this operation was classified as flakes. Slightly over half of the raw material can be classified as “unknown” chert. A significant percentage (90%) of the debitage from this operation was patinated. Cortex was absent on 90% of the debitage. Around fifty percent of the debitage featured simple platforms, while 10% had bifacial platforms. Polish and retouch were present on only 20% of the debitage, while edge wear was indicated on 30%.

Operation 11, a 2 x 2 m unit, was located on structure 100, adjacent to Operation 10. This operation was undertaken in order to expose more of Structure 100 and its interior construction. The majority of debitage in this operation can be classified as flakes, and the remainder as angular debris. All of the chert from this operation was classified as “unidentifiable” because of post-depositional alteration. This was due to the fact that all of the pieces from the operation were patinated. A few pieces had cortex, but most did not. A majority of the pieces from this zone had simple platforms. There was no polish on any of the pieces, and evidence of retouch and edge wear was present on only 13% of the pieces. One stone tool was excavated from this operation; it was classified as a uniface as it was worked on one side only. Its raw material was an “unknown” chert, and it was patinated on both sides. Both polish and edge wear were present on this tool.

Conclusions

The fact that lithic materials preserve well allows for much insight into what was occurring at Pechtun Ha approximately 1000 years ago. Operations 8, 9, and 12 were contiguous units placed side-by-side and contain debris from two distinct contexts. Operation 8 uncovered two terraces at the southeastern corner of Structure 109 while Operations 9 and 12 revealed an adjacent midden. An average of 78% of the debitage found in these operations was classified as either a flake or a flake fragment. This indicates that there was probably active tool maintenance occurring in this area. Also, an average of 33% of the debitage exhibited signs of polish. I assume that these pieces were utilized for domestic activities; for example, clearing vegetation for planting, cutting palm leaves for the thatch structures, butchering, craft production, and so on. The biface, blade fragment, and biface fragment found in Operations 9 and 12 each contained polish on both faces. It is conceivable that these tools were used for daily utilitarian tasks, like those proposed above. A small percentage (11%) of the debitage showed signs of burning which lends limited support to the notion that the midden deposit was periodically burned (see Harrison and Acone, this chapter). It is possible that these burned pieces of debitage, however, were re-deposited and fell from the upper slopes of the mound through erosional processes and may have been burned via activities taking place on-mound. In Operations 8 and 9, an average of 18% of the debitage was patinated, while in Operation 12, the figure was 72%. Nevertheless, the presence of patination on lithics from Zones 3 and 4 suggests that the midden had been exposed to the elements for an extended period of time.

Operations 10 and 11 are located side-by-side on circular Structure 100. Many clues indicate that this structure was used for ritual purposes. Its location along an oxbow and its unique construction and circular shape allude to its importance. Also, many speleothems (broken stalactites or stalagmites from caves) which had ritual meaning, were excavated from the fill of the structure. The most striking aspect of the debitage from these operations is the fact that 95% were covered with

patination. Normally this would indicate that the debitage had been exposed to surface weathering for an extended period of time. I believe, however, that these flakes were deposited here *because* they were patinated. In many caves, the Maya ritually deposited patinated stone tools in homage to the rain god Chac. Due to this structure's association with the caves, as noted by the speleothem inclusions, these flakes were likely placed in the fill of this sacred structure for a similar reason.

There is much evidence at Pechtun Ha that the site was a consumer of lithics, meaning that they probably were trading for finished tools rather than making them, or that we have not yet found the workshops. This is indicated first by a lack of cores from the excavations. Cores are large nodules of chert from which tools and flakes are removed. Another indication is that an average of 95% of the debitage had no cortex, further showing that there was no initial-stage lithic reduction at the site. The fact that nearly all of the flakes from the site were thin, retouch flakes rather than large, primary flakes also suggests the absence of tool production. Furthermore, a fair number of retouch flakes bore evidence of utilization, which indicates that the residents of Pechtun Ha were maximizing the use-life of their chert material.

As a result of this analysis, I can suggest that the Maya of Pechtun Ha were consumers in the larger whole of the lithic industry. Evidence from this analysis also sheds light on the daily tasks in which site residents probably were engaged. This analysis is a preliminary study; further analysis should be undertaken in order to test these results and conclusions.

Fauna

Sally Graver

This section is a description and analysis of the faunal remains from the site of Pechtun Ha, which is thought to have been occupied in the Late to Terminal Classic period. The goal of this analysis is to reconstruct ancient Maya subsistence through the analysis of faunal remains and to recreate the ancient environment through analysis of the habitats of the animals that were uncovered by excavations at Pechtun Ha. The animal remains from this site represent a sample of the faunal contribution to the Maya diet. This section will explore a number of questions about ancient Maya subsistence and environment; such as which animals were hunted, which habitats were exploited, and what processing methods were used.

Methodology

Each bone from Pechtun Ha was analyzed and then recorded according to set criteria. Those criteria include the Lab Collection Bag number, operation number, zone number, taxa, quantity, element, and weight. It was also noted which bones were whole or burnt. All bones were scrutinized for evidence of gnawing or cut marks, but these two properties were found on only two occasions and were placed under the category of "comments." Prior to analysis, each bone was cleaned by washing with water, dry brushing, or by using a bamboo stick, or a combination of these methods. The bone artifacts were recovered from the site most often by screening, but in a few cases bone was uncovered *in situ* using a brush and metal dental pick.

A limited number of resources were available to aid in the identification of the bones. The comparative collection in the lab was limited as it consisted only of the crania of tapir, peccary, and a canine, as well as a turtle shell and the skeletons of an armadillo and a boa constrictor. Stanley Olsen's books, Mammal Remains from Archaeological Sites (1990) and Fish, Amphibian, and Reptile Remains from Archaeological Sites (1980) were useful; however, both books only covered fauna common to the Southeastern and Southwestern United States. Human Osteology (1971), William Bass' detailed book about the human skeleton was helpful in identifying the bones of some of the animals. Unfortunately our library did not contain a book on Belizean or Central American faunal remains. The lack of an adequate comparative collection made it difficult to positively identify a number of species. Xibun Archaeological Research Project staff members, Ramon Placido and Ronaldo Ismael Mátues, who are native to the region, were instrumental in identifying some of the species uncovered. Graduate students on the Xibun Archaeological Research Project, Steve Morandi and Tamarra Martz, contributed their knowledge and helped to identify a number of species as well. The condition of the faunal remains was key identification and analysis. Some bones were highly fragmented and thus were virtually impossible to identify. Sometimes only context could help to identify small, fragmentary bones. When bones were complete, it was almost always possible to identify the species.

Analysis

Below, the analyzed bones from Pechtun Ha are described and organized according to operation and zone. Special attention was paid to identifiable bones that provide information about subsistence and environment at Pechtun Ha. Operation 8 at Pechtun Ha was located on the southeastern edge of Structure 109 and encompassed a wall that represented the corner of a multi-tiered platform and construction fill. Zone 8 contained only one bone and a tooth. The animals represented in this operation were an unidentified large mammal and a human (the only human remains found at Pechtun Ha). Both specimens were found in the construction fill (Zone 8) behind the facing stones that retained a second-tier of the platform. The long bone was not whole and thus could not be identified; however, the bone was large enough to be categorized as a large mammal. This bone had no other special characteristics. The tooth that was uncovered was not whole, but still identifiable as a human premolar. It was heavily worn suggesting tooth wear as a result of the consumption of certain foods. Grains prepared with a *mano* and *metate* can contain small fragments of stone that lead to pronounced tooth wear. Since no other bones were found in this operation it can be assumed that these bones were somewhat randomly incorporated into the construction fill.

Operation 12 was the richest excavation for faunal analysis at Pechtun Ha. This operation was located between Operations 8 and 9 and included a limestone wall that bordered a midden. This midden was marked by a dark discoloration of the soil in the northeast corner of the operation. The soil discoloration was thirty centimeters in diameter and located in front of the bottom strata of the rock wall. Zone 3 of Operation 12 was a culturally rich zone that includes the remains of a large mammal, a fish, and an unidentified animal. A distal phalanx, a middle phalanx, the ends of two distal tibia or radii, and four miscellaneous tarsals or carpals represented the unidentified large mammal. A fish vertebra and two unknown bone fragments from an unidentified animal were also found in Zone 3. Further excavation of this dark soil yielded a great number of *in situ* bones. The bones were delicate and appeared to be smashed in several places. The area yielded the left side of a tapir maxilla with five molars and premolars, a tapir jaw fragment with three molars, and numerous

crushed skull fragments. The bones and the area around them were designated as Zone 4. There were not only tapir skull fragments in this zone but peccary skull fragments as well. Among the tapir bones recovered from Zone 4 were a sub-orbital bone fragment, jaw bone fragments the left and right side first molar, and various tooth fragments. A large number of the skull pieces were burned either partially or completely. A variety of peccary skull parts were also found. The right sub-orbital bone fragment and six peccary molars were exposed in this zone. Along with the tapir and peccary bones, several unidentified bone fragments, small bone fragments, and a claw or tooth from an unidentified species was found.

The midden continued into Zone 5 as collapsed debris deposited in a heap along the eastern side of Structure 109. In this zone the distal phalanx, middle phalanx, and proximal phalanx of an unidentified species were found along with a number of small tarsals or carpals. The phalanges that were uncovered make up a full digit of a large mammal. This mammal was either a peccary or a tapir as those two animals are the largest terrestrial species native to Belize. A carnivore canine lacking enamel, an ulna from a medium-sized mammal, and a number of unidentified bones from unidentified species were present. Also found in this zone were fish vertebrae and a fish jaw fragment with tiny rows of teeth.

Zone 6 of Operation 12 was another rich zone in which many animals were represented. There was a light density of charcoal in this zone, perhaps indicating periodic burning of the trash and/or the dumping of hearths into the midden. The majority of bones from this zone were peccary; over 800 skull fragments were uncovered. Many of these peccary skull pieces were burned as well. The identifiable skull fragments include a left and right parietal skull fragment, one left and two right sub-orbital bone fragments, and one right and three left-sided parietal skull fragments. This information provides a minimum number of individuals (MNI) for the peccary found in this zone. It is apparent that there were at least three peccary represented in this zone because three left-side parietal skull fragments were excavated. This zone contained a few large mammal bones as well: two long bone fragments and a metatarsal epiphysis. A fish jaw fragment with teeth and an ocelot molar also were unearthed in this zone. The unidentified species recorded included a rib fragment, a skull fragment, long bone fragments and a clavicle.

The midden continued in the culturally rich layer of Zone 7. Peccary was again heavily represented here. This zone contained the sub-orbital and upper orbital crest along with many other skull fragments, one molar, and two canines. Zone 7 also yielded another fish jaw with rows of teeth, seven turtle-shell fragments, and unidentified long bone fragments. Zone 8 contained more specimens, contributing to the minimum number of individuals (MNI) for peccary. This included jaw fragments with 34 molars and premolars, 4 canines, and 13 incisors. There were at least four peccary maxilla collected from this zone, and therefore the MNI for peccary is four individuals. The fact that peccary were the most heavily represented species at Pechtun Ha demonstrates how important peccary was to the diet of the Maya. This zone also contained turtle shell, unidentified rib fragments, and small long bone fragments. One of the unidentified rib fragment is unique in that it shows evidence of a butcher mark—the only obvious cut mark among the bones analyzed.

Operation 9 at Pechtun Ha was located between Structures 109 and 105. This operation uncovered a midden. A dark soil discoloration and a high density of artifacts marked this midden. Outside of the area of dark soil, there were very few sherds. Only a few bones were uncovered from this operation. The identified fauna that was recovered includes turtle and a large mammal. The

other four taxa could not be identified. There were seven turtle-shell fragments uncovered in Zones 4 and 6. A long bone fragment from a large mammal and a long bone fragment from an unidentified smaller animal were found in Zones 5 and 6. A pelvis fragment from a small mammal or large amphibian was uncovered in Zone 5 with ten tiny bone fragments of unidentified animals. The bones found in this operation likely resulted from its proximity to the midden of Operation 12 which is located to the west of Operation 9.

Operation 10 was placed on Structure 100, the stone mound at Pechtun Ha. There was a good deal of bioturbation and movement of rocks in this operation. The artifact density was low and the artifacts that were found were probably part of the construction fill or were left after abandonment. The animals represented in the faunal remains from this operation include snake, peccary, ungulate, and several unidentified species. Seventeen snake vertebrae were found in Zones 2 and 3 and would have comprised a medium-sized snake. Zone 2 yielded half of the hoof of an ungulate. Three long-bone fragments from unidentified animals were found in Zones 3 and 4. The right mandible and four molars of a peccary were uncovered in Zone 4 of Operation 10. There were also twenty miscellaneous unidentified bone fragments from an unknown species in Zone 4. The faunal remains from this operation were most likely discarded in the construction fill after these animals were prepared and eaten.

Operation 11 also was located on Structure 100. This part of the stone mound did not contain many bones, and those present probably had been deposited as part of the construction fill. A light artifact density and a high density of limestone rocks marked Zones 2 and 3. The three bones that were found represent an unidentified large mammal and a gibbon. Zone 2 of this operation included a gibbon incisor and Zone 3 contained two unidentified bone fragments of a large mammal. The faunal remains from this operation do not provide much information about subsistence.

Conclusions

The faunal remains from Pechtun Ha provide a wealth of information about the Maya of the Sibun River Valley in Belize. Although there were a small number of each species represented, the faunal remains reveal a glimpse of ancient Maya subsistence and the environment during the Late to Terminal Classic period. The faunal remains from Pechtun Ha also demonstrate how the Maya prepared their food and which animals they preferred; interestingly, the animals upon which the Maya subsisted are still present in the same area today.

Xibun Maya of Pechtun Ha subsisted on and utilized a number of different species of animals. These species included large mammals like tapir and peccary and smaller animals like snake, turtle, fish, ocelot, and gibbon. The peccary was the most heavily represented species at Pechtun Ha. Tapir is Central America's largest native terrestrial animal. The tapir can grow up to six feet long and can weigh between 330 to 660 pounds. Of all the species hunted by the Maya, the tapir provided the largest amount of meat. The second largest mammal hunted by the Maya was the peccary, a hog-like animal weighing between 35 and 85 pounds. Operation 12 contained one tapir skull and the remains of four peccary skulls. This evidence demonstrates that peccary were a popular hunted species and that tapir were also an important part of the ancient Maya diet. Perhaps peccary were more readily available or easier to hunt than other species.

It is interesting that only the skulls of these large mammals were uncovered in Operation 12. This suggests something about food preparation—perhaps the skulls were discarded in the midden because they were the undesirable part of the animal. The long bones and desirable meat parts must have been processed and discarded at an alternative location. Similarly, the presence of the phalanges of a large mammal suggests that this, too, was an undesirable part of the animal. The fact that a number of the tapir and peccary skull pieces were burned suggest that the whole animal may have been cooked over an open fire, with only the exposed bones—or bones covered with a small amount of flesh—getting burned. However, several of the long bones found were burned as well. Another indication of food preparation is the butcher mark on the unidentified rib fragment. This mark indicates that a stone tool was used to strip the flesh from the bone of this animal. It is unclear how the aquatic species were prepared by examining their remains. The presence of gibbon in the faunal remains suggests that the Maya diet was supplemented by a variety of species other than the largest meat producers, tapir and peccary.

It is important to understand the habitats of animals that were hunted by the Maya in order to recreate the prehistoric environment and to determine how far Pechtun Ha hunters traveled in order to obtain meat. The presence of aquatic animals such as fish and turtle suggests that Pechtun Ha residents utilized the Sibun River (located only 250 meters to the south) to obtain food. Belize's native tapir is called Baird's tapir. Baird's tapir is relatively common in less disturbed habitats such as grassy swamps, rainforests, forested hillsides, and flooded grasslands. Baird's tapir is not common in heavily disturbed and peopled environments. The presence of tapir at a small site such as Pechtun Ha suggests that undisturbed habitats lay within easy reach of local hunters. Two species of peccary occur in Belize: White-lipped and Collared peccary. Collared peccary are found in rainforests, deciduous forests, and areas of scattered trees and shrubs. White-lipped peccary reside only in the rainforest. The habitats of these two important subsistence animals demonstrate that the animals hunted by the Maya were native to the area and that the prehistoric environment may have been similar to that of today, that is, largely forested rather than denuded for agricultural fields.

All of the operations at this site provide examples of the variety of faunal species that were consumed or utilized by the ancient Maya. The midden in Operation 12 demonstrates that peccary was a preferred subsistence animal and that large mammals such as tapir were also consumed. The types of bone left in the midden and the alterations they incurred indicate methods of food preparation. The faunal remains from Pechtun Ha provide a rich picture of prehistoric Maya subsistence.

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Chapter 11

Initial Investigations at Pakal Na: A Shrine, a Cave Torch, and the House of a Putative *Cacao* Lord

Eleanor Harrison

Introduction

Pakal Na, a dispersed settlement located in the middle reaches of the Sibun River valley, was the focus of excavation for the second half of the 1999 field season. The site, situated on land owned by the Belize Gravel and Mining Company (BGMC), is perched on an escarpment that gently slopes down to the nearby Sibun River (Map Sheet 2). During the 1999 field season the survey team mapped Pakal Na, a site comprised of single and clustered mounds that formed a linear pattern about a kilometer in length, running along the north side of the Sibun River (Morandi and Norris, Chapter 2). Two plaza groups were the focus of our investigations at Pakal Na: a small plaza group, located in the southwestern part of Pakal Na (Operation 13) and a larger group in the northeastern part of the site (Operations 14, 16, and 22).

Units of Excavation and Field Methods

From March 18 to May 2, a total of four operations were excavated at Pakal Na. Excavations focused on two structures at the site, Structures 127 and 130 (Map Sheets 2 and 8, respectively). Operation 13, a 2 x 4 m unit, was located on Structure 127. Operations 14 (1 x 5 m), 16 (1 x 2 m), and 22 (ca. 1.5 x 1.5 m) were located in and around Structure 130 within the main plaza group of Pakal Na. In both areas, excavation provided an understanding of construction phases and methods of architectural construction and, in the case of Structure 130, revealed a burial context and an adjacent midden deposit. Excavation techniques utilized at Pakal Na are identical to those described for Pechtun Ha (see Harrison and Acone, Chapter 10). The following presents a detailed description of the excavations in all four operations.

Operation 13: Excavations of a Shrine (Structure 127)

Structure 127, located about 400 meters south of the main plaza group of Pakal Na, is part of a small plaza group consisting of three other structures (Structures 126, 128, and 129), which surround all four sides of a central patio (Map Sheet 2). The group of mounds is not cardinally oriented, rather they run along a northeast-southwest axis. Structure 127 occupies the southeastern side of the plaza. This structure is considerably smaller than the other three structures. It measures 6.5 meters (northeast to southwest) by 6 meters (northwest to southeast). Collectively, the structures are positioned on top of a basal platform (Structure 125), which extends about 7 - 8 m along the southeastern or backside of Structure 127. Based on its small size and minimal artifactual debris (with the exception of a prominent pit cache described below), Structure 127 may have functioned as

a shrine structure. The 2 m (north-south) x 4 m (east-west) excavation unit, positioned near the southeastern corner of the platform, was divided in half. The western half of the unit is Square A and the eastern half Square B. The latter revealed a pit cache placed within the final phase of construction, a mud-packed platform that held little to no stone masonry.

Zone 1 in Squares A and B consists of a semi-compact humic layer mixed with orange alluvium that had been disturbed and compressed over the years by intensive plowing. Zone 1 is a clayey silt matrix with a very light density of artifacts, including debitage, obsidian, ceramic sherds, baked clay, and fire-cracked rock. After about 5 cm in depth, Zone 1 interfaced a compact orange and white matrix that appears to be the remains of a relatively intact platform construction at Structure 127.

Zone 2 in Squares A and B consists of an orange matrix that appears to be remains of a floor surface or, more likely, the collapsed remains of a wattle and daub perishable structure that once stood on the Structure 127 platform. The orange-colored matrix slopes downward to the south. The orange layer contains patches of gray and white (Zone 3), which appears to be part of a deteriorated platform construction, restricted to the northeast corner of square B. Excavations defined the extent of the surface of the white platform construction, along with a discrete cut (Zone 4) intruding within the white platform surface.

Zone 3 is restricted primarily to Square B and comprises the white patches of the platform construction that are preserved in the northeastern part of Operation 13. The surface of the platform appears highly deteriorated and weathered and perhaps was exposed to the elements for an extended period of time. The angle of the platform edge reflects the northwest-southeast orientation of the structure and may represent the southwestern side and perhaps southernmost corner of Structure 127 (see Structure 127, Map Sheet 2).

Zone 4 consisted of a discrete pit feature in the Zone 3 platform surface, and was initially identified by a high density of pottery sherds in the vicinity of the pit feature (Figure 11.1). Zone 4 represents a discrete cache deposit, which post-dates but appears associated with the Zone 3 platform construction. Little to no artifacts were found associated with the floor beyond the artifacts within the cache deposit. The pit and associated white platform construction unit appear to have been plowed during a recent episode of citrus cultivation, which ultimately destroyed the top portion of the pit and disturbed its contents. The top portion of what appears to be an overturned vessel found in the pit had clearly been struck. Interestingly, the remains of the clay vessel appear baked, rather than fired as the sherds are friable and deteriorated and the overall shape suggestive of a *comal*. To the south of the vessel were layers of pottery sherds, lying one on top of the other in several layers, seemingly pushed to the south by plowing activity. Also further to the south, five nearly complete obsidian blades and a large, tubular greenstone bead (Figure 11.2) were found. These pieces were identified on the ground surface prior to excavation, but their position (less than a meter to the south of the disturbed cache) suggests that they were once part of the cache assemblage and later were plowed and pushed forward. Charcoal was collected from a relatively sealed context beneath the deteriorated *comal*-like vessel. While the vessel is beyond diagnostic recognition, the C-14 sample may provide an absolute date for the deposit.

The discrete cache feature associated with such ritually charged materials indicates that Structure 127 likely served an important ceremonial role within this group. The regal-ritual contents

of this cache further suggest the inhabitants had access to considerable wealth. However, the small scale of the plaza group, which lacks any signs of masonry construction, is not reflective of an elite

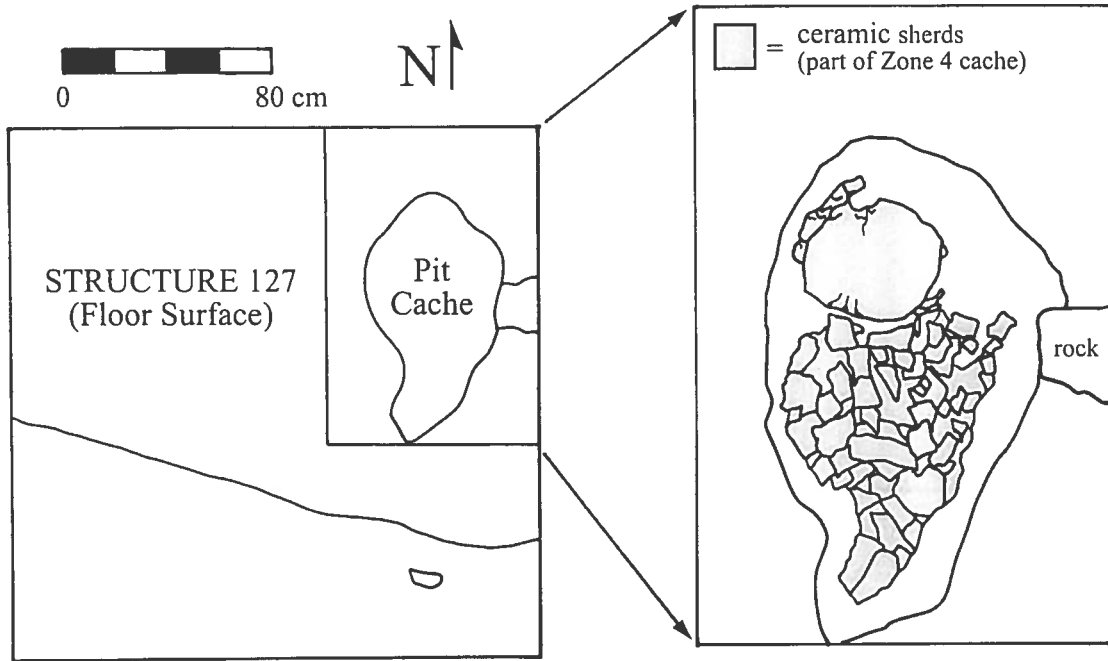


Figure 11.1 Planview of Square B, Operation 13, showing edge of the platform with the location of the intrusive cache pit and a close-up view of the smashed cache vessel.

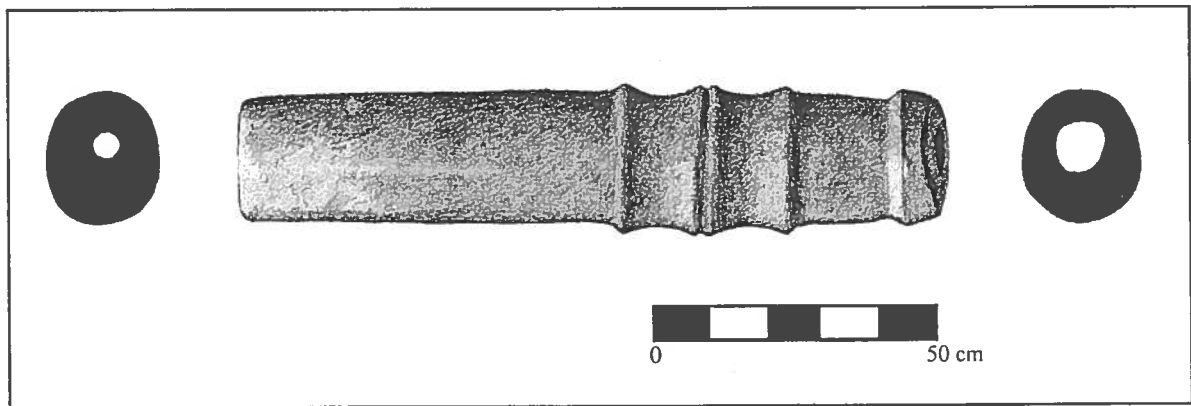


Figure 11.2 Tubular greenstone bead found on the surface of Structure 127, associated with the cache deposit of Operation 13.

status and, furthermore, no other comparable artifacts were recovered from Structure 127. The evidence suggests that certain precious items, such as the tubular bead, may have been heirloom pieces that were acquired through several generations of inheritance before being deposited in Structure 127. The large greenstone bead appears to have been part of elite ornamental attire—a pectoral or belt component—such as adorned nobles during the Classic period (Freidel and Schele

1988). Its anomalous appearance within such a humble context may indicate that this plaza group post-dates the Late Classic, when such regalia would have been strictly in the hands of elite personages, perhaps reflecting the decline and subsequent pillage of Classic centers during the Terminal Classic period. Whatever the case, Structure 127 seems to have functioned as a special-purpose structure during the occupation of the plaza group. While caches are often found in the context of household platforms, the small size of Structure 127 and the quality of the deposit suggest it may have served as a shrine, perhaps honoring the ancestors through inherited memorabilia and the vestiges of their Classic Maya heritage.

In Zone 5, only the southern half of Square B was excavated and the southern tip of the Zone 4 pit-feature was cross-sectioned in the excavation of Zone 5. While the zone consists of a mottled matrix, a reddish-orange compact clayey soil found in the southern half of Square B and also in the northeastern portion of Square A predominates. The compact matrix appears to be part of the construction fill running underneath the Zone 3 white-gray platform surface. The deep orange, compact material seems to taper out as it moves south and west in square A and south in square B, as it slopes downward in these directions. The stratigraphy is extremely mottled in the western and southern sections of Square A. As a result, Zone 5 was taken down arbitrarily. The deep reddish-orange construction fill extends about 40-50 cm from the eastern edge of Square A. The mottling may be due to the mix of collapse covering the slope of the structure as it extends out to the west and south. Artifact density in both squares was light and included debitage, chipped tools, ceramic sherds, three obsidian blade fragments, baked clay, fire-cracked rock, and some flecks of charcoal.

Zone 6 runs directly beneath Zone 5 and consists of a slightly darker brown mottled matrix. There are some discrete concentrations of red sediment in Squares A and B that appear to represent areas of burning. A number of soft pink limestone blocks, suggesting exposure to extreme heat, were noted on the surface of Zone 6, and were better defined at the base of the zone. The deteriorated limestone forms a rough line and appears to relate to the western edge of a dark brown matrix that runs between Squares A and B. It is possible that these stones were part of a wall that defines an earlier construction phase, however, lack of preservation and limited horizontal exposure prevents any solid reconstruction. Two C-14 samples were collected from this zone and may shed light on the time elapsed between this earlier and the overlying construction phase. A light density of artifacts was noted in Zone 5 and excavation ceased at this point due to the lack of preservation and difficulty in excavating the extremely compact matrix.

Architecture and Deposits Associated with Structure 130: the House of a Putative Cacao Lord

Excavations involving Operations 14, 16, and 22 were positioned within the largest plaza group at Pakal Na, located in the northeastern half of the site (Map Sheet 8). This area was the most thoroughly investigated at Pakal Na during the 1999 field season. Unlike the patio group previously discussed, this plaza area is considerably larger and is open on the north side with a series of structures surrounding the other three sides of a central patio. Structure 133 contains a rear platform (Structure 140) and is situated along the east side of the plaza. Structure 130, the largest structure at the site, is positioned along the western side of the plaza. A low, elongated mound (Structure 131) abuts the edge of Structure 130 and stretches northward. Another elongated mound (Structure 132) interfaces the southeast corner of Structure 130 and stretches along the south side of the plaza. Structure 130 also contains a rear platform surface, extending to the west, which was shovel test-

pitted for possible midden deposits (Map Sheet 8). A spike in cultural material found in a shovel testpit along the southern edge of Structure 130 prompted the placement of Operation 16, which ultimately revealed a rich midden deposit. Operations 14 and 22, both positioned along the central axis of the front eastern face of Structure 130, revealed a series of distinct construction phases and several pit features, one of which was a large burial presumably containing the remains of an important Pakal Na community leader. The following presents the details of the three operations. Together, the excavations in and around Structure 130 shed light on the daily and special ritual activities taking place within the leading household of Pakal Na, where a “cacao lord” may have once lived.

Operation 14

Operation 14 consisted of a long trench excavation (1 m north-south x 5 m east-west), oriented 20 degrees east of north (see Map Sheet 8). The unit was placed on the central axis of Structure 130 and was subdivided into Squares A and B. Square B comprised a 1 m x 1 m square in the eastern end of the excavation unit while Square A included the remaining 1 x 4 m within the operation. The purpose of the excavation unit was to better understand the method and phases of construction for the eastern side of Structure 130. Operation 14 revealed two major architectural phases (Phases 1 and 2a) and two pit features, a fire pit and a larger burial pit, both of which were partially exposed in the western end of the unit.

The first phase of construction consisted of an earthen-filled mound covered with a river cobble surface, and possibly faced with a limestone retaining wall. Phase 2a altered the look and feel of the structure substantially, with the addition of as many as five terraces, faced with massive limestone blocks, which led to the top of the mound where presumably a large perishable structure once stood. The large stone-faced terraces created a façade that was probably meant to simulate the monumental stone masonry platforms found at larger city centers within the Maya area. The mound construction, however, contained primarily earthen rather than cobble construction fill. Nonetheless, the Phase 2a architectural modification would have necessitated a large work force and suggests that the family living in this plaza group had gained significant status within the community by this time. The two pit features are clearly associated with the Phase 2a construction. Operation 22 exposed a minor architectural modification to the upper part of Structure 130, with the addition of at least two upper terraces capping the burial feature and effectively heightening the top portion of the structure. This modification is referred to as Phase 2b, but is not discussed in any detail until the review of Operation 22 (see further below). A single plaza floor, exposed in Operation 14, is associated with all phases of construction. The following presents the details of the excavation of Operation 14.

Zone 1 in Squares A and B is composed of loose, brown topsoil that is only a few centimeters thick. The zone contains silty soil with a light to medium density of river pebbles and a light density of small limestone inclusions (1-2 cm in length). The soil matrix has a great deal of root disturbance and contains a high density of organic debris.

Zone 2 is a loose, clayey-silt natural earthen layer directly below the topsoil in Squares A and B. A large root from a nearby tree runs north-south across the unit in the eastern end of the operation. The high density of root activity may have caused a great deal of the disturbance in the architecture of the lower levels of Structure 130. Toward the eastern end of the unit, the top portion of a large facing stone was exposed at the base of Zone 2, running north-south across the unit. The

large stone slab continues into the walls of the excavation unit, indicating that its width is more than a meter. This stone appears to be a front (eastern) facing stone for the façade of Structure 130, confirmed by a deteriorated plaza floor (Zone 13) found to the east of the large facing stone. There is a medium density of smooth, river pebbles and small cobbles within the matrix of Zone 2, possibly representing some spill-out of fill once retained by the large eastern retaining wall.

Zone 3 consists of a natural earthen layer mixed with a light density of tumble. The matrix consists of silty clay with a light to medium density of river cobbles and limestone that increases in density at the bottom of the zone. At the base of Zone 3, a significant number of river cobbles were defined, along with several large cut limestone slabs, similar in size to the eastern retaining wall. The cobble surface and large limestone slabs represent part of the Phase 2a construction, at which time Structure 130 was transformed into a multi-terraced platform. The north and south cross-section maps (Figures 11.3 and 11.4) clearly illustrate the Phase 2a cobble surface encountered at the base of Zone 3 in Operation 14.

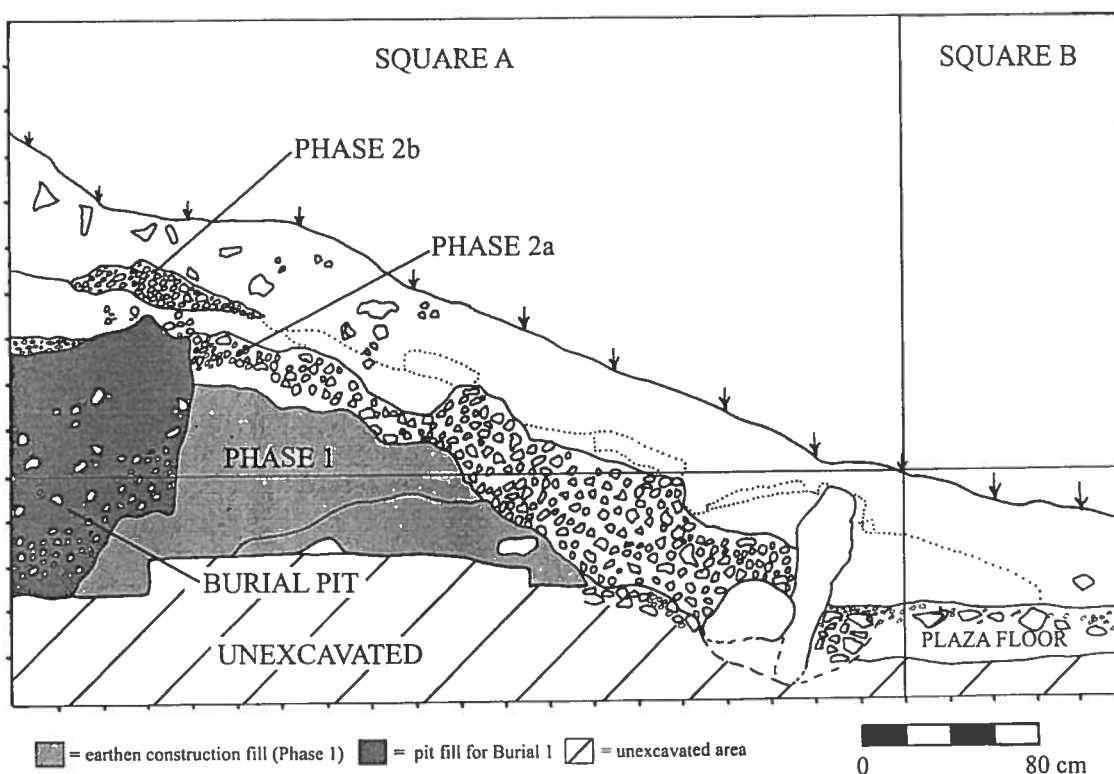


Figure 11.3 North Wall cross-section of Operation 14. Note two pit features intruding into Phase 2a

Zone 4 consists of the upper river cobble surface and construction fill primarily at the western end of Operation 14; it is comprised of a high density of smooth river cobbles that range from 2 to 10 cm in size. A medium density of smooth and angular limestone cobbles was also encountered in the matrix, ranging in length from 2 to 15 cm, which likely represent collapsed terrace retaining walls. As noted above, the river-cobble construction layer excavated in Zone 4 seems to represent several terrace surfaces associated with the Phase 2a construction. Remnants of large limestone slabs, now mostly collapsed, faced the multiple terraces and, in antiquity, would have presented an impressive, all-masonry façade. A compact, gray clay construction fill underlies the Zone 4 cobble surface in the

western end of the unit (Figure 11.4) and is part of the Phase 2a construction. A medium density of artifacts was noted in Zone 4. Notably, two net weights worked from the smooth river cobbles, measuring roughly 10 cm in diameter, were recovered in Zone 4. The cobbles are approximately the same size as others deposited within the Phase 2a cobble layer. At the base of Zone 4, below the gray clay construction fill, another layer of river cobbles was encountered in the western end of the unit; this layer (Zone 6) represents the surface of the Phase 1 construction.

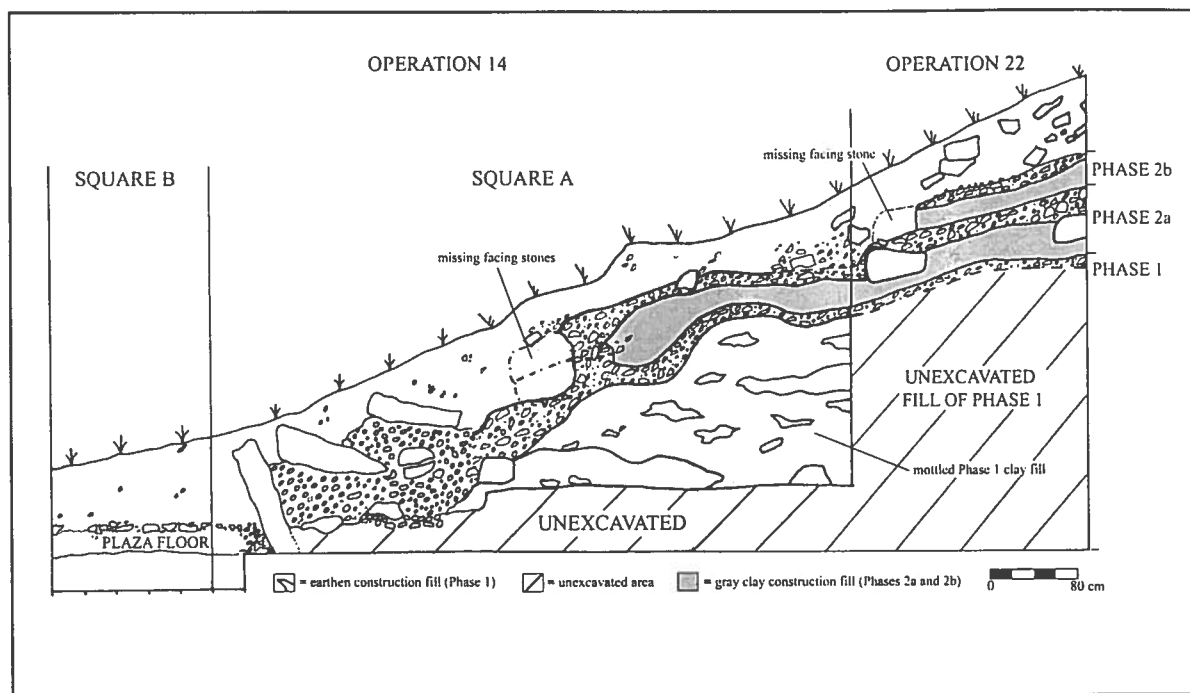


Figure 11.4 South Wall cross-section of Operations 14 and 22

Zone 5 was restricted to Square A and consisted of five of the largest limestone slabs noted throughout excavation of Zones 5, 6, and 7. The limestone slabs are seen in the north and south wall cross-section drawings (Figures 11.3 and 11.4). Only two of the largest slabs could be removed without damaging the integrity of the cross-sections of the excavation unit. Due to root and other natural disturbance, the original configuration of these stones in antiquity is unclear. There are about three stones that appear *in situ*, but the majority of the stones look as if they had slipped from their original contexts. These large stones probably functioned as a series of terrace retaining walls. Excavation of Operation 22 exposed two of the upper terraces in a relatively intact state, spaced roughly a meter apart. If consistently spaced, a total of five terraces may have existed on the eastern side of Structure 130 during Phases 2a and 2b. Presumably, a central staircase also flanked the eastern side of the structure, leading up to the top of Structure 130. Poor preservation and limited horizontal exposure, however, prevented any firm identification of this architectural feature.

Both the north and south cross-sections (Figures 11.3 and 11.4) show two distinct layers of cobbles in the western half of Operation 14, which merge in the eastern half of the unit. The two cobble layers appear to represent different construction phases (1 and 2a), that merge toward the base of the structure on the eastern side. Thus, discerning the construction phases in the eastern end of the unit was difficult during excavation (see Zone 6 below). The western extremity of the south wall

cross-section (Figure 11.4) shows the addition of a terrace surface during the final Phase 2b modification (discussed further below) that was identified in Operation 22. Operation 14, on the other hand, shows Phases 1 and 2a but does not reveal any later modifications that took place along the eastern edge of the structure. This indicates that the lower terraces built during Phase 2a were maintained following the Phase 2b modification, which only altered the top portion of the structure with the addition of at least two upper terraces that were revealed in Operation 22.

Zone 6 removed what was likely a combination of Phases 1 and 2a, although probably predominantly the latter. Some of the Phase 1 cobble layer which overlies the clay-filled mound was removed as Zone 6, but predominantly this zone consisted of a thick layer of river cobbles in the eastern end of Square A that appears to be associated with the Phase 2a construction. In Square B, Zone 6 represents river cobbles that have spilled out from the Phase 2a construction fill directly to the east of the large eastern limestone slab that likely functioned as the eastern retaining wall for Structure 130. Below the river cobble collapse in Square B, a deteriorated plaza surface (Zone 13) was exposed. A medium density of artifacts was recorded in Zone 6 of Square A, while a lighter density was recorded in Square B. Similar to Zone 4, Zone 6 contained several net weights, found within the river cobble fill in the eastern portion of Square A. These worked river cobbles, identical in shape and size to unworked cobbles in the fill, were likely utilized for netting fish in the nearby Sibun River. It is conceivable that the net weights were lost during a fishing expedition, and later recovered when river deposits were mined for construction materials for the building of Structure 130. The repeated appearance of such deposits, however, is suggestive of a purposeful placement, perhaps serving as dedicatory offerings during the Phase 2a construction episode. Zones 8 and 12 continued the removal of the thick layer of cobble fill found to the west of the large eastern retaining wall.

Zone 7 comprised the collapsed remains of an upper terrace retaining wall found in the western wall of Operation 14 (Figure 11.5) that was further exposed in Zone 3 of Operation 22 (Figure 11.6a). Operation 22 would reveal that these stones represent two consecutive terrace constructions affiliated with Phases 2a and 2b. The south wall cross-section of Operation 22 (Figure 11.4) shows the Phase 2a cobble surface defined at the base of Zone 7 stepping up to a one course-high terrace surface and running underneath the second course of stones, which represents the upper Phase 2b terrace wall. The matrix of Zone 7 consisted of a semi-compact clay soil with flecks of charcoal and ash, and fire-cracked rock inclusions. Overall, the deposit contained a light to medium density of artifacts with evidence of burning. At the base of Zone 7, a portion of the Phase 2a terrace surface in the western end of Operation 14 was defined, represented by a concentration of small limestone pebbles and river cobbles (Figure 11.5). Portions of two pit features (Zones 9 and 17), one superimposed on top of the other, were defined at the base of Zone 7. The Zone 9 pit represents a secondary fire pit dug into the surface of Zone 17 and a portion of a large cut of a burial deposit. Both pits cut into the Phase 2a terrace surface and are clearly identifiable in the west and north wall cross-sections (Figures 11.3 and 11.5). In sum, these pits are associated with Phase 2a and were later capped by the Phase 2b construction modification, described in Zone 3 of Operation 22. The western portion of the Phase 2a terrace surface exposed at the base of Zone 7 was excavated separately as Zone 10. The floor surface measured over 10 cm in thickness and contained an associated compact gray clay fill layer, excavated as Zone 14.

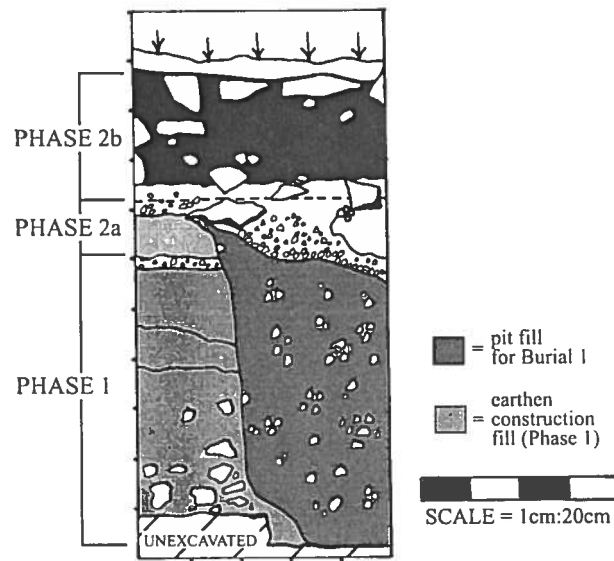


Figure 11.5 West wall cross-section of Operation 14 showing two pit features

Zone 8, primarily in the western half of Square A, consisted of around 25 cm of clay construction fill associated with the top portion of the Phase 1 clay core construction. The zone underlies the associated Phase 1 cobble fill layer excavated as Zone 6 in the western half of the excavation unit (Figures 11.3 and 11.4). A small portion of the lower layer of river cobble fill remaining in the eastern end of Square A, and likely associated with Phase 2a, also was removed as part of Zone 8. The matrix of Zone 8 consisted of silty clay with a significantly lighter density of river cobbles. In the western part of the unit, the matrix was virtually devoid of inclusions. At the base of Zone 8, the tops of several cut limestone blocks were defined, running north-south across the center of the eastern half of Square A, embedded into the Phase 1 clay construction fill (see Zone 21 below and Figure 11.4). While admittedly crude in construction, with only a couple of stones resembling any sort of linear pattern, the single course of stones could be the remains of a Phase 1 exterior retaining wall which was partially dismantled when Phase 2a was constructed on top of it.

Zone 9 is a fire pit feature (Figures 11.5 and 11.6b) associated with the Phase 2a construction, briefly discussed above. The pit is associated with, but post-dates, a large burial pit feature (Zone 17). Zone 9 in Operation 14 revealed a small portion of a shallow pit dug into the surface of the burial cut. Both pit features were better defined in Zone 4 of Operation 22 (Figure 11.6b). Zone 7 comprised the artifact-rich fill of the pit feature that was exposed in Operation 14. The pit feature was lined with small limestone pebbles and contained evidence of burning, in the form of charcoal, ash, and fire-cracked rock. It yielded a relatively high density of cultural material, including animal bone, freshwater shell, a fragment of a bifacial tool, ceramic sherds, debitage, and baked clay material. The pit feature may be the remains of a hearth, however, its placement on the central axis of Structure 130, directly above a burial cut, suggests a ritual purpose. Only a portion of the pit was exposed in the western end of Square A, and appears to be about 25 cm at its deepest point. The remainder of the pit was revealed in Zone 4 of Operation 22.

Zone 10 is a portion of the Phase 2a terrace cobble surface, measuring 10-15 cm in thickness and positioned directly beneath the Zone 7 collapsed debris. The Zone 10 surface is associated with the two pit features (Zones 9 and 17). Zone 10 comprised a small area (roughly 30 cm [east-west] x 40 cm [north-south]) to the south of the Zone 9 pit feature in the southwestern corner of Operation 14. Defined as a surface, the matrix consisted of a high density of small limestone pebbles and river cobbles. Both pit features appear to cut into this terrace surface and post-date Zone 10. At the base of Zone 10, the compact gray clay fill associated with the Phase 2a construction was exposed and removed separately as Zone 14.

Zone 11 is directly below Zone 8 in the western half of the unit, and consists of the compact earthen construction fill of Phase 1, that is, the inner core of Structure 130. The matrix is mottled and contains intermittent flecks of reddish clay material. The soil is mottled due to the basket-load deposition of the strata on a relatively steep slope that descends to the east. The various colors of soil may represent different clay sources mined for construction and may signify gradual stages of the mound-building process. A cache deposit and a second burial, both lacking intrusive pits, were found within the Phase 1 core construction fill in Operation 22 and lend further support to the notion of a protracted mound-building event for the initial building phase of Structure 130. The north and south cross-sections (Figures 11.3 and 11.4) illustrate the large amount of earthen fill that served as the central core of construction for Structure 130.

Zone 12 represents the remaining lower layer of river cobbles that were excavated as part of Zones 6 and 8 to the west of the eastern retaining wall. The cobble fill lies directly behind the large eastern facing stone in Square A and appears to be part of the Phase 2a construction episode. At the base of Zone 12, a surface of white limestone cobbles was defined. This construction fill represents the remains of the plaza surface, also identified in Zone 13 of Square B to the east of the large facing stone. The large limestone slab, defined as part of Zone 5, clearly cuts into the plaza floor and the floor continues to the west behind the facing stone, interfacing the earlier Phase 1 construction (Figures 11.3 and 11.4). Excavation of Zone 12 revealed that the large limestone slab, described as the eastern facing wall of Structure 130, post-dates the construction of the plaza surface, which was utilized throughout all building phases of Structure 130.

Zone 13 consisted of the limestone cobble fill of the plaza floor to the east of Structure 130, found mainly in Square B. Only a small portion of the floor, directly to the east of the large limestone slab, was excavated in Square A. The surface of the plaza floor construction measures roughly 5 to 10 cm in thickness and is a fairly level surface. The layer is comprised of a high density of limestone cobbles mixed with silty clay (Figures 11.3 and 11.4). The plaster or packed earthen surface that presumably overlay the cobble fill has since deteriorated. Artifact density is relatively high, including sherds (several that appear diagnostic), debitage, an obsidian blade fragment, and some baked clay material. The high level of cultural material associated with the plaza floor construction suggests the secondary use of midden debris and may indicate a longer occupation level in contrast to the earlier discussed Structure 127 in which construction fill was virtually devoid of artifactual material. A cobble-free construction unit (Zone 15) was defined beneath the Zone 13 plaza floor.

Zone 14 underlies the deteriorated pebble surface of Zone 10 and the excavated area encompasses similar dimensions, roughly 30 cm (east-west) x 40 cm (north-south). The zone, confined to a small area in the southwest corner of Operation 14, consisted of a compact, gray clay

construction fill associated with Phase 2a construction and the cobble surface of Phase 1. The gray clayey fill was about 15 cm thick, and contained small river pebbles which increased in size and density toward the base of the zone (see Zone 16 below). The gray fill and overlying cobble floor surface defined in Zone 10 appear to be part of a terrace construction, which run underneath the upper Phase 2b terraces exposed in Operation 22.

Zone 15 consists of a cobble-free construction fill, underlying the remains of the limestone cobble construction of the plaza floor (Zone 13). The zone is about 20 cm thick and the matrix contains loose, silty clay with a light density of small limestone pebbles. Artifact density is extremely light and it appears that the zone interfaces a natural earthen layer midway through the zone. Excavations in Square B ceased at this point.

Zone 16 underlies Zone 14 in the southwest corner of Operation 14 and represents a top portion of the Phase 1 cobble surface and clay construction fill. The zone comprises a thin cobble layer and an underlying clay-filled matrix that contains a light density of limestone pebbles, but is otherwise devoid of inclusions (Figure 11.4). There is a light density of artifacts with some flecks of charcoal present. Several different colored matrices interface Zone 16 to the east at the same elevation. This mottled matrix is similar to the “basket-load” deposition of the Phase 1 earthen construction. These discrete soil deposits are part of the same construction sequence, however, attempts were made to remove them separately (see Zones 18, 20, 21, and 23 below).

The southern end of a large burial cut associated with Phase 2a was exposed in the western part of Operation 14. Zone 17 represents the top portion of the pit fill (Figures 11.3, 11.5 and 11.6b). The large burial pit cut through the Phase 2a terrace construction and intruded deeply into the clay core of the earliest phase of construction. The pit, placed on the central axis of Structure 130, is about 120 cm in depth and contains a burial deposit at the base of the pit (Zone 22). The cut of the burial pit, further exposed in Operation 22, appears to have been capped with a cobble surface which sealed the pit and created a surface flush with the surrounding Phase 2a terrace surface. When the inhabitants of Structure 130 dug the immense burial pit, a large portion of the Phase 2a terrace construction was dismantled and appears to have been rebuilt during the Phase 2b architectural modification, which effectively heightened the top portion of the structure (see Zone 3 of Operation 22). After 25cm in depth, the burial fill continued, but was arbitrarily divided into a new zone (Zone 19).

Zone 18, located below Zone 11, represents one of the mottled soils noted within the Phase 1 clay construction. The zone is a small area located within the southern portion of the excavation unit, and extended about 10cm in depth. The clayey matrix of Zone 18 is significantly redder in color, but like Zones 8, 11 and 16, it contains little to no inclusions and was virtually sterile. Zone 18 abuts the south side of the large burial feature, which cuts deeply into the clay core construction fill. The other mottled soils of Phase 1 were removed separately (as Zones 20, 21, and 23)

Zone 19 is more of the fill of the burial pit, located directly below Zone 17. The matrix of the fill contains a high density of fire-cracked rock and other evidence of burning. The pit fill is a dark organically-rich matrix with a relatively high density of artifacts compared to the surrounding earthen fill which is relatively sterile. The pit fill also contains a light to medium density of limestone and river pebbles, unlike the earthen fill that is relatively devoid of inclusions. The stark

contrast between the pit fill and the clay construction fill is best illustrated in the north and west wall cross-sections of Operation 14 (Figures 11.3 and 11.5).

Zone 20 represents one of the mottled soils within the Phase 1 clay construction fill. The matrix consists of a yellowish-gray clay construction fill, similar in color and texture to Zone 11. The construction fill contains no inclusions and few artifacts were recovered.

Zone 21 is more of the core construction fill, adjacent and to the east of Zone 20. The matrix is an orange-red sediment containing little to no inclusions and has an undulating surface, indicative of basket load construction. The matrix is virtually sterile in terms of cultural remains. In the eastern part of Square A, a rough line of stones, initially identified in Zone 8, were fully exposed at the base of Zone 21. The stones may represent the remains of an earlier, partially dismantled retaining wall, which appear to line the eastern edge of the Phase 1 clay-filled mound. The south wall cross-section of Operation 14 (Figure 11.4) shows the stone “retaining wall” positioned along the eastern edge of the Phase 1 earthen mound, along with the plaza floor abutting the eastern edge of this initial construction episode of Structure 130.

Zone 22 comprises a dark-colored fill from the bottom of the burial pit feature, in the northwestern end of the unit (Figure 11.3). The pit appears to taper significantly toward the base of the burial pit and only a small amount of the fill was removed as part of Zone 22. The intrusive feature was identified as a deep burial pit when several toe bones protruding from the north wall were recovered from the bottom section of the pit (Figure 11.3).

Zone 23 is more of the earthen construction fill associated with Phase 1, located directly below Zone 8 and to the west of Zone 12. The silty-clay matrix is mottled, compact, and contains very few inclusions and cultural material. Together, Zones 8, 11, 16, 18, 20, 21, and 23 comprise the initial clay core construction sequence, referred to as Phase 1. The Phase 1 clay mound extends over a meter in height within Operation 14 (Figure 11.4). Excavations, however, stopped prior to reaching a natural earthen layer beneath the plaza surface in Square B. If the natural earthen layer is a relatively level surface extending under Structure 130 further to the west, the maximum height of the Phase 1 core construction at its highest point in Operation 22 would measure over 1.80 meters. The basket load stratigraphy noted throughout the earthen core construction reflects the most likely method of construction. Clay sources mined near the river would have been transported up to the site in baskets and appear to have been thrown on top of a prepared natural earthen surface in order to build up the initial mound construction. The associated pebble surface and possibly a series of stone retaining walls covered this clay core during Phase 1. Due to time constraints, excavations in Operation 14 ceased at this point.

Operation 22

Operation 22 is an irregular shaped unit (Figure 11.6), measuring 2.5 m x 2.5 m minus a 1 x 1 m sq in the southeast corner, which marks the western end of Operation 14. Operation 22 expanded the excavation to the north and west in order to expose more of the pit features initially identified in the north and west cross-sections Operation 14 (Figures 11.3 and 11.4). Excavations in Operation 22 revealed two pit features associated with burning events and a portion of a large burial interment.

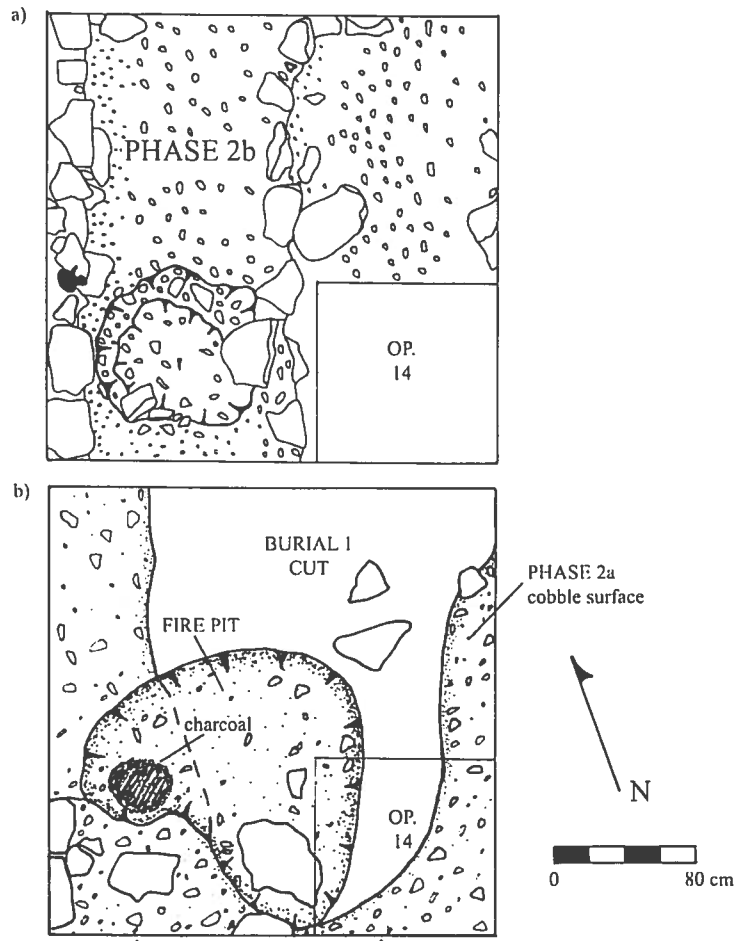


Figure 11.6: Planview of Operation 22, Phase 2 construction: (a) Phase 2b terrace surfaces capped the two pit features of Phase 2a; (b) earlier Phase 2a, a partially dismantled terrace showing the cut of the two pit features.

The excavation served to clarify the series of construction events associated with Structure 130. Time did not allow for the excavation of the entire burial and it was carefully covered with back fill. Proper excavation of the large burial is planned for the 2001 season, at which time it will be fully documented in the 2002 Interim Report.

The Phase 2b terrace modification, which capped the large burial feature, was exposed in Operation 22 (Figures 11.4 and 11.6a) and mirrors the configuration of the earlier Phase 2a terrace. An additional course of stone was added to the existing terrace retaining wall, which runs north-south through the center of Operation 22, and an overlying terrace surface was constructed at this time. Together, archaeological investigations carried out in Operations 14 and 22 defined what appears to be the entire sequence of construction (Phases 1, 2a, and 2b) for Structure 130. As noted above, during the Phase 2a building modification Structure 130 was transformed into an impressive monumental construction, with as many as five terraces on the eastern side of the structure leading up to what was likely a large perishable structure perched on the top of the platform. Large stone slab walls retained the earthen-filled terraces, which appear to have been evenly spaced about a

meter apart. The large scale and impressive masonry façade of the structure suggests the household structure belonged to an elite family who likely governed the affairs of the Pakal Na community. The following presents a detailed description of the zones that precede the burial context in Operation 22.

Zone 1 consists of the top zone, a loose, dark matrix containing a high density of root mass and a light density of artifacts. At the base of Zone 1, a high density of limestone cobbles appeared running north-south along the western edge of Operation 22, approximately 25 cm below ground surface. This line of stones represents a retaining wall of a third terrace, the surface of which is west of the excavation unit and was, therefore, not exposed in Operation 22 (Figure 11.6a).

Zone 2 consists of the tumble and silty-clay matrix fallen from the eastern side of Structure 130. The tumble comprises a medium density of limestone cobbles and cut stones, presumably part of the facing for the two terrace retaining walls ultimately exposed in Operation 22. At the base of Zone 2, a two-course high retaining wall was defined along the western edge of the excavation unit (Wall 1), which rested on a deteriorated packed river cobble surface (Figure 11.6a). This surface slopes downward somewhat and extends out to the east about a meter before it interfaces a lower retaining wall (Wall 2), the collapsed remains of which were noted as Zone 7 in Operation 14. This lower retaining wall, which bisects the center of Operation 22, was built directly over the earlier Phase 2a terrace. The later Phase 2b construction reused the first course of stone from this wall and added another course of cut limestone blocks. The two-course high wall rests on a lower terrace surface partially exposed in the western end of Operation 14 and in the eastern side of Operation 22 (Figures 11.4 and 11.6a). This lower terrace surface, found running underneath the upper terrace, appears to be part of the Phase 2a construction that was maintained during Phase 2b. The east wall of Operation 22 cuts off what appears to be a third, lower retaining wall (Wall 3). Approximately a meter east of Wall 2, there are several large and evenly spaced stones positioned along the eastern edge of the pit (Figure 11.6a). These stone hint at the existence of a third, lower retaining wall at this location. This third terrace wall would have cross-cut Operation 14, however, due to its collapsed state and limited horizontal exposure, the wall was not identified during excavation. The three terrace walls are spaced about a meter apart and the two upper walls (Walls 1 and 2) are built with at least two courses of stone and measure about 40 cm in height. The height of the terraces, when intact, suggests that they may have also functioned as stairs, which likely led up to a perishable house structure perched on top of the platform. Artifacts recovered from Zone 2 include animal bone, debitage, chipped tools, obsidian blade fragments, sherds, and several *mano* fragments. The utilitarian debris suggest a residential function for Structure 130 and the sheer scale of the structure indicates an elite domicile.

Zone 3 consists of just the upper Phase 2b terrace surface and the associated underlying gray clay construction fill (approximately 35 cm in depth). The matrix of the packed cobble surface consists of a silty-clay soil with small limestone pebbles and river cobbles. The underlying construction fill comprises a compact, gray clay fill with only a light density of inclusions. Artifact density is light, and contains similar domestic refuse as found in Zone 2, including another *mano* fragment. At the base of Zone 3, the entire cut of the secondary fire pit feature noted as Zone 9 in Operation 14 was exposed on the surface of the lower terrace and was partially eclipsed when the upper terrace was constructed during Phase 2b. The shallow pit was dug directly into the surface of the burial cut, and may have served a ritual purpose, rather than simply a domestic function such as a hearth feature. It was excavated separately as Zone 4 (see below).

As noted in Zone 9 of Operation 14, the secondary pit feature appeared to represent a fire-related activity. Evidence of burning extended throughout the pit feature. The pebble fill consists of a high density of fire-cracked rock and contains some charcoal and ash. The matrix is significantly darker and more reddish in color, appearing rich in organic remains in comparison to the adjacent gray, clayey construction fill of Zone 5, which surrounded the fire pit and burial cut. At the base of Zone 4, the cut of the burial pit feature was defined in the context of the Zone 5 compact gray clay construction fill associated with the Phase 2a terrace and appeared extremely large in size. At the base of the burial cut, which was located approximately 75 cm below ground surface, two portable-size speleothems, which appear to be part of the same stalactite cave formation, were identified. Caves were seen as powerful portals to the underworld where the gods and ancestors were housed. It is conceivable that the cave formation physically and spiritually linked the primary interment within this burial to the world of the supernatural and deceased. Furthermore, the physical and symbolic importance of the cave formations suggests that the interred not only made visitations to such ritual locales, but also may have led such ceremonial pilgrimages during his or her lifetime. A nearly complete ceramic torch holder, necessary for lighting the way into the dark recesses of the caves during such pilgrimages, was found associated with Structure 130 in the adjacent midden of Operation 16. Together, the data offer intriguing physical evidence of a spiritual dialogue occurring between focal points of the sacred landscape and the local inhabitants of the Sibun settlements. The cave associations, coupled with the central location of the burial on Structure 130, the large dimensions of the pit, and the labor necessary for such a construction, are suggestive of a final resting spot for an exceptionally important individual, likely one of Pakal Na's community leaders.

The large burial cut defined in Operations 14 and 22 clearly extended further to the north beyond the limits of excavation. Time, unfortunately, did not allow for complete excavation of the burial deposit during the 1999 field season and the excavation units were covered carefully. Expansion of Operation 22 is planned for the spring field season of 2001 and finds will be fully reported in the 2002 XARP Interim Report.

Operation 16: A Midden Deposit

Prior to the excavation of Operation 16, a systematic shovel test-pitting operation was performed along the western and southern sides of Structure 130. Like Pechtun Ha (see Harrison and Acone, Chapter 10), the purpose of the test-pitting operation was to determine the locations of possible midden deposits in order to assess time depth and occupational duration. Shovel Test Pit (STP) 34, situated along the southern side of Structure 130 and to the west of Structure 132 in a saddle between the two structures, offered the highest density of cultural debris and seemed likely to contain a midden deposit (see Map Sheet 8). Operation 16, a 1 m (north-south) x 2 m (east-west) unit, was positioned over the STP and, upon excavation, revealed a rich midden deposit resting on a deteriorated baked clay surface. The enigmatic surface appears to represent a low platform extension, similar to Structure 131 to the north, stretching from the southeast corner of Structure 130 and connecting with Structure 132 (Map Sheet 8). The following presents the details of the excavation, including a number of important finds relating to the midden deposit and an interpretation of the possible uses of the enigmatic baked clay surface proximate to the largest household structure at Pakal Na.

The topsoil of Zone 1 is an organic-rich humic layer that contains a high density of roots and a light density of inclusions. Overall, there is an light density of artifacts, including pottery sherds,

baked-clay material, and fire-cracked rock. A net-weight, made from a river cobble, was found in Zone 1 (approximately 90 cm below datum) and is identical to others found in Operation 22. At the base of Zone 1, the matrix becomes increasingly compact.

Zone 2 consists of a semi-compact silty-clay earthen layer that runs underneath the root-filled top zone. The matrix contains a light density of river pebbles (0.5 to 3 cm in length) in what appears to be an earthen alluvial deposit, and is most likely wash-off from the adjacent structures to the north and east. The artifact density, including sherds and debitage, increases in Zone 2, especially in the eastern part of the unit. The midden revealed at the base of Zone 2 appears to have been deposited over the platform extension that stretches from the southeast corner of Structure 130. Contact with this surface defined the base of Zone 2; the underlying artifact-rich layer was removed as Zone 3.

Zone 3 represents a significant spike in cultural material, especially in the eastern half of the unit. The top of the midden slopes downward to the west and appears to be heaped against the western side of the platform extension. There is a sharp contact between the midden debris and the upper earthen layer excavated as Zone 2, evident in north wall cross-section of the unit (Figure 11.7). Containing a heavy density of artifacts—especially debitage and ceramic sherds—this zone included a number of large potentially diagnostic rim sherds. The matrix of Zone 3 is extremely compact and consists of a silty clay soil. There is a light density of inclusions, including one piece of limestone (10 cm in length) and river pebbles up to 15 cm in maximum dimension. Although the midden deposit continues, Zone 3 was ended arbitrary after 20 cm and Zone 4 declared.

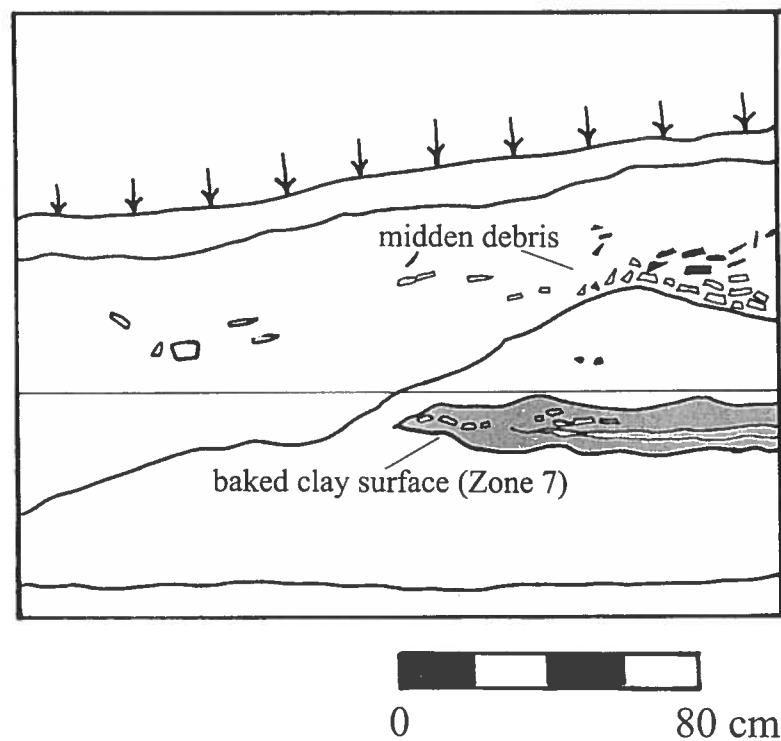


Figure 11.7: North wall cross-section of Operation 16, showing the midden deposited on top of the baked clay surface.

Zone 4 is similar to Zone 3, consisting of a semi-compact, silty-clay matrix with a light density of river pebbles (2-4 cm) with the addition of some small river cobbles (5-15 cm). The matrix is mottled and contains mostly a 7.5 YR5/6 soil color, intermingled with concentrations of dark yellowish brown matrix (7.5YR 4/4 brown) that contain burned patches with small particles of charcoal. There also are larger areas of lighter soil (10YR 5/4), running along the western side of the unit, and another distinctly colored soil (5YR 4/6) found along the northern edge of the unit. The mottled soils appear to represent remnants of enigmatic features outlined on the surface of the midden. In Zone 4, the rich midden yielded an increasingly heavy density of artifactual debris, including large refittable ceramic sherds, debitage, animal bone, a groundstone *metate* fragment, a nearly complete obsidian blade, and charcoal (from which samples were collected for C-14 dating).

Zone 5 consists of a compact, silty clay matrix that contains more of the midden deposit. Artifact density tapers off slightly in this zone, but is still relatively heavy and includes ceramics, debitage, animal bone, and several obsidian blade fragments. A number of significant artifacts were recovered from Zone 5, including a nearly complete ceramic torch holder, which was found along the western edge of the excavation unit (Figure 11.8). As noted above, the torch holder was perhaps utilized during ritual pilgrimages to the dark caves within the Sibun karst. Cut speleothems associated with a circular shrine structure at Pechtun Ha were identified during the 1999 field season (see Harrison and Acone, Chapter 10). In addition, the small portable stalactite formations found in the context of the large burial cut within Structure 130 at Pakal Na (see Operation 22 above) seemingly confirm that special visitations were made to these dark caverns. Portions of speleothems were removed from the caves and transported back to the settlements for ritual purposes. The formations appear restricted to elite contexts and may indicate that such cave rituals were strictly an elite activity. A large sample of charcoal, collected from the vicinity of the torch holder, might be the remains of an exhausted pine torch. Similar remains have been recovered from Sibun caves including Actun Polbilche and Tiger Cave (Pohl and Pohl 1983:32), as well as Pine Torch Rockshelter (see Peterson, Chapter 4).

Another notable find from Zone 5 includes a smashed, but complete vessel recovered at the base of the zone. A dark reddish-brown stain, sectioned by the north wall, appears to have been a large burned area that occupies about half of the total area of the excavation unit. A cluster of ceramic sherds found in the center of the stain appears blackened due to severe burning. A large chunk of charcoal also was collected (FCB#873) for C-14 dating from this locale. The data indicate that the midden either contains re-deposited hearth dumpings or was perhaps periodically burned throughout its use. Additional evidence of burning is apparent in the southeast corner of the unit where a high density of ash, charcoal and red earth was noted. A soil sample (FCB#886) was taken from this area for future sediment analysis.

Zone 6 represents the base of the midden deposit. The matrix is an organic-rich soil containing flecks of charcoal, and is loose to semi-compact with few inclusions. The matrix of Zone 6 contains a light density of artifacts relative to previous zones and includes ceramic sherds and several obsidian blade fragments. The base of the midden overlies a compact, baked clay surface (Zone 7), which appears to represent a living surface (Figure 11.8). The Zone 7 surface was defined in the eastern end of the unit and the matrix surrounding the surface was removed as part of Zone 6. Several stains, possibly postholes, were identified in the southwest corner of the excavation unit at the same elevation as the Zone 7 surface, suggesting that the deteriorated surface was at least

partially covered in antiquity. The possible posthole features extend roughly 5-10 cm in depth, and intrude into the remains of construction fill underlying the level of the baked clay surface.

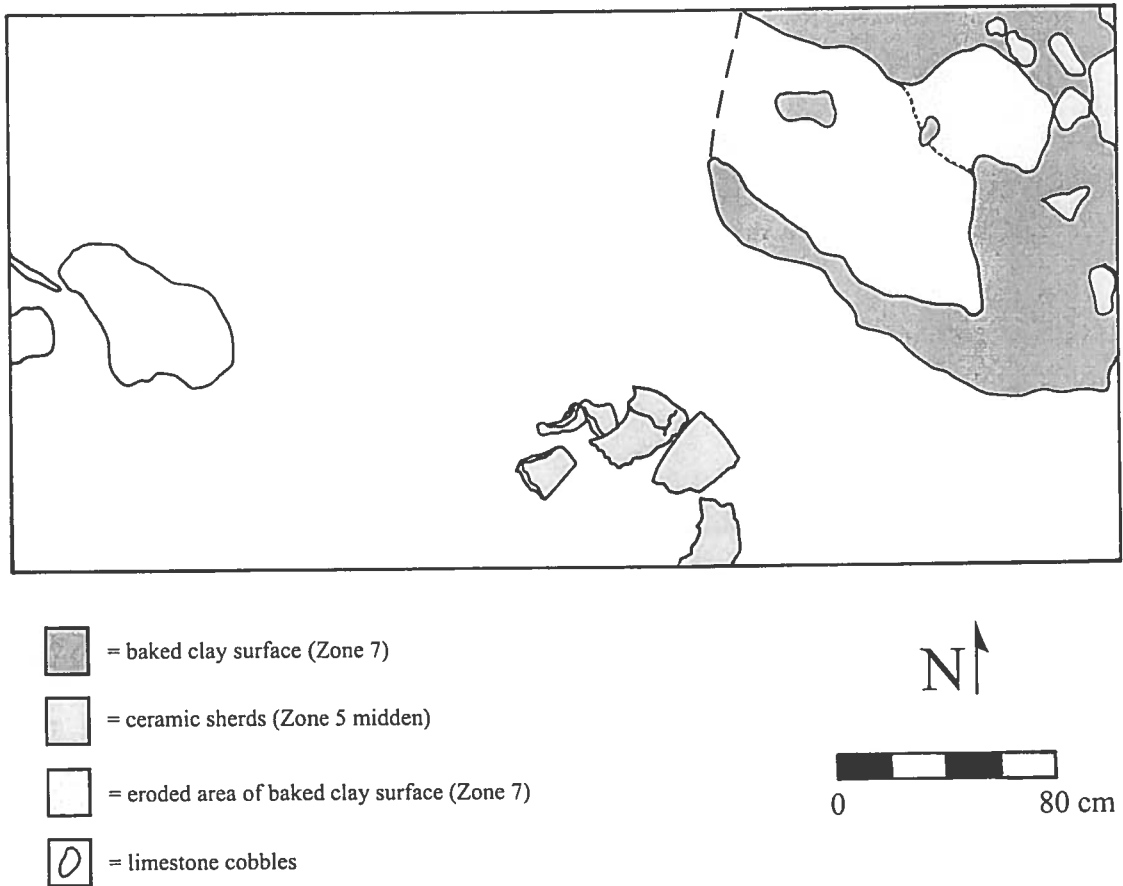


Figure 11.8 Planview of Operation 16, showing the baked clay surface with remnants of the overlying midden deposit. Note the possible posthole features and the ceramic torch holder in the western half of the unit.

The compact, baked clay surface of Zone 7, preserved only in the eastern portion of the unit, is an orange-red color (Figure 11.8). The position of the living surface suggests that it is part of the low platform extension stretching from the southeast corner of Structure 130. The surface is approximately 5-10 cm thick and contains an underlying 15 to 20 cm of earthen construction fill which was also removed as part of Zone 7 (Figure 11.7). The construction fill consists of a semi-compact silty clay with little to no inclusions. Immediately to the south of the terminus of the Zone 7 floor, there is evidence of burning. Clusters of large sherds were recovered, a number of which lie flat on the surface, further suggesting its use as a floor in antiquity (Figure 11.8). The position of the baked clay surface, seemingly part of the low platform extension attached to the southeast corner of Structure 130, and its association with the midden refuse suggest a utilitarian function directly involving the main household unit at Pakal Na. One theory, which necessitates further testing, is that the baked clay surface was a drying and processing area for cacao, the chocolate bean whose production continues today in the middle and upper reaches of the Sibun Valley. Traditional Maya villages in the Toledo District of Belize use similar facilities for drying cacao and inevitably they are located proximate to the main household (McAnany, personal communication, 1999).

Zone 8 consists of a silty clay matrix with little to no inclusions. Zone 8 is 20 cm deep and provided a subsurface for the Zone 7 baked-clay layer. The matrix is looser than Zone 7 and the artifact density decreases significantly in Zone 8 (confirming that the midden deposit of Zones 4-6 rested on top of the Zone 7 surface).

Zone 9 is a shovel test pit, a probe that sought a culturally sterile level at the base of Operation 16. The STP went down about 60 cm below the base of Zone 8. The matrix consists of a silty clay soil with a light density of limestone inclusions. A significantly lighter density of artifacts exists at this level, including debitage, obsidian, and ceramic sherds. Zone 10, a continuation of the shovel test pit, contained only a light density of artifacts. Excavation was discontinued at this point (260 cm below datum).

Conclusions

The four excavation units described above (Operations 13, 14, 16, and 22) yielded important information regarding the ancient occupation of Pakal Na, in both the main plaza and a smaller satellite plaza group. The archaeological investigation of Structure 127, located within one of Pakal Na's minor groups, suggests that this small structure was built and utilized over a shorter period of time than main plaza Structure 130. The lack of evidence for multiple phases of construction, combined with a paucity of artifactual debris, is suggestive of a shorter occupational span for Structure 127. The small size of the platform and presence of a prominent pit cache containing an assemblage of regal-ritual objects, including a large tubular greenstone bead (Figure 11.2) and five nearly complete obsidian blades, point to a special ritual function, perhaps a shrine structure. The regal-ritual contents of the cache, are peculiar, however, in the context of such a humble plaza group. Its anomalous appearance may indicate that this area of the site post-dates the Late Classic period during which such ritual items likely would have been restricted to elite personages. If the deposits are indeed associated with the later Terminal Classic period, the finds may reflect the passing on of heirloom pieces or, perhaps the decline and subsequent pillage of Classic Maya centers during this time. In either case, Structure 127 seems to have functioned as a special-purpose building, perhaps honoring ancestors through the vestiges of their Classic Maya heritage.

The three phases of architectural modifications associated with Structure 130 in the main plaza of Pakal Na indicate that the largest structure of the site was not built in a single occupation episode, but more likely was constructed over an extended period of time. The presence of the rich midden deposit associated with Structure 130 and the re-deposited refuse found within the construction fill of the patio floor in the main plaza are also suggestive of an extended occupation in this area. Operations 14 and 22 offered extensive vertical and horizontal exposure of the eastern façade of Structure 130 and indicate that the initial phase of construction consisted of a substantial earthen core fill containing basket-load stratigraphy. This core fill was covered with a layer of river cobbles and possibly contained a façade of cut limestone blocks. It was during the following Phase 2a construction episode that the structure was transformed into a multi-terraced platform. At least five terraces and likely a central staircase flanked the eastern façade of Structure 130; it is probable that, in the past, a large perishable house structure stood on the top of the platform. The final building modification (Phase 2b) capped several significant pit features associated with Phase 2a, including a large burial pit, which was only partially exposed in Operations 14 and 22. Future investigations during the 2001 field season will expand the excavations of Operation 22 to fully

expose the large burial pit found along the central axis of Structure 130. Phase 2b included a minor architectural modification, which involved rebuilding the upper Phase 2a terraces that were dismantled during the excavation of the large burial pit in antiquity.

The discovery of a speleothem in the large burial pit, along with the identification of a ceramic torch holder, attest to the importance of caves among Sibun valley residents. Finds of cut speleothems, associated with a special circular shrine structure in the main plaza of Pechtun Ha (see Harrison and Acone, Chapter 10), lend further support to the notion of cave pilgrimages as a central role of elite activity. The data provide physical evidence of an ancient Maya spiritual perception of the sacred landscape, viewed through the local lens of the Sibun settlements. Together, the excavations offer insight into the daily and special ritual activities that took place at Pakal Na. Future investigations will shed greater light on the social, political and economic position of Pakal Na with regard to other settlements dispersed throughout the Sibun River valley and beyond.

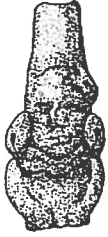
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Chapter 12

“First Shovel” at the Oshon Site

Steven Morandi and Ben Thomas

Introduction

The Oshon site is located south of Hattieville (mile 18 on the Western Highway) and northwest of Freetown, a small village of about 70 people. It is named after Samuel Oshon Sr., who owns the property where the site is located. Presently, a few banana and avocado trees are grown on the tops of structures at the site, which contain many cobbles and provide well-drained sediment. With thirty-seven known structures, the Oshon site is clearly the largest to be systematically explored along the Sibun River by XARP surveyors and archaeologists to date. Undoubtedly, more structures exist at the site which are nearly invisible due to vegetation cover or low elevation.

The survey of the Oshon site (Map Sheet 9) revealed 2 central plaza groups containing five structures each, located immediately adjacent to one another. These features comprise the site core, which is about 200 meters north of the current path of the Sibun River. Plaza A is located to the northwest of Plaza B, on slightly higher ground. Generally, the central surface of Plaza A is composed of tightly packed limestone and chert cobbles ranging in size from 5 to 20 cm in length. This layer was covered by more sediment and organic debris closer to the edges of the bordering structures due to slope erosion. The smallest structure that defined Plaza A (Structure 402) was located on its western side, fronted by two uncarved stelae.

Plaza B contains the largest structure at the site (Structure 406), but is otherwise bounded by relatively long, low platforms. Off the northwest side of Structure 406, there is a large depression that held a small amount of water when discovered. The surface of the plaza is quite flat; no excavations were performed to determine the methods of its construction. To the south of Structure 431, there was a second, symmetric depression.

Modern drainage was detected southeast of Plaza B running westward into a deep oxbow. According to local inhabitants, Plaza A does not become submerged during the rainy season, but in Plaza B, the surface may become covered with a few inches of water. The two central plaza groups are surrounded by low structures found singly or in clusters of two to five. The southernmost structure found in 1999 (Structure 424) was only 15 meters from the present high, steep edge of the Sibun River.

Excavations at the Oshon site focused on Structures 401 and 437. A total of five excavation units, Operations 18, 19, 20, 21, and 23, were placed on these structures. Structure 401 was a large multi-tier platform. Structure 437 was a small, barely discernible platform thought initially to have been attached to Structure 401. Its squared end is identified by the contour lines between Structure 401 and Structure 402 on Map Sheet 9.

Our excavations were located with the following objectives in mind:

1. to understand the nature of the construction of Structure 401. This includes the materials used in construction, the techniques employed, and the various phases of construction if discernible;
2. to investigate the connection between 401 and 437. Were these two separate structures or were they one integrated whole?
3. to find middens or heavy artifact concentrations along the outside edges of the structures;
4. to find diagnostic artifacts that would enable us to elucidate the chronology of the site;
5. to find dateable organic material from sealed contexts; and
6. to establish an artifact inventory for the Oshon site.

Surface Collection and Shovel Test Pits

During reconnaissance, mapping, and excavation phases at the Oshon site, a few artifacts were recovered from the cobble surface of Structure 401. Surface finds were marked and located by tape and compass in relation to the nearest datum point. The surface collection included a conch shell (1.65 meters from the Operation 18 datum at a bearing of 106°), a *mano* fragment (1.59 meters from the Operation 18 datum at a bearing of 144°), and a groundstone axe (5.60 meters from the Operation 19 datum at a bearing of 187°)

A shovel test-pitting (STP) program was used to detect areas with a high density of artifacts. The shovel test pits were considered a single unit, designated Operation 17. The STPs were concentrated around the north and west sides of Structure 401 in Plaza A. During the survey of Plaza A, it was noted that immediately west of Structure 401 there is a low platform (Structure 437), and STPs around this structure were completed as well. The connection between Structure 401 and 437 was uncertain from observation of surface features.

Operation 17 consisted of six STPs in Plaza Group A running nearly east-west from the edge of Structure 437 to the edge of Structure 401. The STPs were arranged two parallel lines of three equally spaced holes. All STPs yielded a topzone of dark grayish-brown sandy silt that was dry and compact. Consistently found beneath the topzone was a sandy silt with fire-cracked rock and hard brown clay-like nodules (termed “baked clay material”), which in turn overlaid a dense cobble surface. This cobble surface was undoubtedly an extension of that seen in the center of the plaza. All STPs in Operation 17 contained a medium density of pottery sherds with well-preserved slip, as well as chert debitage. STP 1 also contained obsidian flakes and prismatic blade fragments, and had, overall, the highest density of artifacts. STP 4 and STP 6 contained animal bone in addition to pottery sherds and chert debitage. The number and variety of cultural materials found in Operation 17 suggested that it was a midden area that might yield important and chronologically diagnostic artifacts. Therefore, two excavation units, Operation 18 and Operation 19 were set up to further explore the area.

Structure 401 Excavations: Operations 18 and 20

The first excavation unit to be set up at the Oshon site was Operation 18 (Figure 12.1), located at the end of a long row of cut limestone blocks at the base of Structure 401 in Plaza A. The excavation unit was positioned to reveal the northwest corner of Structure 401 in order to yield information about its final construction phase. Initially, the unit was a 1 x 1-meter square, but it was twice expanded 50 cm to the west (to become a 1 x 2-meter unit), when the corner of the structure was not reached.

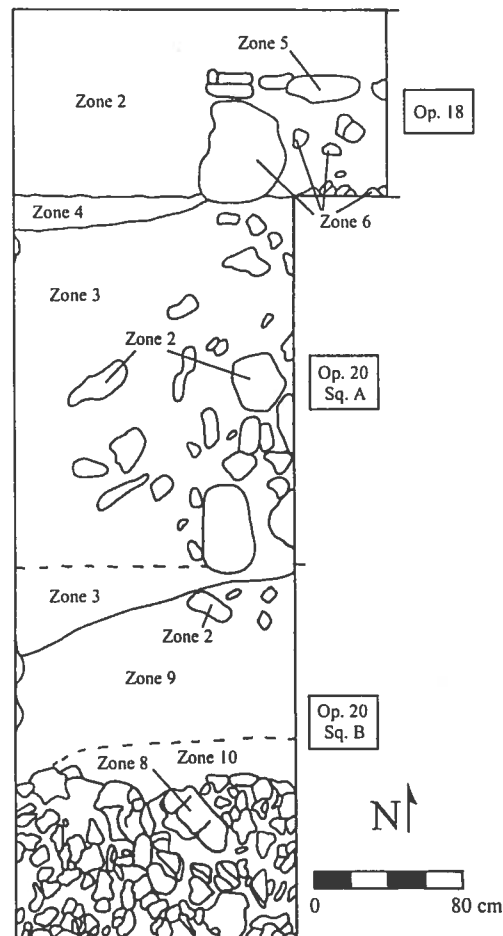


Figure 12.1 Plan of Operations 18 and 20

Zone 1 was a dry, compact, dark grayish-brown sandy-silt topzone with no inclusions, identical to that found in the Operation 17 STPs. This zone covered the top portion of the limestone blocks used as a basal retaining wall on the north side of Structure 401. A light density of artifacts, including debitage, obsidian, pottery sherds, and flaked stone tool fragments, was found here. Most of the debitage was retrieved from the south central portion of the zone, near the northwest corner of Structure 401.

Zone 2 was identical in color to that of Zone 1, but contained several types of variably sized inclusions. The inclusions included limestone, chert, and sandstone-like nodules ranging in size

from about 1 to 7 cm in length. Several pieces of fire-cracked rock also were found in this zone, though their origin (ancient or recent) remains unknown. The artifact density increased in this zone, and included pottery sherds with solid red or black slip, chert debitage, medial fragments of obsidian prismatic blades, and animal bone. As in Operation 17, the slip preservation on the sherds was excellent. The animal bone consisted primarily of what appeared to be small fish vertebrae. Zone 2 ended abruptly at a compact layer dominated by limestone cobbles that represented the plaza surface. Interestingly, some small hard clay nodules were found as inclusions just above the cobble layer, and may relate in some way to the construction of that layer, perhaps as part of a once intact hardened clay covering over the cobbles.

A 37-cm diameter circular area of the compact cobble surface lacked any stones, and was thought to be a pit when first encountered and designated Zone 3. Indeed, Zone 3 was very dark grayish-brown silty clay that extended about 19 cm below the top of the surrounding cobbles in a pit-like shape. The zone contained a few sherds and some chert debitage, but may have been created by disturbance from a once existing tree.

Zone 4 represents the cobble surface of Plaza A adjacent to Structure 401 (Figure 12.2). It is a uniformly flat layer 1 to 2 cobbles thick (as revealed in the excavation of Zones 3 and 7), clearly artificially constructed. The subangular to subrounded cobbles are of smooth white limestone generally 3 to 12 cm in length. Smooth and polyhedral chert cobbles were occasionally used to construct this layer as well.

Zone 5 consisted of large, well-shaped white limestone blocks that formed the north side basal retaining wall for Structure 401. Some of the blocks were cracked and displaced through post-depositional forces such as root action of trees, but the original placement of most could be discerned. It is apparent that each block was shaped specifically to fit into a particular place in the wall. The blocks of the wall ranged in size up to about 50 cm in length and 10 cm in thickness, and were piled in two courses. It appears from initial observations, that these stones were set into the cobble surface of the plaza, rather than having rested upon it.

Zone 6 consists of tumbled limestone cobbles from the presently sloped north-facing surface of Structure 401. Some of these nodules are irregularly shaped, though with smooth white surfaces. The cobbles of this zone were from 1 to 30 cm in length. Zone 6 was not excavated, as time did not permit it.

Zones 7 and 8, like Zone 3, defined a pit-like feature with a surface revealed as a circular break in the Zone 4 cobbles. Only half of the feature was visible in Operation 18, as it was located along the western wall of the unit. The pit was larger and deeper than that represented by Zone 3, but contained a nearly identical matrix. Zone 7 and 8 consisted of a loose, dark brown silty clay. At a depth of 20 cm, Zone 7 was arbitrarily ended, and Zone 8 started, to maintain stratigraphic control. As with Zone 3, zones 7 and 8 may have been created by the growth of a tree here in the past. A light density of artifacts was found in Zone 7, including pottery sherds, the proximal end of a chert biface, and an obsidian blade fragment. Zone 8 contained a light density of pottery sherds.

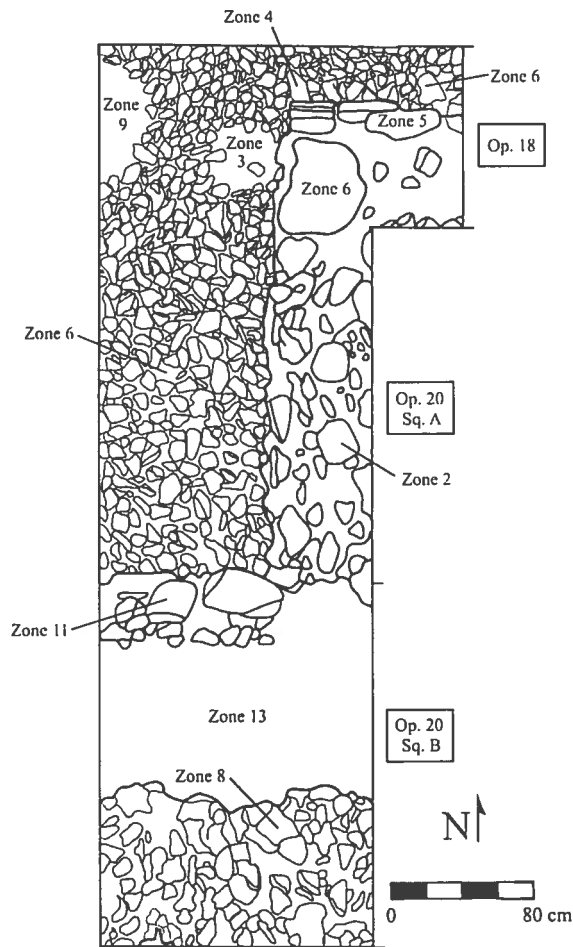


Figure 12.2 Planview of the cobble surface of the plaza floor

Zone 9 was an olive brown layer of sediment found when Zone 8 was removed. It is the same matrix underlying Zone 3, and may form a layer beneath much of the cobble surface in Operation 18. Zone 9 was not excavated.

Zone 10 was assigned, upon later observations, to the west side retaining wall of Structure 401. This wall consisted of thin limestone slabs, smaller and less finely cut than those of Zone 5. Zone 10 was not excavated.

Operation 20 was initiated as a southward extension of Operation 18 (Figure 12.1). The 1.5 x 4-meter trench was placed with its long axis in a north-south line along the western edge of Structure 401 as it was defined by Operation 18 excavations. The purpose of Operation 20 was to expose a large part of the western edge of Structure 401 in order to examine its construction in more detail (Figure 12.3). Also, it was hoped that the relationship between Structure 401 and Structure 437 could be defined. Furthermore, Operation 20 offered the possibility to collect midden debris that might be located along the edge of Structure 401. Operation 20 was divided into two 1.5 x 2 meter squares to provide some spatial control. Square A was designated as the northern square, and Square B, the southern square.

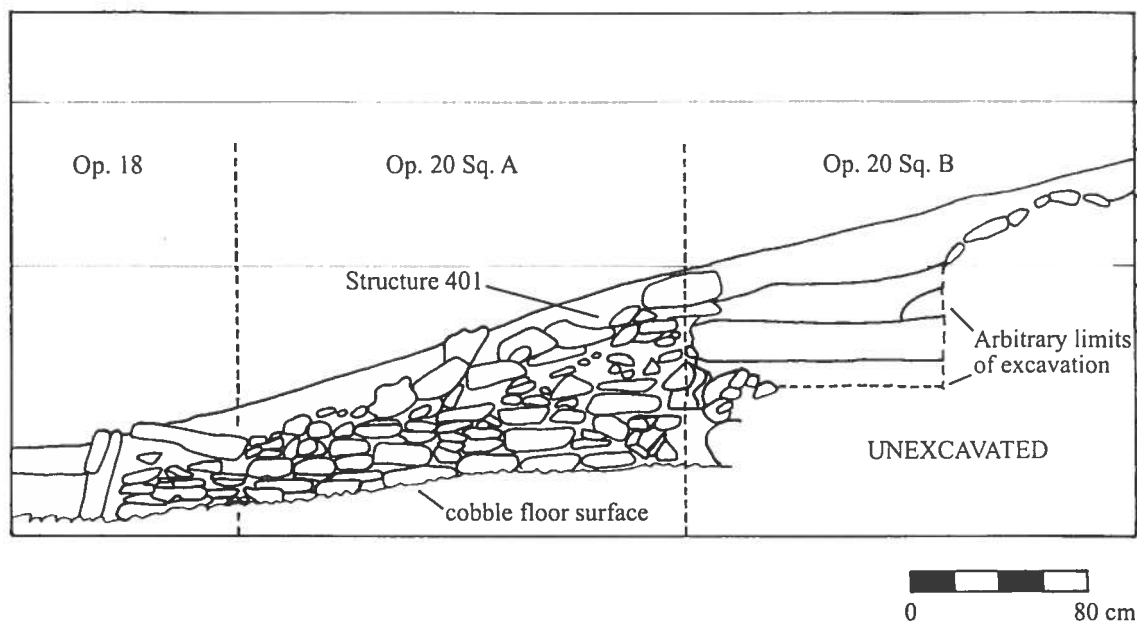


Figure 12.3 East wall of the excavation showing construction of Structure 401

Zone 1 is the same very dark grayish brown sandy-silt topzone without inclusions that blanket all of the units excavated at the Oshon site. In this case, the zone was unusually loose due to rain during the two days prior to its excavation. A of Zone 1 revealed a medium density of artifacts. A variety of artifact types were recovered, including pottery sherds, chert debitage, obsidian blade fragments, and a groundstone axe-like tool. Animal bone was found in this zone, as well as 1 x 4 mm metal strips of more recent origin. Square B of Zone 1 contained the same density of artifacts, including pottery sherds, chert debitage, obsidian-blade fragments, flaked chert tool fragments, and another groundstone tool.

Zone 2 was a scatter of cobbles in most of Square A and in the northern third of Square B. This zone contained limestone, chert, and sandstone cobbles that had tumbled from the surface Structure 401. The hard, white limestone cobbles ranged in size from 3 to 30 cm in length, while the occasional chert nodule was about 15 cm in length and covered with an orange-yellow cortex. The other type of cobble appeared to be a type of reddish sandstone, 3 to 10 cm in length. The loose sediment associated with the removal of these cobbles was screened, which revealed a light density of pottery sherds.

Zone 3 was a dark, grayish brown semi-compact silty clay with a few limestone inclusions that likely were tumble from Structure 401. The bulk of Zone 3 was located in Square A, though a small portion of Zone 3 material extended into Square B. During collection of the matrix, such a small amount of material was collected from Square B that it was included with that of the Square A. Several artifacts were recovered from this zone, including pottery sherds, chert debitage, obsidian blade fragments, and portions of flaked stone tools. Animal bone was also found in this zone. Zone 3 excavations revealed the western edge of Structure 401 at the southern end of Square A, where it

took a right angle turn to the west. What was thought to be a straight edge to Structure 401 suddenly became an inset corner.

Zone 4 was compact brown silty clay with limestone and chert cobble inclusions. Again, these inclusions are likely to be tumbled pieces from Structure 401. Several types of artifacts were recovered in medium densities, including pottery sherds, chert debitage, flaked chert tools, and obsidian blade fragments. Animal bone was also found in this zone. The excavation of Zone 4 further revealed the nature of both the west and north facing retaining walls that formed the inset northwest corner of Structure 401. Interestingly, the north facing wall appeared to have been constructed much like that of the parallel retaining wall along the front of the structure uncovered in Operation 18 (Zone 5), in both materials and construction technique. The difference between the two was that the former was constructed as a vertical wall, rather than a sloping one. The expected west-side retaining wall still appeared somewhat jumbled at this point. Since the right angle of the inset corner fell just south of the boundary between Square A and Square B, only a very small portion of Zone 4 material was found in Square B. It was decided to include it with the Square A matrix.

Zone 5 appeared to be identical to Zone 4 in color and texture, but it contained many very small limestone, clay, and red chalky nodules less than 3 cm in size. The excavation of Zone 5 revealed the west and north side retaining walls of the inset corner of Structure 401, as well as a compact cobble surface recognizable as the plaza construction layer. Zone 5 contained a medium density of artifacts. Pottery sherds, chert debitage, and obsidian blade fragments were found, as well as animal bone. A small but complete conch-like shell was found at the bottom of Zone 5 in the southwest corner of Square A. As with zones 3 and 4, the minuscule portion of Zone 5 matrix that fell into Square B was include with the Square A material. In hindsight, it appears that lowest few centimeters of Operation 18, Zone 2, might have been separated out as a different zone, in effect, the northern continuation of Operation 20, Zone 5. The former contained the same types of inclusions, though they were not mixed into sediment so far above the plaza surface as in the latter.

Zone 6 is the solid layer of cobbles that forms the surface of Plaza A (Structure 400). This zone is identical to Zone 4 of Operation 18, and forms the southern extension of that zone into Operation 20. The majority of the cobbles are hard, smooth, white limestone, 3 to 20 cm in length, while a few (perhaps less than 5%) are a gray-brown chert with orange cortex, 5 to 15 cm in length. Interestingly, no pit-like features such as those encountered in Operation 18 (zones 3 and 7) were found intruding into Operation 20, Zone 6.

Zone 7 is the limestone retaining wall on the west edge of Structure 401, part of the inset corner. The limestone slabs that make up this feature are roughly 10 to 25 cm in length and 5 to 10 cm thick. They are stacked in a fairly orderly way, so that the west edge of the wall is relatively straight. This zone is a southern extension of Zone 10 of Operation 18 and should be considered identical to it. This zone was not excavated, and no artifacts were found directly associated with it.

Zone 8 was found directly beneath Zone 1 in the southern portion of Operation 20, Square B. It is a uniform layer of irregularly shaped limestone cobbles, one stone thick, which may be part of the highest terrace level of Structure 401. The northern edge of Zone 8 is parallel to the north-facing walls of Structure 401, indicating that it is relatively well-preserved and purposefully constructed. Oddly, a gap between the Zone 2 and Zone 8 cobbles exists. Furthermore, the Zone 8 cobbles do not

extend out to the north-facing retaining wall of the inset corner of Structure 401. How the surface of this area of the structure appeared in the past remains a mystery. Later removal of cobbles from the surface of the structure could have caused the observed pattern, though it would not seem likely to have left a straight edge to Zone 8. The cobbles recovered west of Structure 401 in zones 2, 3, and 4 are not as numerous and irregular as would be expected had there been a major slumping of the structure in this area.

Zone 9 is a compact dark grayish brown silty clay with a few large limestone inclusions, likely to be tumble from Zone 8 above it. Given that Zone 9 has the same matrix, color, and adjacent position to Zone 3, it may be an extension of that zone into Square B, though Zone 9 appeared significantly more compact. There were few artifacts recovered from this zone (chert debitage and pottery sherds). The southern extent of Zone 9 was limited because the Zone 8 cobbles were not removed in order to keep the final construction phase intact. Zone 9 was therefore arbitrarily ended as a vertical wall beneath the edge of Zone 8.

Zone 10 is a compact light olive brown silty clay found beneath Zone 8 and the southern portion of Zone 9. It is a sterile layer with no inclusions, and is much lighter than the surrounding sediment. Zone 10 may be part of a prepared surface for construction of the upper level of Structure 401, as it roughly follows the edge of Zone 8 above, though it is distributed less regularly. The southern edge of Zone 10 was arbitrarily ended as a vertical wall continuing the Zone 8 and Zone 9 boundary.

Zone 11 is the north-facing retaining wall running west from the inset corner of Structure 401. It is constructed in a manner much like that of the front basal retaining wall of Structure 401 (Operation 18, Zone 5). The limestone blocks that comprise this wall have squarely cut edges and reach sizes of 20 x 20 x 50 cm. They are set in two courses without any mortar. Unlike the sloping central front wall of Structure 401, the north-facing inset corner wall was set vertically.

Zone 12 is a brown, compact, silty clay with small rock inclusions of unknown type scattered throughout the matrix. The inclusions range in size from 0.3 to 1 cm. Only a few pottery sherds and pieces of debitage were found in this zone. The southern edge of Zone 12 was arbitrarily ended as a vertical continuation of the wall above it to support the Zone 8 cobbles.

Zone 13 is similar to Zone 12, but may be distinguished by its higher clay content. This zone continues behind the Zone 11 retaining wall and Zone 2 tumble to expose the interior construction fill of Structure 401. No artifacts were found in this zone, indicating that it may be part of core construction fill consisting of uniform silty clay compacted behind a retaining wall. Curiously, no layer of cobbles was ever found between the Zone 2 tumble and Zone 8 cobbles of Operation 20.

Zone 14 was assigned when the top of Structure 401 was cleaned for photographs. Some of the loose sediment between tumbled limestone cobbles (Zone 2) was removed, and sherds and obsidian blade fragments were found. Since the underlying stratigraphy is unknown, it was decided to give the zone a new number. In the future, it may be included as part of Zone 2.

Defining Structure 437: Operations 19, 21, and 23

Operation 19 was located on the northern side of Structure 437 and extended from the surface of the platform to the plaza floor. This unit enabled us to uncover the connection between the structure and the plaza floor. There were a total of 5 zones in this operation. Only two were excavated fully. Zone 1 was the topzone. The topzone was loose and silty with a high concentration of organic material. It was only a few centimeters thick and had a medium density of artifacts. The artifacts, however, displayed considerable variety, including sherds, debitage, obsidian, and groundstone (in addition to a number of groundstone tools discovered on the surface). Also found on the surface was a conch shell. The variety and relatively large quantity of artifacts on the surface suggests active and heavy utilization of the site in its final phase of occupation.

Directly under Zone 1 we came upon the remains of the last phase of construction. The southern half of the excavation uncovered a compact matrix that is the final floor of the structure. There was no plaster evident and, as at other excavations in the area, we have to come to the conclusion that floors were not plastered but were rather finished by creating a hard packed earthen surface. At Pechtun Ha this surface may have been fired. The floor was bounded to the north by Zone 3, a retaining wall built along the edge of the platform (Figure 12.4). This wall ran in an east-west orientation across the width of the excavation. To the north of the wall was a build up of looser clayey-silt. Zone 2 had a high density of artifacts and bottomed out on a hard surface in line with what appears to be the level of the plaza floor. The hard surface had a high concentration of cobbles. It would appear then that the plaza was built with a cobble layer that was probably covered by a clay or earthen surface. This idea seems to be supported by the excavation results of Operations 18 and 20. We did not excavate into Zone 5 as our goal was to see how Structure 437 joined the plaza. We also did not want to remove the retaining wall and excavate into Zone 4.

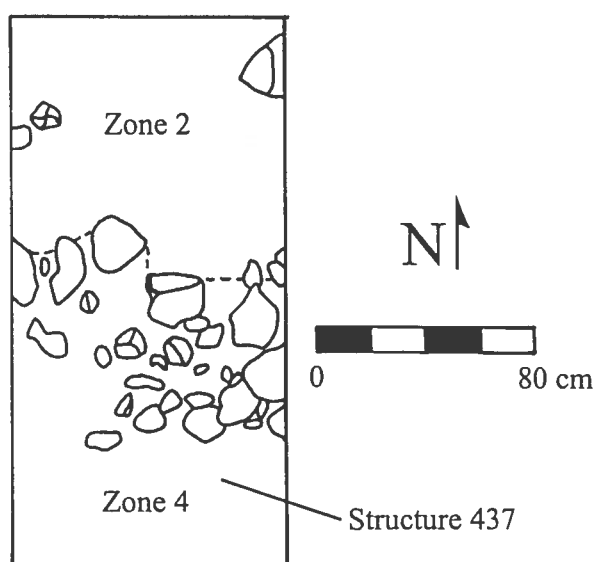


Figure 12.4 Operation 19 showing the retaining wall and platform surface

Instead we decided to follow the retaining wall to the east to see how or if it connected with Structure 401. To do this we laid out a trench along the line of the wall that was 1.5 x 4 meters long

and extended from the east wall of Operation 19 to the edge of Structure 401 and Operation 20 (Figure 12.5). This operation, Operation 21, uncovered more of the platform's retaining wall. Most of the soil in this zone was a mixture of silt and tumble from the wall and the platform.

Once again Zone 1, the topzone, was a fairly thin layer of loose organic silt. Under the topzone we uncovered the remains of the final phase of construction. The main feature was the long retaining wall that extended in an east-west direction across the length of the excavation. This feature we termed Zone 2, and at first glance it appeared to be one continuous wall. By the end of excavation we were not as convinced of the continuous nature of the wall. This is discussed in more detail below. Zone 2 separated the trench into two parts. The part to the north of the wall appeared to be an "exterior" area and the part to the south appeared to be the interior of the structure.

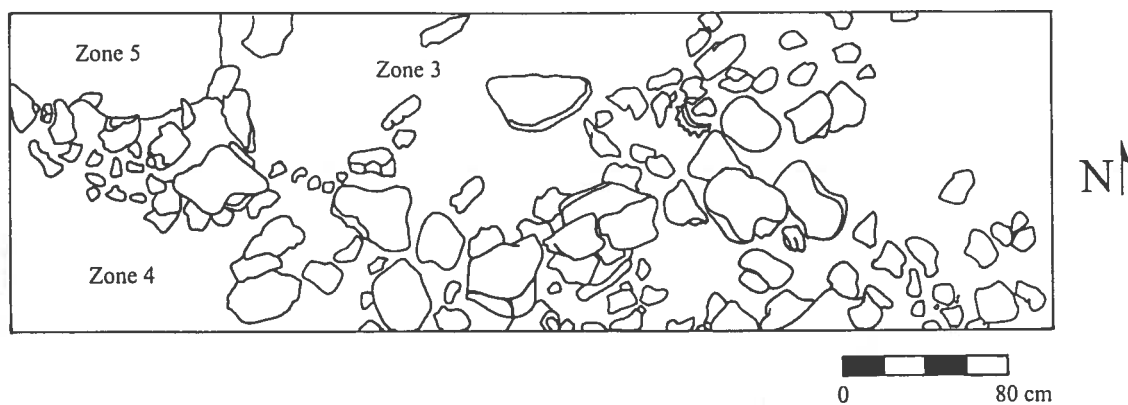


Figure 12.5 Plan of Operations 19 and 21. Operation 21 extends to the east towards Structure 401

The soil mixed in with Zone 2 and extending across the trench, below Zone 1, was designated Zone 3. This was a loose clayey silt mixed with pockets of purer clay. The removal of Zone 3 to the north of Zone 2 revealed a dark clayey silt that had built up along the wall. This clayey-silt layer, Zone 5, was bounded by the wall (Zone 2) to the south and the tumble from the wall to the east. Due to this constraint, Zone 5 does not appear to extend to the east of the excavation. This zone yielded a high density of artifacts and resembled Zone 2 of Operation 19 in both cultural context and soil characteristics. Zone 5 bottomed out on the cobbled plaza surface.

To the south of Zone 2, the removal of Zone 3 revealed a cobble surface in the SE corner of the excavation. These cobbles appear to be the edge of Structure 401 (Figure 12.6). This zone was not excavated. To the west of Zone 4 and under Zone 3 was a pocket of silty clay mixed with cobble inclusions. This lens, Zone 6, was deposited right in the middle of Zone 2 and divided the wall into two. This deposit was the first indication that Zone 2 was not one continuous feature. It appears that Zone 6 divided the eastern edge of Structure 437 from the western edge of Structure 401. Structures 401 and 437 were separated by a narrow passage between them.

Zone 8 appears to be tumble from Zone 2 that fell to the north of the wall in the eastern portion of the excavation. This zone bounds Zone 5 and prevents it from covering the entire trench.

To the east of Zone 8 is Zone 7, a pocket of silty clay under Zone 3. Zone 7 appears to be a natural buildup of soil along the outside edge of the wall.

Operation 23 was laid out to connect Operations 21 and 20. This unit is a small triangular excavation with the point extending to the north. The excavation connected the cobble surface of Structure 401 with the cobble surface (Zone 4) of Operation 21, thereby achieving a continuous exposure of the cobble surface from Operation 20 to Operation 21. We also found the cobble plaza floor and the retaining wall for the platform in the northern part of the excavation. This operation enabled us to get a continuous exposure of the features that extended across several operations.

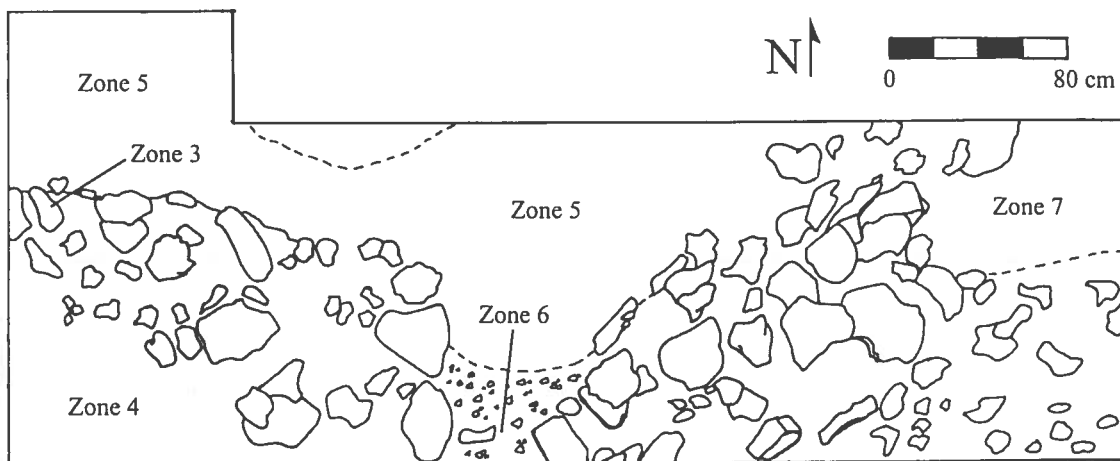


Figure 12.6 Base of Operations 19, 21, and 23. Note cobble surface in the southeastern corner. This was the edge of Structure 401

The three operations described here aided our understanding of the structures at Oshon site. The construction of the mounds is consistent with what we discovered at other sites. The platforms appear to be large earthen constructions held in place by retaining walls made of limestone blocks. The high artifact density both on the surface and through the excavations suggests that Oshon was a heavily utilized site right through its final phase of occupation. There was a relatively high amount of obsidian at the site and we also found several pieces of groundstone tools, a conch shell, and a piece of a ceramic whistle with a human effigy. The variety and exotic nature of some of these artifacts may indicate that the residents of Oshon were part of an active trade network routed along the Caribbean shoreline and up the lower reaches of major drainages such as the Sibun River.

Results

Several important pieces of information were gleaned through excavations at the Oshon site. First, the method of construction of Structure 401 was elucidated. Overall, Structure 401 exhibits the finest masonry on its north side, including the retaining wall for the central basal tier of the structure (Operation 18, Zone 5), as well as the north-facing wall of the exposed inset corner of the structure (Operation 20, Zone 11). Each contains two dry laid courses of well-cut limestone blocks, though the central retaining wall is sloped approximately ten degrees from vertical, while the inset

corner contains vertical walls. The west-facing retaining wall of the inset corner contains a different style of masonry, consisting of small, roughly cut limestone slabs stacked horizontally. No indications of plaster or other covering of the masonry was found. The placement of these two styles of wall construction suggests that Structure 401 was built for optimal viewing from the north side, in Plaza A.

Second, the materials from all operations indicate that several types of artifacts were manufactured or discarded in this area. The density of ground stone tools, flaked chert tools and debitage, obsidian blades, pottery sherds, animal bones, and unworked shell suggests that the area between Structure 401 and Structure 437 was a significant midden area. Nearly all of the flaked chert tools and obsidian blades found were proximal or medial fragments, though nearly complete ground stone tools were present as well. Additionally, the presence of an “overshot” obsidian flake containing the base of a prepared polyhedral core indicates local production of prismatic blades. Aside from the location of the midden and abundance of artifacts, a clay whistle fragment in the form of a human head and torso, with appliquéd earspools and headdress, further suggests that the midden contained materials used by an elite sector of the population.

The timing of occupation of the Oshon site is still unknown, though preliminary analysis of pottery sherds suggests a Terminal Classic final phase. Analysis of pottery by Sandra Lopez Varela during the 2001 XARP field season will help to determine the period of construction and occupation at the Oshon site.



Chapter 13

Obsidian from the Settlements and Caves

Jason Paling

Introduction

Following the obsidian analysis performed by Elizabeth Kuba (1998), a member of the XARP 1997 season, I continued the examination of the obsidian artifacts. Compared to the discoveries of the 1997 season, a larger number of obsidian pieces were found in the course of excavations and cave exploration during 1999. The goals of my analysis are to continue to elaborate on Kuba's (1998) obsidian data set and to formulate a comprehensive study comparing certain properties of the obsidian pieces among the sites in the Sibun area. Finally, in accordance with the data sets, I propose to speculate on the potential uses of the obsidian discovered at each site.

Field Recovery and Methods

This year, for the first time, obsidian was collected from cave explorations. Furthermore the team investigating surface sites incorporated a shovel test-pitting program (STPs) in addition to traditional trench excavations. As a result, there exists a greater diversity of contexts from which obsidian was recovered as compared to 1997. The initial step in the analysis of the artifacts was to categorize the properties of each piece. New categories were added to Kuba's (1998) original data set to facilitate additional analysis.

The 1999 field season also instituted a new database system (Filemaker 3.0), for organizing incoming artifacts. As each piece of obsidian entered the lab from the field, a four-digit code was given to delineate its location within the Sibun River Valley. First, each obsidian piece was categorized by the site at which it was found: Pechtun Ha, Pakal Na, or the Oshon site. Next each piece was identified by its specific context, including operation, zone, and square from which it came, as shown in the example below.

Site	Operation	Zone	Square
Pechtun Ha	13	1	A

For obsidian found during cave explorations or within shovel test pits, the four-digit code would still apply. However, if obsidian was found within a cave, it would be labeled by cave district, cave name, cave component number, and finally a unit number, for example:

District	Cave	Component	Unit
Tiger	Metate	1	2

Any obsidian piece found within an STP would be associated with the site at which it was found, the STP operation, the post-hole number, and finally by the zone in which it was discovered, as indicated below:

Site	STP/Op	STP #	Zone
Oshon	17	1	1

Due to the enormous quantity of obsidian collected during the 1999 field season, I proceeded to give each piece its own number. I also measured each piece's greatest length, width, and thickness to a tenth of a millimeter, using sliding calipers. These data provide the potential for comparative analysis of different pieces of obsidian.

The obsidian was then classified either as a complete blade or a blade or a flake fragment. Blades and a select number of flakes could then be identified either as a proximal, medial, or distal fragment or a complete piece. Presence of a bulb of percussion denotes the proximal end of a blade fragment or flake. Distal pieces were identified as possessing a tip, but lacking a bulb of percussion. Medial segments exhibited no signs of a bulb of percussion or tip. Whole blades had both a bulb of percussion and a tip.

Continuing with Kuba's (1998) data set, I then categorized the pieces by retouch type. A unifacial piece was manufactured by establishing a platform on a core and then knocking off a blade or flake with no additional flaking. In contrast, a bifacial piece was a unifacial piece that had been reworked on the ventral side, perhaps to create a sharper edge. During the 1999 field season we found one bifacial obsidian blade.

In tradition with Kuba's method for describing the physical properties of obsidian, I continued to document the clarity and purity of the obsidian. Pieces were classified as transparent, translucent or opaque. A transparent piece allowed for a clear passage of light. If the obsidian let light through but was not clear enough to see through, it was considered translucent. Opaque pieces allowed no light to pass through. In addition the purity of a piece could be clear, dusty, streaked, slightly streaked, cloudy, have irregularities such as air pockets or pocks, or have a combination of these properties.

To test my hypothesis that most obsidian blades found in the Sibun valley were functional pieces, I added the categories of use-wear, shape, and distal shape to the data set. When inspected under magnification, if an obsidian piece displayed a regular seriated pattern on its edge, I concluded that it had been used. Pieces that demonstrated a fine, unfractured edge were determined not to have been utilized. Pieces that were damaged around the edge in an irregular manner were classified as irregular. Irregularity suggested that the edge had been utilized. Pieces that could not be identified as irregular, used, or unused were labeled indeterminate. It was unclear whether or not the indeterminate pieces had been utilized; some of them may have been edge-damaged as a result of some activity other than tool usage, such as ancient trampling or modern excavation or transport.

The cross-sectional shape of each blade was also recorded. An obsidian blade could either be triangular, trapezoidal, triangular-trapezoidal, trapezoidal-triangular, or pentagonal (Figure 13.1). The shape of each piece was recorded in hopes of determining the type of obsidian tool. The shape of the distal blade fragments and whole blades were noted. The tips of these pieces could be

rectangular, curved, oval, pointed, or rounded (Figure 13.2). A rectangular tip was squared at the end. A curved tip was rounded into a point, whereas a pointed tip narrowed into an awl-like point. One complete blade within the data set exhibited an elliptical appearance, so I denoted its distal ends as oval. Finally, some unique pieces of obsidian are illustrated, including an “overshot” flake that included the base of the prepared core from which it was struck (Figure 13.3).

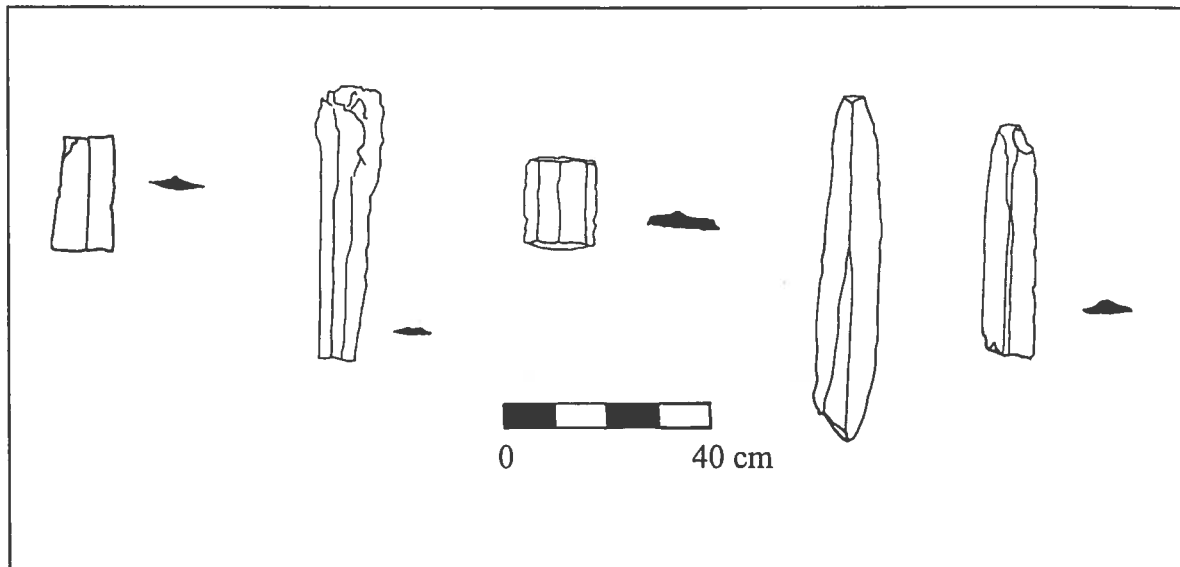


Figure 13.1 Variations on cross-sections of obsidian blades including (left to right) triangular, trapezoidal, triangular-trapezoidal, and trapezoidal-triangular

Data Tabulation

At Pechtun Ha, Operations 8 and 9 were carried out on the southeast corner of Structure 109, a large residential mound. A total of 63 pieces of obsidian were found. Operations 10 and 11 were trenches located within Structure 100, a stone non-residential mound. A total of 7 pieces were collected. Finally, Operation 12 yielded a total of 11 pieces of obsidian, and was located in the saddle between Structure 109 and Structure 105, which we have considered a midden pit.

Excavations performed at Pakal Na included Operation 13, a trench at Structure 127. Squares A, B, and C supplied 13 pieces of obsidian. However the large obsidian pieces ID#124-128 were found during a surface collection and according to operation director Eleanor Harrison probably came from a cache located in Square B. Operation 14 contained 14 pieces of obsidian, a low concentration of obsidian for a large axial trench through the 4-meter tall mound of Structure 130. Operation 16 was located to the south of Structure 130 and is considered to be a midden area. Eight pieces of obsidian were retrieved from Operation 16. As of May 1, 1999, Operation 22—a trench adjacent to Operation 14 and within Structure 130—remained unfinished; thus, all of the obsidian could not be tabulated.

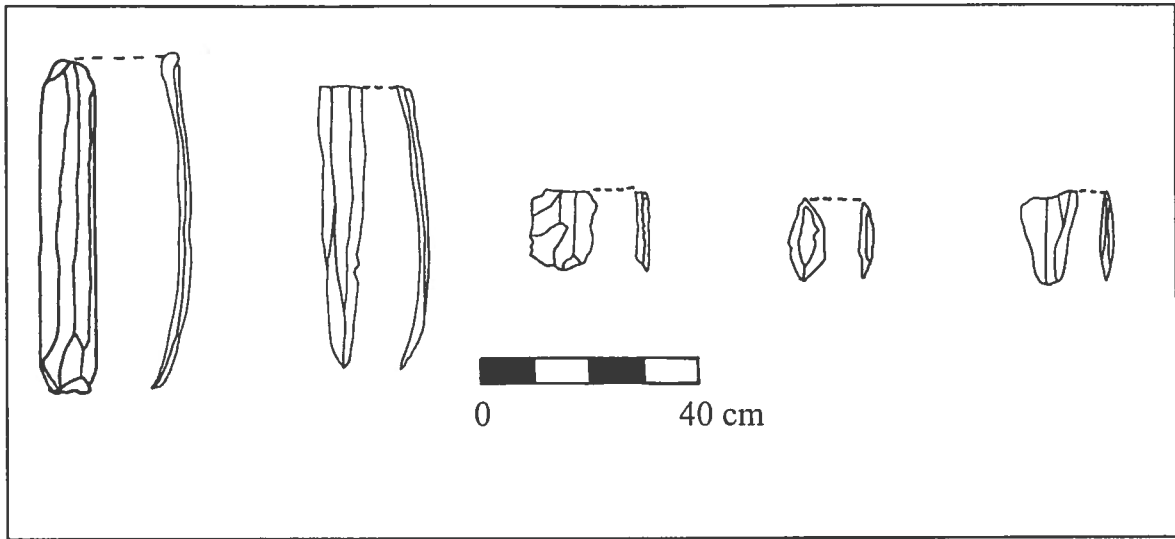


Figure 13.2 Obsidian blade distal end shapes including (left to right) rectangular, pointed, oval, pointed, and curved.

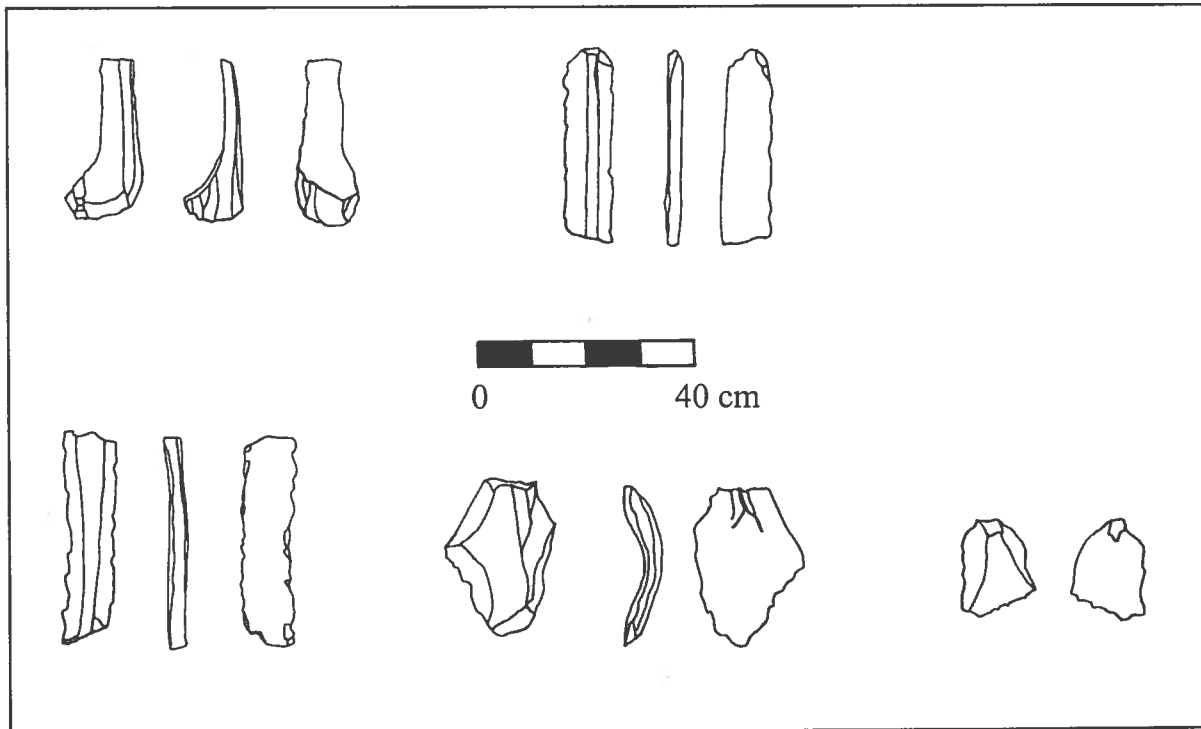


Figure 13.3 Distinctive pieces of obsidian (left to right) including (top row) an overshoot blade and a blade with indeterminate retouch; (bottom row), a blade with irregular retouch and two flakes.

Finally, the Oshon site excavations, Operations 18-21 and 23, were conducted within Structure 401, a residential mound of Plaza A. A total of 87 pieces of obsidian were processed at the time of this report. However, a substantial amount of obsidian was still left unprocessed, including the remains of an obsidian core.

Results and Discussion

Figure 13.4 shows the relative contribution of whole blades, proximal, medial, and distal fragments retrieved from excavation and collections from caves in the Sibun Valley as of May of 1999. The greater percentage of fragments (medial and proximal) indicates that the blades being found were parts of utilized tools. The contexts from which the obsidian was collected bolsters this notion as a high concentration of obsidian was found around house mounds as opposed to that from caves or the Structure 127 cache. Further strengthening my position is the relatively large collection of obsidian artifacts from midden contexts at both Pechtun Ha and Pakal Na.

The relative percentage of obsidian fragments shows an interesting pattern (Figure 13.4). An almost equal number of proximal and distal fragments is found overall (25% and 27%, respectively). Only 3% of the blades were complete, and the majority of fragments were medial (45%), supporting the notion that they were heavily utilized.

Use wear analysis results indicate that 22% of the obsidian pieces exhibited clear use, and 16% showed no sign of use. A full 48% of the sample was classified as indeterminate in terms of use wear, and the remaining 14% showed irregular wear. The large percentage of indeterminate and used pieces aids the argument that the pieces of obsidian found in the Sibun River Valley at the sites excavated in the last two field seasons were in fact utilitarian tools.

In some cases, tool types could be determined. For example, a piece that is triangular in cross-section with a pointed distal end may be an awl (if wear patterns support this notion). A piece that is trapezoidal in cross-section may be considered a blade because of its thickness and sharper edge. Such a tool could be used for slicing and cutting. The pieces that might be considered ritual tend to be triangular and trapezoidal in shape, but show little use-wear and are not fractured.

Finally, obsidian was classified in terms of color and clarity. Approximately 44% of the obsidian were transparent, while 33% were translucent, and only 23% opaque. One piece of obsidian, found in Glenwood Cave, was identified as Pachuca obsidian based on its greenish tint. The origin of the other obsidian is unknown at present but future neutron activation analysis will hopefully yield this information. Considering that the pottery from excavations to date is predominantly Late to Terminal Classic in date, the sources of the obsidian will be important in formulating models of obsidian trade in the Sibun River Valley at the close of the Classic period.

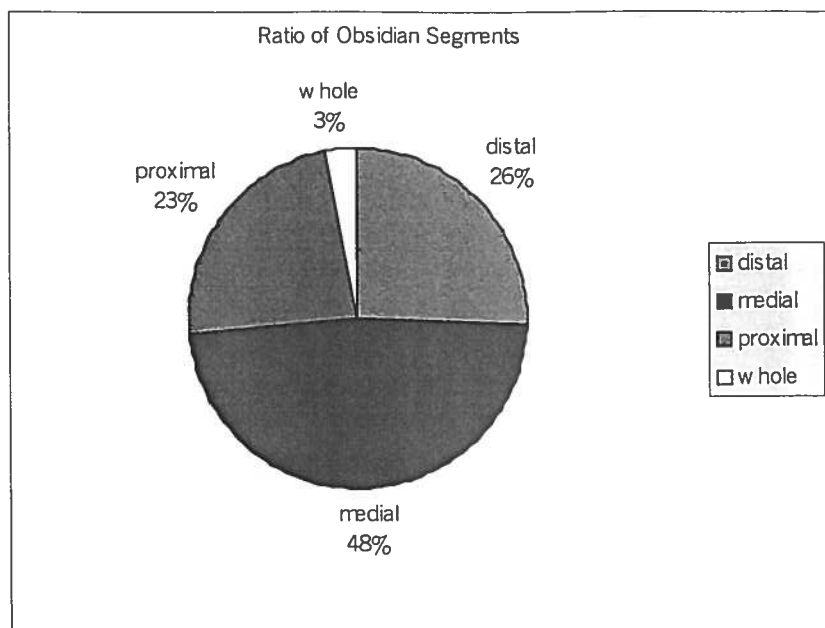
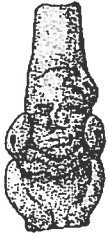


Figure 13.4 Chart of obsidian fragment types (n=268).

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Chapter 14

Comparing Artifact Densities among the Sites of Pechtun Ha, Pakal Na, and the Oshon Site

Errin Weller

Introduction

The Xibun Archaeological Research Project's 1999 field season included excavations at the Sibun River sites of Pechtun Ha and Pakal Na with limited test excavations at the Oshon Site. The principal purpose of these excavations was to determine a time frame for site occupation as well as to examine architecture and construction phases. This purpose determined the placement of the nine excavation units to be examined, 5 of which are located at Pechtun Ha, 2 at Pakal Na, and 2 at the Oshon Site. The artifact density data from the sites of Pechtun Ha, Pakal Na, and the Oshon Site can be used to facilitate discussion and an examination of the similarities and differences between Sibun River valley sites in the area.

At Pechtun Ha, Operations 8, 9, and 12 were placed in association with Structures 109 and 105 to locate architecture and a midden while Operations 10 and 11 were placed on Structure 100 in order to investigate a mound with extensive stone construction. At Pakal Na, Operation 13, was placed on Structure 127 near the location of a tubular greenstone bead and 5 obsidian blades found on the surface in the hopes of finding a cache deposit and to investigate the function of the mound. Operation 16 was placed between Structures 130 and 132 in search of a midden and architecture. At the Oshon Site, Operations 18 and 19 were placed to investigate the architecture of the mound. Each of these operations will be examined in order to calculate the artifact count and mass per zone to determine artifact density. These data will then be used to understand artifact distribution and cultural layers.

Methodology

Calculating Densities of Artifacts

The laboratory database system was utilized to calculate counts and weights per artifact category for each zone of each operation. The data were placed in tables to be used in calculating artifact density. In order to calculate artifact density it was necessary to first determine the volume of soil per zone. Since excavation methods and zone demarcation follow cultural and natural stratigraphy, zones vary widely in cubic mass. The volumetric calculation did not subtract the volume of inclusions or large stones.

The difference in elevations for each corner of the operation zone was taken from the excavation forms to determine zone thickness. Ideally, the bottom elevations of a completed zone and the top elevations of the next zone to be excavated are equal. In cases where these elevation

measurements differed, an average was taken and used in further calculations. If there was an average difference greater than 5 cm then the plan view and profile maps of the zone were consulted to try and find the reason for the incongruity and, if possible, to correct it. If correction was not possible, then the average elevations were used in volume calculations.

The length and width of the zone was also needed for a volume calculation since each zone may not be the same length and width as the unit (for example, the unit may be 200cm by 200cm, but Zone 2 may only be 100cm by 100cm). The zone dimensions were obtained mainly from plan view maps that had the zones demarcated and also from zone forms that occasionally recorded zone size.

Knowing the height of each zone corner and the width of the zone, the area, and then the volume, was calculated in the following manner:

Area1 = average height of the zone from the NW to NE corner * Width

Area2 = average height of the zone from the SW to SE corner * Width

Average area = (Area1+Area2)/2

Volume =Average area * Length

Using volume, the artifact density can be calculated by employing a density formula $D = m/V$ where m equals the mass of the artifacts and V is the volume of the zone. Four different artifact densities were calculated: the number of artifacts per zone, the total mass (weight) of artifacts per zone, and the total number artifacts and total mass of artifacts per zone volume. These initially calculated artifact densities, however, are not directly comparable, because of the differences in zone volumes. Therefore, all density values are normalized to a volume of cubic meter. Artifact density calculations based on mass are the most meaningful numbers for comparisons. For this reason, they form the foundation for examining artifact distribution across zones.

Sources of Error

In this methodology and the following analysis, there are sources of error including observational and instrument error, each of which can affect the data. As discussed in the beginning, the excavation units were placed with a specific purpose, which constitutes a bias. They were placed to examine middens or architectural features and not, for example, burials. Therefore, the artifacts may not be representative of the sites as a whole or of which activities were taking place across an entire site. Another set of biases inherent in unit excavation was related to the screening of excavated deposits. Screen size, artifact visibility, and artifact recognition all affected what was collected. The thumbnail rule for pottery sherds was also used in screening (no sherds smaller than a thumbnail were saved). However, people have different conceptions of thumbnail size and not all followed the rule closely.

Another source of error is contained in the zone elevations used to calculate volume and thus, density. Errors in the measurement of elevations could be due to several factors including the placement of the line level along the measuring string, the tightness of pull on the measuring string while taking measurements. In cases where line level error seemed unusually high, plan and profile drawings were consulted to verify zone depth and in turn try to minimize the error when calculating volume and density.

Numerous human errors affecting artifact counts, weights, and densities in slight ways could have occurred at many stages including processing in the laboratory, completing the lab classification forms (LCBs), or entering data into the computer. In select cases, artifacts weighed less than the scale could measure or it was decided they would not be weighed. In this case, weights are recorded in the data tables as zero for calculation purposes. It is also possible that the artifact densities may not be comparable due to differential preservation in different units of excavation. My own personal human error also must not be discounted.

Pechtun Ha

Operation 8 at Structure 109

Operation 8 is a 2 meter square unit positioned on the southeastern corner of Structure 109. An overall soil volume of 1.419 cubic meters contained in 6 different zones was excavated. As shown in Tables 14.1-14.4, the artifact density is the highest in Zones 2 and 3, but declines in Zone 4 only to spike again in Zone 6. As the end of the operation neared in Zone 8, artifact counts and densities decreased in all categories with the exception of bone.

Zone 1 contains only 1 piece of debitage and 10 pottery sherds for the lowest zone artifact density of Operation 8. There is a dramatic increase in the artifact assemblage in Zone 2 as groundstone tools and obsidian were recovered, as well as the highest amount of debitage and pottery at 77 and 482 pieces, respectively (Table 14.1). The artifact counts and densities of Zone 3 are also high, though slightly less than those of Zone 2. The artifact data for Zone 4 indicates a sharp decline in the artifacts recovered from the unit, suggesting that Zones 2 and 3 are a cultural horizon with occupation. Excavators opined that Zone 2 contains artifacts washed off from Structure 109 while Zone 3 is a compact floor surface, a speculation supported by the high artifact density.

Zones 4 and 6 are approximately the same volume at 0.228 cubic meters and 0.272 cubic meters, but significantly more artifacts came from Zone 6 indicating another cultural surface, possibly the lower platform of Structure 109 as it also contains a line of stones. Artifact types for Zone 8 (most likely construction fill) decrease to only 6 pieces of debitage and 140 pottery sherds.

Operation 9 at Structures 105 and 109

Placed 80 cm east of Operation 8, Operation 9 is a 1 x 2 m unit located in the saddle between Structures 109 and 105. Zone 1 is a nearly sterile alluvial soil, as indicated by the solitary pottery sherd that was recovered from 0.325 cubic meters of soil (Table 14.5). Likewise, Zone 2 remained very low in artifact density, although it was a very shallow zone (Tables 14.5 - 14.8). Upon examining the artifact data for Zone 3, a spike in the number of pottery sherds and debitage can be seen and the artifact density doubles from that of Zone 2. Zone 3 is followed by a continued increase in artifact density in Zones 4 and 5, therefore indicating Zone 3 is the beginning of a cultural strata. Since Operation 9 was placed with the purpose of excavating a midden, it seems plausible that Zones 3, 4, and 5 are the midden layers. However, they may represent slope wash from the mound (much like Operation 8, Zone 2).

The high density of artifacts in Zones 4 and 5 suggests they are midden contexts. The decrease in the amount of debitage from Zone 4 to 5 is interesting, as the number of pottery sherds increased, but their overall weight decreased demonstrating that sherd size decreased. In addition, the zone size is larger, meaning that the density of artifacts decreased relative to smaller zones with the same artifact count. Zone 6 is the second smallest zone, with 0.170 cubic meters excavated yet yielded numerous sherds thus contributing to a high artifact density for the zone. Zone 7 is the final zone excavated with 1 piece of debitage and 26 pottery sherds for a 0.233 cubic meter zone, translating to a low artifact density of 4.3 pieces of debitage per cubic meter and 112 pottery sherds.

The total artifact density based on weight for Operation 9 (Table 14.8) is very similar to Operation 8 (Table 14.4), especially when considering that Operation 9 is a higher volume excavation. Total artifact counts and item densities are also similar with the exception of pottery sherds. One piece of what is believed to be pyrite was recovered from both Operations 8 and 9. It is possible that the pyrite served as a mirror and was then discarded into the refuse area.

Operation 10 at Structure 100

Operation 10 is a 1 x 3 m unit placed in Structure 100 in order to determine the architectural sequence as well as the function of this stone mound. Zone 1 is the topsoil humic layer with numerous large limestone rocks. It is a very thin zone, only 0.055 cubic meters, but containing an extremely high mass of pottery based on volumetrics (Table 14.12). Thirteen pottery sherds yield a density of 5369.1 g/cubic meter, the second highest for the operation, and examination of the pieces reveal that they are large and well preserved. These sherds, however, were recovered from a hole left by an uprooted tree, thus affecting the zone density. The only speleothems recovered from Pechtun Ha were found in Operation 10 (Table 14.9). Only one was collected but inspection of the site reveals that the number is at least 5 speleothems.

The overall trend of artifact quantity and density increases from Zone 1 to 2 and even more so in Zone 3 (Tables 14.9 – 14.12). Animal bone, debitage and pottery sherds increase in number and density with the apex occurring in Zone 4. Animal bone increased greatly from Zone 2 through 4, with 40 pieces in Zone 4 for an item density of 187.8 artifacts per cubic meter and 354.5 grams of bone per cubic meter. Zone 4 appears to be a heavily cultural layer, with the highest artifact density of the operation, and occurs in front of what is believed to be a retaining wall for Structure 100. Based on the data, Zones 3 and 4 are the heart of the cultural strata. A marked decline in density is noted for Zone 5, and Zone 6 is virtually sterile, supporting the supposition that Zone 5 is the plaza floor and Zone 6 is located below the plaza floor.

Operation 11 at Structure 100

Operation 11 is a 2 meter square unit located in the center of Structure 100 to further investigate the predominantly stone mound. Six zones were excavated constituting 6.695 cubic meters of soil. Zone 1 is a humic layer with extensive bioturbation from fallen trees and roots, thus explaining why the artifact density is higher for Zone 1 than for Zone 2 (as evidenced by a large hole left by a long since fallen palm). Zone 2 is a larger zone with a light density of debitage and pottery sherds (Tables 14.13 - 14.16).

The total density per zone is greatest for Zone 3, a relatively thin zone (0.189 cubic meters) with large pottery sherds (20 sherds with a total mass of 179.5 grams). The densities increase from Zone 2 and then decrease with Zone 4, consistent with Zone 3 as the cultural peak. Zones 4, 5, and 6 increase in volume but decrease in artifact density with Zone 5 only containing 15 pottery sherds (Table 14.13). In Zone 6, 26 pieces of debitage were recovered including a large chert core (composing most of the artifact mass density). A large stone disc was also found in association with the chert, perhaps indicating intentional placement within the fill of Structure 100, since Zone 6 is believed to be the cobble plaza floor.

Operation 12 at Structure 109

Operation 12 is an 0.8 x 2 m unit positioned between Operations 8 and 9 in order to excavate the architecture located in the eastern part of Operation 8. Much of the operation appears to contain cultural layers that would suggest a midden deposit (Tables 14.17 - 14.20). Zone 1 is a humic layer with a low artifact density. The artifact density actually decreases in Zone 2, which may be explained by Zone 2 being construction material. In Zone 3, artifact densities are augmented across the board, and artifact categories represented increase from debitage and pottery sherds to include animal bone, chipped stone tools and groundstone tools. Zone 4 is a 40 cm by 40 cm zone encompassing tapir bones in the midden. Eighty-six bones were recovered in 0.012 cubic meters of soil, for an item density of 7,166.7 pieces of bones per cubic meter. This is undoubtedly the highest bone density of any operation excavated. This small zone also yielded the highest density of debitage and pottery (Table 14.19). The zone is located east of (and outside) of the platform wall, suggesting that artifacts were discarded in a midden context.

Zone 5 is adjacent to Zone 4 and likewise has a high artifact density of bone, debitage and pottery sherds. In relation to Zone 4, artifact densities decrease in Zones 5, 6, and 7, but relative to Zones 1 and 2 (as well as other operations conducted at Pechtun Ha) densities remain high, especially in terms of the volumetrics of pottery sherds.

Based on the artifact data and densities for Operation 12, it seems likely that Zones 4 through 7 contain the midden deposit for Structure 109. This midden includes pottery sherds, debitage, disposed tools and the largest amount of animal bone, most likely indicating a component of the inhabitants' diet.

Pakal Na

Operation 13 at Structure 127

Operation 13 is a squared 2 x 4 m unit placed on Structure 127 at Pakal Na. Multiple zones in each square were excavated, revealing highly mottled stratigraphy, in 5.305 cubic meters of soil. The overall artifact density of the operation is relatively low (Tables 14.21 – 14.24), especially in comparison with the excavations at Pechtun Ha. Zones 1 and 2 in Squares A and B are compact soils, making for poor artifact preservation and very low artifact density. There is a cultural spike in Zone 2 of Square B with 75 pottery sherds, but the zone is a full cubic meter causing a low density of 136.327 grams per cubic meter.

Zone 4 is located solely in Square B in the northeastern corner. A small zone of only 0.007 cubic meters yielded 261 pottery sherds and one piece of debitage, for an item density of 37,286.7 sherds and a volume of 31,957.1 g/cubic meter (Table 14.24). A circular shaped piece of baked clay was also recovered, although its function remains unclear. It is believed that this zone is a cache deposit based on the numerous sherds in such a small area. The contents of Zone 4 are also in close association with the location of the tubular greenstone bead and 5 obsidian blades found in the surficial, plow-scarred zone.

Zone 5 is in stratigraphic association with Zone 2 and demonstrates an increased artifact density in debitage and pottery sherds. The first subsurface obsidian blades of the excavation were recovered, as well as two chipped tools, one of which exhibited signs of extreme heat. The density decreases in Zone 6, with lower pottery, debitage, and obsidian densities. The cultural occupation of Operation 13 is difficult to evaluate from the densities since they are consistently low, with the exception of Zone 4B. The cultural layers appear to occur in Zones 2 through 5, but to diminish in the last strata. It is also possible that the cultural layers may have been affected by the plowing that occurred over the structure, as evidenced by a plow scar. This may have shaved off the top of the Zone 4B cache deposit, thus re-depositing some of the artifacts on the surface of the mound.

Operation 16 at Structure 130

Operation 16 is a 1 x 2 m unit in the area between Structures 130 and 132. The location was based upon the results of a shovel test-pitting program and the unit was positioned to maximize retrieval of architectural information and artifacts from the associated midden. Zones 1 through 4 show a trend of increasing artifact counts and densities from Zone 1 (virtually sterile alluvial soil) to Zone 4 that contained a high artifact density (Tables 14.25 - 14.28). All artifact categories follow this increasing trend, with the exception of obsidian. Zone 4 appears to be the core of the midden, as artifact density is highest and excavation revealed that the artifacts are evenly distributed through the zone. Excavations proceeded through zones 5, 6 and 7 with the number of artifacts appearing to decrease. Here, it is important to note that for Tables 14.25 - 14.28, that the totals calculated are not the comprehensive totals for the entire operation, but only for Zones 1 - 4.

The Oshon Site

Excavations at the Oshon Site began in the final weeks of the 1999 field season, thus allowing for only limited examination. The artifact data will be used more for comparison in artifact trends with Pechtun Ha and Pakal Na rather than intrasite analysis. The operations tend to have fewer zones and thus make for difficult examination of artifact trends between zones (Tables 14.29 - 14.36).

Operation 18, Zone 1, was a 1 square meter unit associated with Structure 401 and was positioned to examine a line of stones at the base of the structure. Operation 19 is a 1 x 2 m unit placed because the shovel test pits revealed high artifact density. Zone 2 has the highest artifact density for any zone of an operation with the exceptions of the small volume Operation 13, Zone 4B and Operation 12, Zone 4. The average density for Operation 19 was the highest out of all of the operations examined, thus testifying to the high artifact density of the Oshon Site. A small whistle with an applique human figure with earspools was also recovered from Zone 2, demonstrating the

variety of the artifact assemblage. The broken nature of the artifacts in this excavation, however, in conjunction with the high density, suggests the area was used for depositing broken goods. Preliminary examination of the data, as well as of unprocessed artifacts in numerous artifact bags, reveals high artifact densities in a small volume operation.

Discussion and Conclusions

When examining the artifact categories, differences among the three Sibun River sites appear with respect to densities of pottery sherds, debitage, and obsidian. Excavation units from Pechtun Ha demonstrated that the site had a high density of pottery sherds while the density of debitage was relatively low. Obsidian was medium in density at the site. Ninety-two pieces were recovered, over half of which came from the midden in Operation 9. In comparison, Pakal Na contains much less obsidian, though the difference in densities of sherds and debitage was slighter.

Further differences in artifact densities appear between Pechtun Ha and Pakal Na. Operations 8, 9 and 12 have similar artifact categories and densities, but compared to Operations 10 and 11 of Structure 100, differences become apparent. Operation 10 exhibits low densities of all artifact types except pottery sherds, where the mass density is high due to numerous large pieces. Likewise, Operation 11 contains larger pottery sherds, but considering the volume excavated, there are relatively few artifacts. This could possibly be because much of the volume consisted of large limestone rocks, but the artifact density remains low nonetheless. However, Operations 8, 9, and 12 have pottery sherd densities in the thousands while Operations 10 and 11 are only in the hundreds. A further difference is the presence of speleothems on the surface of Structure 100. These cave formations suggest a ritual function for the structure, as speleothems would have to have been intentionally removed from the caves and brought to the mound. The associated stela and altar to the east of the mound further support a ceremonial function.

The possibility of ceremonial use once again rises when examining Operation 13 at Pakal Na, Structure 127. It is a very “clean” operation, especially when the densities are compared to the Pechtun Ha operations. Artifact densities do not resemble Operations 8, 9, and 12 at Pechtun Ha. Instead, the low densities of Operation 13 much more closely resemble those of Operations 10 and 11 at Pechtun Ha. This similarity could tenuously suggest a ritualistic function for Structure 127 since it seems plausible that Structure 100 is also ceremonial. The possibility that the Pakal Na structure was some type of shrine is also based on the presence of the tubular greenstone bead and 5 obsidian blades believed to be part of a cache deposit. This is speculation, but it remains clear that the data from Operation 13 has more correlation with Operations 10 and 11 than with the domestically associated Operations 8, 9 and 12.

Operation 16 at Pakal Na likewise exhibits a similarity with Pechtun Ha. The almost 3,000 sherds of pottery that were recovered from the excavation put their density on par with those from Structure 109 at Pechtun Ha. The 132 pieces of debitage recovered also make for a similarity with Pechtun Ha. Pechtun Ha Operations 8, 9, and 12 are thought to be domestic contexts, and thus parallels with Operation 16 and its suspected midden are logical. All of the excavations have high artifact densities, especially pottery sherds and debitage.

Of the three sites analyzed, the Oshon Site contained the highest artifact densities, based mainly upon the artifacts recovered from Operation 19. The amount of obsidian recovered also is extremely high in relation to Pechtun Ha and Pakal Na. The same holds true for debitage, as approximately one piece of debitage was recovered for every three pottery sherds. The high artifact densities suggest that at least some individuals at the Oshon Site had access to many important and valuable items.

Table 14.1 Operation 8 artifact counts

Zone	Animal Bone	Debitage	Grd. Tool	Human Bone	Obsidian	Pottery	Pyrite	Total
1		1				10		11
2		77	2		12	482		573
3		32	1		8	365	1	407
4		9	2		3	94		108
6		26	1			301		328
8	1	6		1		140		148
Total	1	151	6	1	23	1392	1	1575

Table 14.2 Operation 8 artifact weights (g)

Zone	Animal Bone	Debitage	Grd. Tool	Human Bone	Obsidian	Pottery	Pyrite	Total
1		0.90				13.80		14.70
2		182.70	65.80		6.30	962.70		1217.50
3		27.50	10.60		3.80	659.10	2.40	703.40
4		38.90	460.50			146.50		645.90
6		71.40				655.90		727.30
8	0.00	9.60		0.00		357.60		367.20
Total	0.00	331.00	536.90	0.00	10.10	2795.60	2.40	3676.00

Table 14.3 Operation 8 artifact density (number/m³)

Zone	Animal Bone	Debitage	Grd. Tool	Human Bone	Obsidian	Pottery	Pyrite	Total	Volume
1		17.857				178.571		196.429	0.056
2		213.889	5.556		33.333	1338.889		1591.667	0.360
3		172.043	5.376		43.011	1962.366	5.376	2188.172	0.186
4		39.474	8.772		13.158	412.281		473.684	0.228
6		95.588	3.676			1106.618		1205.882	0.272
8	3.155	18.927		3.155		441.640		466.877	0.317
Average	0.705	106.413	4.228	0.705	16.209	980.973	0.705	1109.937	1.419

Table 14.4 Operation 8 artifact volumetrics (g/m³)

Zone	Animal Bone	Debitage	Grd. Tool	Human Bone	Obsidian	Pottery	Pyrite	Total	Volume
1		16.071				246.429		262.500	0.056
2		507.500	182.778		17.500	2674.167		3381.944	0.360
3		147.849	56.989		20.430	3543.548	12.903	3781.720	0.186
4		170.614	2019.737			642.544		2832.895	0.228
6		262.500				2411.397		2673.897	0.272
8	0.000	30.284		0.000		1128.076		1158.360	0.317
Average	0.000	233.263	378.365	0.000	7.118	1970.120	1.691	2590.557	1.419

Table 14.5 Operation 9 artifact counts

Zone	Animal Bone	Debitage	Grd. Tool	Obsidian	Pottery	Pyrite	Unworked Shell	Total
1					1			1
2		3		3	20			26
3		57		6	175		1	239
4	5	67		11	626			709
5	2	11	1	25	811	1		851
6	3	15		5	369			392
7		1			26			27
Total	10	154	1	50	2028	1	1	2245

Table 14.6 Operation 9 artifact weights (g)

Zone	Animal Bone	Debitage	Grd. Tool	Obsidian	Pottery	Pyrite	Unworked Shell	Total
1					0.700			0.700
2		5.300			47.400			52.700
3		128.800			385.500		1.400	515.700
4		124.000		10.300	1145.300			1279.600
5	2.700	89.300	0.000	12.600	1657.800	5.700		1768.100
6		44.300		0.900	1283.800			1329.000
7		0.900			43.800			44.700
Total	2.700	392.600	0.000	23.800	4564.300	5.700	1.400	4990.500

Table 14.7 Operation 9 artifact density (number/m³)

Zone	Animal Bone	Debitage	Grd. Tool	Obsidian	Pottery	Pyrite	Unworked Shell	Total	Volume
1					3.077			3.077	0.325
2		46.154		46.154	307.692			400.000	0.065
3		202.128		21.277	620.567		3.546	847.518	0.282
4	17.301	231.834		38.062	2166.090			2453.287	0.289
5	3.953	21.739	1.976	49.407	1602.767	1.976		1681.818	0.506
6	17.647	88.235		29.412	2170.588			2305.882	0.170
7		4.292			111.588			115.880	0.233
Average	5.348	82.353	0.535	26.738	1084.492	0.535	0.535	1200.535	1.870

Table 14.8 Operation 9 artifact volumetrics (g/m³)

Zone	Animal Bone	Debitage	Grd. Tool	Obsidian	Pottery	Pyrite	Unworked Shell	Total	Volume
1					2.154			2.154	0.325
2		81.538			729.231			810.769	0.065
3		456.738			1367.021		4.965	1828.723	0.282
4		429.066		35.640	3962.976			4427.682	0.289
5	5.336	176.482	0.000	24.901	3276.285	11.265		3494.269	0.506
6		260.588		5.294	7551.765			7817.647	0.170
7		3.863			187.983			191.845	0.233
Average	1.444	209.947	0.000	12.727	2440.802	3.048	0.749	2668.717	1.870

Table 14.9 Operation 10 artifact counts

Zone	Animal Bone	Debitage	Mod. Speleothem	Obsidian	Pottery	Unworked Shell	Total Artifacts
1		2	1+		13	5	21
2	1	1		2	26	15	45
3	12	10		1	134	27	184
4	40	1			229		270
5					40		40
6		1		1			2
Total	53	15	1+	4	442	47	562

Table 14.10 Operation 10 artifact weights (g)

Zone	Animal Bone	Debitage	Mod. Speleothem	Obsidian	Pottery	Unworked Shell	Total Artifacts
1		14.800	0.000		295.300	3.300	313.400
2				0.200	354.200	27.200	381.600
3	6.800	16.200		0.600	506.200	26.800	556.600
4	75.500	4.200			1356.800		1436.500
5					78.400		78.400
6							0.000
Total	82.300	35.200	0.000	0.800	2590.900	57.300	2766.500

Table 14.11 Operation 10 artifact density (number/m³)

Zone	Animal Bone	Debitage	Mod. Speleothem	Obsidian	Pottery	Unworked Shell	Total Density	Volume
1		36.364	18.182		236.364	90.909	381.818	0.055
2	2.283	2.283		4.566	59.361	34.247	102.740	0.438
3	21.661	18.051		1.805	241.877	48.736	332.130	0.554
4	187.793	4.695			1075.117		1267.606	0.213
5					246.914		246.914	0.162
6								
Average	37.271	10.549	0.703	2.813	310.830	33.052	395.218	1.422

Table 14.12 Operation 10 artifact volumetrics (g/m³)

Zone	Animal Bone	Debitage	Mod. Speleothem	Obsidian	Pottery	Unworked Shell	Total Density	Volume
1		269.091	0.000		5369.091	60.000	5698.182	0.055
2				0.457	808.676	62.100	871.233	0.438
3	12.274	29.242		1.083	913.718	48.375	1004.693	0.554
4	354.460	19.718			6369.953		6744.131	0.213
5					483.951		483.951	0.162
6								
Average	57.876	24.754	0.000	0.563	1822.011	40.295	1945.499	1.422

Table 14.13 Operation 11 artifact counts

Zone	Animal Bone	Debitage	Obsidian	Pottery	Stone Disc	Unworked Shell	Total
1A		3		20		5	28
2A	1	2		32		19	54
3A	2	2		20		2	26
4A		7	1	81		9	98
5A				15			15
6A		26	2	6	1		35
Total	3	40	3	174	1	35	256

Table 14.14 Operation 11 artifact weights (g)

Zone	Animal Bone	Debitage	Obsidian	Pottery	Stone Disc	Unworked Shell	Total
1A		38.100		263.100		0.900	302.100
2A				273.800		22.400	296.200
3A	2.000	2.300		179.500		3.200	187.000
4A		62.900	1.500	351.000		25.600	441.000
5A				27.200			27.200
6A		426.600	0.200	9.100	516.700		952.600
Total	2.000	529.900	1.700	1103.700	516.700	52.100	2206.100

Table 14.15 Operation 11 artifact density (number/m³)

Zone	Animal Bone	Debitage	Obsidian	Pottery	Stone Disc	Unworked Shell	Total	Volume
1A		15.000		100.000		25.000	140.000	0.200
2A	1.799	3.597		57.554		34.173	97.122	0.556
3A	10.582	10.582		105.820		10.582	137.566	0.189
4A		4.014	0.573	46.445		5.161	56.193	1.744
5A				7.493			7.493	2.002
6A		12.974	0.998	2.994	0.499		17.465	2.004
Average	0.448	5.975	0.448	25.990	0.149	5.228	38.237	6.695

Table 14.16 Operation 11 artifact volumetrics (g/m³)

Zone	Animal Bone	Debitage	Obsidian	Pottery	Stone Disc	Unworked Shell	Total	Volume
1A		190.500		1315.500		4.500	1510.500	0.200
2A				492.446		40.288	532.734	0.556
3A	10.582	12.169		949.735		16.931	989.418	0.189
4A		36.067	0.860	201.261		14.679	252.867	1.744
5A				13.586			13.586	2.002
6A		212.874	0.100	4.541	257.834		475.349	2.004
Average	0.299	79.149	0.254	164.854	77.177	7.782	329.515	6.695

Table 14.17 Operation 12 artifact counts

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Total
1			6		1	98	105
2			5		1	48	54
3	17	1	26	1		342	387
4	86		4	1		74	165
5	34	1	19		3	672	729
6	166		13		3	693	875
7	103		1		4	384	492
8	8	1	1			79	89
Total	414	3	75	2	12	2390	2896

Table 14.18 Operation 12 artifact weights (g)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Total
1			15.100			174.500	189.600
2			11.400			111.900	123.300
3	113.200	128.600	45.200	145.200		835.800	1268.000
4	19.700		13.000	244.700		142.200	419.600
5	50.600	24.000	73.500		1.500	1699.900	1849.500
6	24.900		21.400			2133.100	2179.400
7	82.500		0.000		1.000	2370.900	2454.400
8	13.800	14.700	2.300			295.800	326.600
Total	304.700	167.300	181.900	389.900	2.500	7764.100	8810.400

Table 14.19 Operation 12 artifact density (number/m³)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Total	Volume
1			38.462		6.410	628.205	673.077	0.156
2			50.000		10.000	480.000	540.000	0.100
3	47.619	2.801	72.829	2.801		957.983	1084.034	0.357
4	7166.667		333.333	83.333		6166.667	13750.000	0.012
5	207.317	6.098	115.854		18.293	4097.561	4445.122	0.164
6	697.479		54.622		12.605	2911.765	3676.471	0.238
7	536.458		5.208		20.833	2000.000	2562.500	0.192
8								
Average	339.600	2.461	61.526	1.641	9.844	1960.623	2375.718	1.219

Table 14.20 Operation 12 artifact volumetrics (g/m³)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Total	Volume
1			96.795			1118.590	1215.385	0.156
2			114.000			1119.000	1233.000	0.100
3	317.087	360.224	126.611	406.723		2341.176	3551.821	0.357
4	1641.667		1083.333	20391.667		11850.000	34966.667	0.012
5	308.537	146.341	448.171		9.146	10365.244	11277.439	0.164
6	104.622		89.916			8962.605	9157.143	0.238
7	429.688				5.208	12348.438	12783.333	0.192
Average	249.959	137.244	149.221	319.852	2.051	6369.237	7227.564	1.219

Table 14.21 Operation 13 artifact counts

Zone and Sq.	Carbonized Seed	Chipped Tool	Debitage	Grd. Tool	Obsidian	Polished Stone	Pottery	Total Artifacts
1A			3				3	6
1B			6				11	17
2A			15				7	22
2B	1		5			1	75	82
4B			1				261	262
5A		2	17		3		243	265
5B			4		1		68	73
6A	1		27	1	4	1	80	114
6B			9				92	101
Total	2	2	87	1	8	2	840	942

Table 14.22 Operation 13 artifact weights (g)

Zone and Sq.	Carbonized Seed	Chipped Tool	Debitage	Grd. Tool	Obsidian	Polished Stone	Pottery	Total Artifacts
1A			11.100				4.000	15.100
1B			13.300				14.400	27.700
2A			15.900				14.600	30.500
2B	0.000		6.100				136.600	142.700
4B			2.000				223.700	225.700
5A		47.100	76.400		2.100		412.800	538.400
5B			9.600		0.500		102.600	112.700
6A			48.800	100.000	2.600	23.400	97.700	272.500
6B			12.100				167.000	179.100
Total	0.000	47.100	195.300	100.000	5.200	23.400	1173.400	1544.400

Table 14.23 Operation 13 artifact density (number/m³)

Zone and Sq.	Carbonized Seed	Chipped Tool	Debitage	Grd. Tool	Obsidian	Polished Stone	Pottery	Total Artifacts	Volume
1A			6.250				6.250	12.500	0.480
1B			11.299				20.716	32.015	0.531
2A			18.293				8.537	26.829	0.820
2B	0.998		4.990			0.998	74.850	81.836	1.002
4B			142.857				37285.714	37428.571	0.007
5A		6.154	52.308		9.231		747.692	815.385	0.325
5B			14.388		3.597		244.604	262.590	0.278
6A	0.965		26.062	0.965	3.861	0.965	77.220	110.039	1.036
6B			10.896				111.380	122.276	0.826
Average	0.377	0.377	16.400	0.189	1.508	0.377	158.341	177.568	5.305

Table 14.24 Operation 13 artifact volumetrics (g/m³)

Zone and Sq.	Carbonized Seed	Chipped Tool	Debitage	Grd. Tool	Obsidian	Polished Stone	Pottery	Total Artifacts	Volume
1A			23.125				8.333	31.458	0.480
1B			25.047				27.119	52.166	0.531
2A			19.390				17.805	37.195	0.820
2B	0.000		6.088				136.327	142.415	1.002
4B			285.714				31957.143	32242.857	0.007
5A		144.923	235.077		6.462		1270.154	1656.615	0.325
5B			34.532		1.799		369.065	405.396	0.278
6A	0.000		47.104	96.525	2.510	22.587	94.305	263.031	1.036
6B			14.649				202.179	216.828	0.826
Average	0.000	8.878	36.814	18.850	0.980	4.411	221.188	291.122	5.305

Table 14.25 Operation 16 artifact counts

Zone and Sq.	Animal Bone	Debitage	Fish Net Weights	Grd. Tool	Obsidian	Pottery	Total
1A			1	1		1	3
2A		2				56	58
3A		55		1	4	691	751
4A	5	75		7	3	2206	2296
Total	5	132	1	9	7	2954	3108

Table 14.26 Operation 16 artifact weights (g)

Zone and Sq.	Animal Bone	Debitage	Fish Net Weights	Grd. Tool	Obsidian	Pottery	Total
1A			90.000	4.200		0.800	95.000
2A		8.000				142.100	150.100
3A		132.200		28.400	3.000	1739.300	1902.900
4A	10.000	301.400		652.100	1.100	4213.700	5178.300
Total	10.000	441.600	90.000	684.700	4.100	6095.900	7326.300

Table 14.27 Operation 16 artifact density (number/m³)

Zone and Sq.	Animal Bone	Debitage	Fish Net Weights	Grd. Tool	Obsidian	Pottery	Total	Volume
1A			2.062	2.062		2.062	6.186	0.485
2A		7.143				200.000	207.143	0.280
3A		112.245		2.041	8.163	1410.204	1532.653	0.490
4A	6.757	101.351		9.459	4.054	2981.081	3102.703	0.740
Average	2.506	66.165	0.501	4.511	3.509	1480.702	1557.895	1.995

Table 14.28 Operation 16 artifact volumetrics (g/m³)

Zone and Sq.	Animal Bone	Debitage	Fish Net Weights	Grd. Tool	Obsidian	Pottery	Total	Volume
1A			185.567	8.660		1.649	195.876	0.485
2A		28.571				507.500	536.071	0.280
3A		269.796		57.959	6.122	3549.592	3883.469	0.490
4A	13.514	407.297		881.216	1.486	5694.189	6997.703	0.740
Average	5.013	221.353	45.113	343.208	2.055	3055.589	3672.331	1.995

Table 14.29 Operation 18 artifact counts

Zone and Sq.	Debitage	Obsidian	Pottery	Total Artifacts
1A	18	1	54	73

Table 14.30 Operation 18 artifact weights (g)

Zone and Sq.	Debitage	Obsidian	Pottery	Total Artifacts
1A	165.400	1.100	242.200	408.700

Table 14.31 Operation 18 artifact density (number/m³)

Zone and Sq.	Debitage	Obsidian	Pottery	Total Density	Volume
1A	105.300	5.800	315.800	426.900	0.171

Table 14.32 Operation 18 artifact volumetrics (g/m³)

Zone and Sq.	Debitage	Obsidian	Pottery	Total Density	Volume
1A	967.251	6.433	1416.374	2390.056	0.171

Table 14.33 Operation 19 artifact counts

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Whistle	Total
1	25		20		7	98		150
2	27	7	493	1	28	1431	1	1988
Total	52	7	513	1	35	1529	1	2138

Table 14.34 Operation 19 artifact weights (g)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Whistle	Total
1	50.400		109.300		8.300	515.300		683.300
2	25.300	255.100	2186.400	0.000	24.700	4143.900	0.000	6635.400
Total	75.700	255.100	2295.700	0.000	33.000	4659.200	0.000	7318.700

Table 14.35 Operation 19 artifact density (number/m³)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Whistle	Total	Volume
1	58.685		46.948		16.432	230.047		352.113	0.426
2	106.719	27.668	1948.617	3.953	110.672	5656.126	3.953	7857.708	0.253
Average	76.583	10.309	755.523	1.473	51.546	2251.841	1.473	3148.748	0.679

Table 14.36 Operation 19 artifact volumetrics (g/m³)

Zone	Animal Bone	Chipped Tool	Debitage	Grd. Tool	Obsidian	Pottery	Whistle	Total	Volume
1	118.310		256.573		19.484	1209.624		1603.991	0.426
2	100.000	1008.300	8641.897	0.000	97.628	16379.051	0.000	26226.877	0.253
Average	111.487	375.700	3381.001	0.000	48.601	6861.856	0.000	10778.645	0.679



Chapter 15

Colonial Period Settlement in the Valley

Patricia A. McAnany

Introduction

Research on Colonial-period occupation within the Sibun Valley has just begun. Compilation of existing primary and secondary historical sources hints at the existence of a rich historical record including the presence of a late sixteenth-century Spanish mission, British colonial sites dating to the latter part of the eighteenth century, and nineteenth-century Maroon sites established by escaped slaves of African ancestry. The discovery of a nineteenth-century tombstone during the 1999 field season further personalizes the history of this valley. Below, this evidence is discussed as a prelude to archaeological fieldwork to be conducted during the 2001 season and designed specifically to locate historical sites.

Spanish Colonial Incursions

During the sixteenth century, Spanish *conquistadores* arrived in the Americas and eventually made their presence known in the Sibun Valley. Often called the Xibun Valley in early historical documents, cacao orchards of the valley likely attracted Spanish attention (Jones 1989:103). Apparently, the Spanish Crown bestowed a grant of Sibun valley land and native labor (an *encomienda*) to a Spaniard. In return, the grantee was obliged to build a small church for a visiting friar and to promote the Christian conversion of the Xibun Maya. Called a *visita*, such a chapel was built somewhere along the Sibun (Figure 15.1); its exact location is yet to be discovered. Historian Grant Jones (1989:201) has found evidence that the church was adorned with a bell through an account of the desertion of the Xibun community in 1630 at which time Xibun Maya resisting their Spanish overlords removed the bell from the church and took it with them. The *visita* was abandoned sometime after 1635 and, after that time there is little historical record of Maya settlement in the Sibun Valley. The next event of the Colonial period takes place around 1786 when an Anglo-Spanish Treaty extended the boundary of permissible timber extraction south to the Sibun River.

Anglo-Belizean and Maroon Settlements

During the year following the 1786 treaty, a map of land-claims was produced by David Lamb “by order of Edward Marcus Despard, Esq.” This map and more recent versions of it were re-discovered in a London archive by Daniel Colonial settlements. Shown on the maps are the locations of small houses and camps along the Sibun River. These symbols are accompanied by

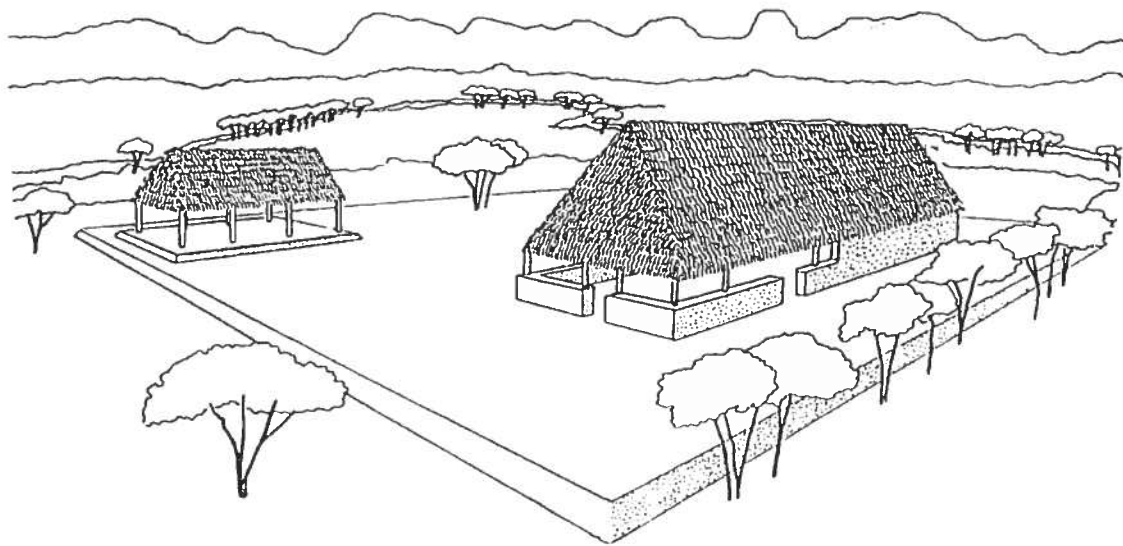


Figure 15.1 Hypothetical reconstruction of the Spanish *visita* of the Sibun Valley (drawing by Steven Morandi).

surnames of individuals claiming the land, most likely for the purpose of lumbering mahogany with crews of slaves of African ancestry. Proceeding up river from 4-Mile Creek, names (from the 1787 maps) include the following: Dean, Sullivan, Bath, William Tucker, Grace Taylor, English, Bach, Jackson, Carey, Tealing, T. Smith, I. Dean, Humphrys, Yarborough, Feril, McGillivry, Teland, Harrison, Mauger, Hicky and Garbut. Some of these individuals (or families) held more than one parcel along the river. The holding of Grace Taylor (the sole female name) was located directly below Gracy Rock, suggesting that there may be some historical truth to the story that this place name harkens back to a woman named Grace who frequently was seen laundering her clothes on a rock near the river.

A subsequent 1833 map shows that there was considerable change in land ownership during the intervening period of 46 years. Family names from this period include J. Young in the current Freetown Sibun area; Hill in the Gracy Rock area; English in the area between Teakettle Creek and Colonel English Creek; Jackson in the stretch between Indian Creek and Caves Branch; and Yarborough at the confluence of Caves Branch with the Sibun River. Between the resurgence of Caves Branch and its mouth, there were two holdings: one by Lawrie on the north side of the river and one by A. Young on the south side. Not far up the Sibun beyond Caves Branch, two holdings (both on the north side of the river) are indicated for J. Young who was followed upstream by another holding by English. Whether these holdings were timber camps or farms is not clear. Continuity in holdings between the 1787 and the 1833 maps exist in three names only: English, Jackson, and Yarborough. The holdings indicated on these archival maps could be difficult but not impossible to locate. Many Sibun valley residents likely know the location of old bottle dumps and a concerted effort to document this first European occupation of the valley would be an important step towards documenting the cultural heritage of the Sibun Valley.

During the nineteenth century, government reports suggest that settlements were established by slaves who escaped the shackles of slavery and sought to live independently in isolated locales within the Sibun Valley. The locations of these settlements (called Maroon sites) are not known, we have only documentary records of their existence. In the historical treatise, *Archives of British Honduras*, Sir John Alder Burdon referred to an 1816 report of a Maroon community “near Sheboon River, very difficult to discover, and guarded by poisonous Stakes” (Burdon 1935: v. 2, 184). This report was followed by a letter dated 1820 (written by Superintendent Arthur to a Mr. Bathurst) which mentioned the existence of “two Slave Towns, which it appears have long been formed in the Blue Mountains to the Northward of Sibun” (cited in Bolland 1988:63). Historical sociologist Nigel Bolland (1988:40) suggests that the community noted by Burdon may have been located near the Runaway Creek tributary to the Sibun but to date the settlement has not been found. The established Maroon communities mentioned by Superintendent Arthur likely were situated at the base of the Maya Mountains where the Sibun Gorge empties onto the fertile valley bottomland. The Maya Mountain portion of the Sibun drainage has been called the Blue Mountains (currently, the Chanona-family farm—located at the base of the gorge—is named Blue Mountain Ranch), but these Maroon communities also await discovery and documentation.

When land at the base of the Sibun gorge and east of the present-day Hummingbird Highway was developed for cacao production, a tombstone was removed from an area near the river called St. Thomas. When the author located this tombstone during the month of April, 1999, it had been placed behind the Hummingbird Citrus Limited cacao-processing plant (Figure 15.2). This piece of white granite measures 150 cm (in length) by 80 cm (in width) by 10 cm (in thickness). It bears the following inscription that was professionally chiseled and presented in five lines of text:

**IN MEMORY OF
ROBERT GENTLE
WHO DIED ON THIS BANK
THE 12th MAY 1812
IN THE 39th YEAR OF HIS AGE**

Unfortunately, the inscription on the upper three lines of the stone is better preserved than the lower section. Regardless, the third and fourth lines appear to state the date (May 12, 1812) of the death of Robert Gentle and the fact that he died in his 39th year. So, the tombstone commemorates the death of Robert Gentle on the banks of the Sibun River. The stone on which the memorial was carved probably was imported and the inscription itself likely crafted by a professional (of which there were precious few in this British colony in 1812). But still, many questions remain regarding the circumstances of his life and death. The Gentle family is not listed on the property-holding map of 1833; had the family acquired property in the valley or was Robert Gentle an employee of a large land-holding estate such as Belize Estates? Did he die by drowning (and thus the reference to the bank of the river), through foul play, or as a consequence of hard physical labor while working in the lumber extraction industry? Whatever the cause of his death, he left behind a memory strong enough to compel family, friends, co-workers, or an employer to purchase and install a professionally inscribed tombstone on the banks of the Sibun River.



Figure 15.2 Tombstone of Robert Gentle found behind the cacao plant at Hummingbird Citrus Limited (photo by P. A. McAnany).

This brief historical overview indicates that between the sixteenth and the nineteenth centuries, the Sibun Valley attracted many different types of settlers: Maya, Spanish, European, and African. Through the twentieth and twenty-first centuries, Garifuna, Creole, and Asian settlers also found the Sibun valley to be a hospitable place to live. Embedded within the cultural history and cultural remains of the valley there are many human dramas and compelling mysteries such as that of the *visita*, Robert Gentle, and the Maroon communities. With a combination of archival and archaeological research, many of these stories of human struggle and triumph can be brought to light and recorded for future generations.

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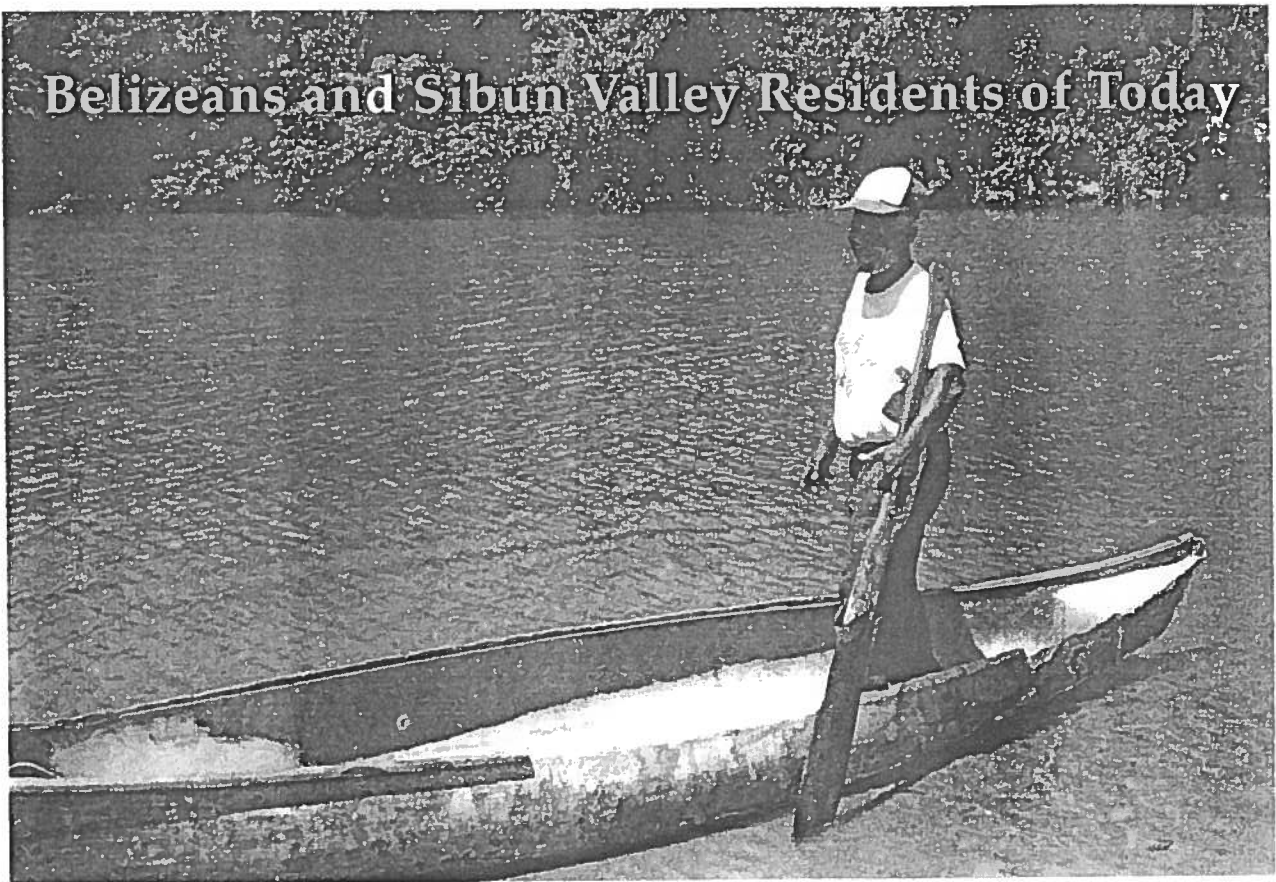
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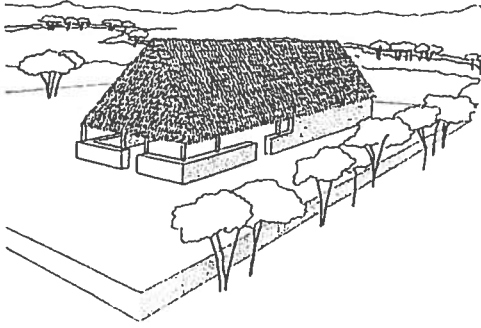
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Part III





Chapter 16

Belizean Perspectives on Archaeological Research

Geralyn Dion

Introduction

Public education in archaeology is a growing issue. Traditionally, archaeologists have focused more on collecting and studying data rather than sharing the information with the public. An archaeologist from an outside country might come to Belize to conduct research and leave without informing the local population of the findings. It is important to share information gained with Belizeans about their past. In order to determine the kind of public education programs offered by the government of Belize, the commissioner of the Department of Archaeology (DOA) was interviewed during the Spring of 1999. In order to assess the public's opinion about archaeology, a survey was conducted asking Belizeans their feelings about archaeology. This chapter presents the results of the DOA interview and of the questionnaire. The information gathered provides insight on the types and effectiveness of public archaeological education programs. The purpose of this assessment is to aid in the improvement of the relationship between archaeologists and the people of Belize.

Methods and Questionnaire Content

A questionnaire was designed and distributed to a sample of Belizeans. Due to time constraints, a total of only 50 Belizeans were approached to answer the questionnaire. The locations of the interviews were chosen to avoid disturbing people in their homes or at work. Interview locations included Novelo's bus station in Belmopan and two restaurants along the Western Highway, "Cheers" and "JB's."

Belize contains a wide variety of ethnic groups, and the project was designed to include each in the sample. These groups include Mennonites, Creoles, Mestizos, Garifuna, Maya, European, and people born in other countries who now hold Belizean citizenship. Mennonites arrived in Belize from Canada and Mexico. They make up a Protestant sect that control their own schools and financial institutions. Creoles are descendants from African and West Indian slaves, but many people call themselves Creole mainly to differentiate themselves from Maya and Mestizo people. Many of the ancestors of the current mestizo population came to Belize as refugees from the Yucatan after the Guerra de Castas (Caste War) in 1847. Many Mayan-speakers of Belize are not direct descendants of indigenous peoples living in this area at the time of the Spanish conquest but are 19th and 20th century immigrants from Guatemala and Mexico. The Garifuna population originally came to Belize from the Bay Islands of Honduras and generally is characterized as descendants of a combination primarily of African slaves and Carib Indians.

The survey was designed to collect the opinions of the citizens of Belize. The first question on the survey asks, “What is your definition of archaeology?” The meaning of archaeology can be different for each person based on his or her background, or lack of background, on the subject. The way a person understands archaeology may affect his/her answers for the remainder of the questionnaire. The subject’s ability to answer this question also will reflect the archaeologists’ success as a public educator. In other words, if archaeologists are not doing their part to educate, the public may have misconceptions about archaeology.

The second question asks, “How do you feel about archaeology in general?” Some may think it is valuable for understanding the past and for cultural identity. Others may feel that archaeology is destroying the cultural resources. The third question asks “How do you feel about non-Belizeans working on archaeological sites in Belize?” This question is important because many foreign archaeologists come to study Belizean archaeology. If the public’s opinion is expressed on this subject, the archaeologists will have the public’s feelings in mind when dealing with individuals or communities.

Question 4 asks “Have you ever worked at an archaeological site?” This question was asked with the notion that those who have worked on a site are more knowledgeable and appreciative of archaeology. This may account for the answers given on the rest of the survey. If the person answered yes, he/she is asked which archaeologist he/she worked with and at what site. He/she is also asked if he/she enjoyed working at that site. If the person had not worked at an archaeological site, he/she is asked if he/she would like to work at an archaeological site. The purpose of this question is to ascertain the desire of Belizeans to engage in active learning about their cultural past.

Question number 5 asks, “Do you feel that the past cultures of Belize are important to understand and preserve,” and question 6 asks, “do the past cultures interest you?” The purpose of these two questions is to assess whether or not individuals care about the preservation of past cultures and have an interest in knowing about past cultures. Question 7 asks, “What do you know about the past cultures?” The purpose of this question is to evaluate whether the public is knowledgeable of the past cultures of Belize. Those responses would reflect on the quality of public education in Belize.

Question 8 asks, “How do you learn about past cultures?” with choices being school, museums, public lectures, and common knowledge. Question 9 asks, “How do you hear about local archaeological discoveries...” with choices including television, radio, local newspapers, and magazines. These questions assess if archaeology is publicized in Belize through educational institutions and/or the media. These channels are effective ways to inform the public about archaeology and past cultures. Asking the public where they get their information will let archaeologists know which educational facilities or media need improvement. The data collected by the surveys were entered into an Excel spreadsheet. Results are summarized below

The Department of Archaeology in Belize

In order to find out if there are public outreach programs for archaeology in Belize, the researcher met with Dr. Allen Moore, Commissioner of the Department of Archaeology in

Belmopan. The Department's efforts at public outreach were discussed during the interview. Dr. Moore stated that the Department of Archaeology (DOA) disseminates information about archaeology in a variety of ways. The DOA enhances sites, monuments, and material culture after they have been studied in order to develop such material for tourism in Belize. The DOA encourages foreign archaeologists to give public lectures on their work in Belize and also provides its own lectures about archaeology in Belize. The DOA contains a library available to the public. However, the library cannot handle large groups of people and is limited to smaller groups, schools, and interest groups. Public exhibits of artifacts sometimes are displayed, however these exhibits are not advertised and those who see them are limited to those who happen to pass by.

The DOA is currently working on informational pamphlets for public use. The Department would like to make pamphlets available for all who would like one; however, because of constraints in finances, not many copies will be printed. The DOA does not act directly with schools to form a curriculum. Archaeology is incorporated within the social studies program set up by the government rather than the DOA.

The Department is accessible to lay people and it is relatively easy for a person to walk into the office to speak with someone or to gather information about archaeology in Belize. This accessibility was demonstrated when I, an undergraduate student, was able to make an appointment for an interview. Dr. Moore expressed the desire to make the Department even more accessible.

Many local Belizeans could learn more about archaeology by participating on an archaeological project. According to Dr. Allen Moore, jobs for archaeological projects are not advertised. When an archaeologist wishes to hire, he/she usually will hire people from the communities near the project. The community usually knows when a project is taking place near their village and this serves as advertisement for employment. Foreign archaeologists are encouraged but not required to hire local people. The DOA does not require the hiring of Belizeans because archaeologists work with small budgets and it would be unfair to require a quota of employees. In the opinion of this researcher, a quota should be set for hiring of local Belizeans in order to facilitate education and to strength local sentiments regarding site preservation.

According to Dr. Moore, archaeologists face a dilemma pertaining to public education. It is the responsibility of the archaeologist to inform the public of archaeological projects and studies. However, information may result in the looting of these sites. At the same time, the information obtained by an archaeologist belongs to the citizens of Belize and needs to be shared with them.

It is apparent that the Department of Archaeology is attempting to educate the public about archaeology. Unfortunately, it does not receive sufficient funding to accomplish these goals. The survey given to the public reflects what Belizeans presently know about local archaeology and what the public would like to understand. This may reflect on the current accomplishments of the DOA and the areas where improvement is needed.

Results of Questionnaire

The results of the survey indicate the need for more public education regarding archaeology. The majority of those who answered the survey were Creole (17) and Mestizo (14). Garifuna,

European, Canadian, United States, East Indian, mixed Mestizo/Maya/Creole and mixed Belizean/English/ Bermudan are also represented. No Mennonites answered the survey and they are not represented in the sample. More males (38) than females (12) responded to the survey, and Belizeans from many different villages were queried.

Many people answered the first question “How would you define archaeology” by stating that archaeology was the study of the past or the study of artifacts. Another common answer was “history.” Four people answered that they did not know and nine did not answer. Those who did not answer generally answered only those questions that allowed multiple choice responses rather than open responses. Many people do know the basic definition of archaeology, which shows that the remainder of the questionnaire was answered with this definition in mind. Those who did not offer a definition of archaeology were provided with one by the author before the survey continued. Generally, such individuals would then remember hearing something about archaeology and would be able to answer the rest of the survey.

Forty-seven of the fifty people surveyed felt positive about archaeology in general. One felt negative and two had no opinion. The gentleman who felt negative about archaeology wrote, “...this study [archaeology] has not resulted as a positive result for Belize/Belizeans in that the study has not encouraged enough Belizeans to [participate]” (Questionnaire # 48). This leads the researcher to believe that he thinks archaeology is important, but he answered the question based on how he feels archaeology is conducted in Belize. Some people felt that archaeology is a positive force because it boosts the economy in the form of tourism. Others wrote of the importance for Belizeans to know their past. The results of this question show that, in general, Belizeans feel that archaeology is important for the country.

Thirty-nine people felt positive about non-Belizeans working on archaeological projects in Belize. They felt that foreign archaeologists are better educated and would be able to teach Belizeans about their past. One gentleman wrote that “more effort needs to be directed to a greater participation of locals” (Questionnaire #1) and another expressed that “...it has its advantages and disadvantages. Locals should be trained in this field. Non-Belizeans should work along with locals to achieve maximum benefit” (Questionnaire #23). Many expressed the desire for more non-Belizeans to be involved in the archaeology of Belize. Others were concerned that artifacts have been exported from the country. Five people felt negative about foreign archaeologists. One felt that archaeology should be left for the people of Belize to work on. Two felt that when foreigners excavate, the results of the studies are not reported to Belizeans. Six people had no opinion about this subject and one suggested that the projects “should entail some element of Belizean participation” (Questionnaire #9).

Ten of the Belizeans surveyed had worked on an archaeological project and out of those, only one did not enjoy the job. The majority of the participants had not worked on a site and their comments were not formed from first-hand experience. Of those with no direct field experience, almost half expressed an interest in working on an archaeological site if they had the chance, indicating that there is interest in employment in the field of archaeology.

Forty-eight of the fifty sampled felt that past cultures were important to understand and preserve. “Past cultures may teach us how to live in a sustainable manner. This is important for our future” (Questionnaire #50). The sentiment that knowledge of the past allows us to “appreciate what

we have,” was also expressed by several people. Forty-nine of fifty interviewees indicated that past cultures are of interest to them. This leads to the next question that asks, “What do you know about past cultures?” Many wrote that they did not know very much and would like to know more. These answers suggest that Belizeans are interested in learning about their past, but do not have access to sufficient educational opportunities to learn about Belizean archaeology.

The last two questions of the survey tried to determine the sources from which interviewees had received information about archaeology. Forty-one indicated that they had learned about past cultures in school while twenty-two had heard about past cultures by visiting museums. Eleven learned by attending public lectures and twenty-three knew about past cultures through common knowledge. Some mentioned tourism and what they had learned by visiting sites and listening to tour guides. Others cited books as an important resource. Thirty-five said that they heard about archaeological discoveries on television while twenty-one learned about discoveries on the radio and twenty-nine learned of discoveries from newspapers and seventeen from magazines. Many had learned about discoveries by word of mouth. A few who lived near the project headquarters of the Xibun Archaeological Research Project said that most of their knowledge came from interaction with project members. Overall, television seems to be the greatest medium for informing the public about archaeology. Whether or not television depicts archaeology accurately is a question for another study. Public lectures seem to be the least popular medium and perhaps needs to be improved. One gentleman wrote that “information is needed in local communities in a form that is comprehensible and useful so that villagers take an active interest in archaeological research and site management and protection” (Questionnaire #50). Another man expressed his desire for more public information. “Sometimes I hear about sites from friends who have heard about it from other friends, and these sites are not reported (to the public)” (Questionnaire #48). One man offered the following extensive comment:

“In Belize you do not hear about any archaeological news on TV or radio, unless it is a story about looters or drug smugglers using artifacts to remove their goods. The local Belize papers are only slightly better (to the tune of one archaeological report in the last two years). The only relevant printed matter I have seen is tour-oriented guide brochures in Belize and some relative Belize information from the United States that is published and funded by non-Belizeans” (Questionnaire #30).

It seems as if the public is not receiving adequate information, according to several comments.

Error and Biases

Within every survey there are biases as well as errors. In this study, there was error associated with the design of the survey questionnaire. One problem relates to question four (whether the interviewee ever worked at an archaeological site). This question contains sub-questions A, B, and C. On the original questionnaire, sub-question A is on one side of the page while B and C are on listed the other side. Many people did not respond to sub-questions B and C regardless of the answer given for question four. While a “yes” answer required the answering of sub-questions A and B, a “no” answer required answering sub-question C. Therefore, the results of this question may be invalid since the opinion of those who did not answer these questions cannot be ascertained. The response to question number three, “how do you feel about non-Belizeans working

on archaeological sites in Belize?” may have been biased by the fact that a non-Belizean student of archaeology was conducting the interview. Belizeans, in general, are very sensitive to their national image as warm and hospitable people and are unlikely to express negative feelings in the presence of a foreigner. Question 7, which inquired what the interviewee knows about past cultures, also contains design problems. The researcher thought this question was too broad, however, it was still included in the survey.

There are also biases in the results such as the author’s inability to communicate with Belizeans who could not understand or speak English. A Spanish version of the survey was created to include the Spanish-speaking citizens of Belize in the sample. Despite the fact that there was a Spanish version available, many Spanish-speaking citizens did not fill out a survey due to lack of communication between the researcher and the subject. Only a few surveys were completed by Spanish speakers. Another bias is that of gender. Many more male subjects agreed to fill out the survey than females. When the researcher approached a female subject, several refused to fill out a survey and asked their husbands to respond.

Discussion

As noted by Dr. Moore, the DOA is in the process of designing more effective methods for communicating with their public. The school system is a major source of public education. The DOA could work with the schools to educate young people about past cultures and archaeology. If this generation of students takes an interest in archaeology, the next generation of archaeologists in Belize may be comprised mostly of Belizeans instead of foreigners. By working with schools, the DOA could set up an appropriate curriculum that would allow students to visit and perhaps work on archaeological sites.

Non-Belizean archaeologists need to inform local communities regarding their research and discoveries. If looting is a fear, locations need not be revealed, but the information belongs to the people of Belize. Reports on archaeological research are submitted to the DOA; however, there is no mechanism for filtering this information to the public. Perhaps more public lectures given by foreign and local archaeologists about their projects would aid in educating the local population.

The DOA could require that Belizeans be hired to work on archaeological projects conducted by foreign archaeologists, a rule that currently exists in Guatemala. If budgets do not allow for such hiring, the archaeologist could, alternatively, host an “Archaeology Day” or “Archaeology Week” and open a site to visits and participation in field work by members of local communities. This would contribute to the flow of information about archaeology to the general public. Field trips by schools should also be encouraged. Finally, the media is a tool that archaeologists should use to inform the public about discoveries. Perhaps a newsletter could be started at a small cost of paper and print. The DOA has been working on pamphlets for the public, which would improve community awareness.

Conclusion

Many steps can be taken to improve public education in archaeology and to increase public awareness of the importance of preserving past cultures and, by doing so, help to diminish the

problem of looting. Results of this survey suggest that many Belizeans desire more public outreach and public education. Together the DOA and archaeologists who survey and document Belizean heritage can work to educate and involve Belizeans in archaeological research. This effort will improve relations between the people of Belize and archaeologists. As expressed by an observant Belizean, “as a modern multi-ethnic society, we need the knowledge of the past to help serve as a building block to the future” (Questionnaire #29).

Samples of Questionnaire in English and Spanish:

Public Opinion Questionnaire about Archaeology

I am a Boston University Archaeology student from the United States. I am conducting a survey in order to assess the public’s opinion about archaeology in Belize in order to work towards establishing a better relationship between the archaeologist and the public. Your opinion is important to this study. Please answer as truthfully as possible.

Sex M F

Ethnicity Creole Maya European Mennonite Mestizo
 Garifuna/Garinagu Other (Please specify) _____

Language English Spanish Other (Please specify) _____

Village _____

1. How would you define archaeology?

2. How do you feel about archaeology in general?

Positive Negative No opinion

Comments:

3. How do you feel about non-Belizeans working on archaeological sites in Belize?

Positive Negative No opinion

Comments:

4. Have you ever worked at an archaeological site?

Yes (please proceed to questions A and B) No (please proceed to question C)

A. If your answer was yes, with which archaeologists did you work and at what site?

B, Did you enjoy working at that site?

C. If your answer to No. 4 was no, would you like to work at an archaeological site?

5. Do you feel that the past cultures of Belize are important to understand and preserve?

Yes No Don't care

Comments:

6. Do the past cultures interest you?

Yes No No opinion

Comments:

7. What do you know about the past cultures?

8. How do you learn about past cultures? (Check all that apply)

School Museum Public lecture Common knowledge
 Other (please specify) _____

Comments:

9. How do you hear about local archaeological discoveries?

on television on the radio in local newspapers in magazines
 other (please specify) _____

Comments:

Preguntas al Público sobre Arqueología

Yo soy una estudiante de arqueología de la Universidad de Boston. Estoy haciendo un estudio para saber el opinión del público sobre arqueología en Belice y para establecer una mejor relación entre el arqueólogo y el público. Su opinión es importante para el estudio. Por favor conteste.

Género H M

Ethnico Creole Maya Europeo Mennonite Mestizo
 Garifuna/Garinagu Otro (Especificado por favor)

Idioma Inglés Español Otro (Especificado por favor)

Pueblo _____

1. ¿ Como definiría la ciencia arqueología?

2. ¿Qué piensa en general de la ciencia arqueología?

Positivo Negativo No opinión

Respuesta:

3. ¿Qué siente de las personas de otras países trabajando en los sitios arqueológicos en Belice?

Positivo Negativo No opinión

Respuesta:

4. ¿Ha trabajado en un sitio arqueológico?

Sí (Proceder a preguntas A y B) No (Proceder a pregunta C)

A. Si su respuesta fue sí, ¿con cuál arqueólogo trabajaba y cuál sitio?

B. ¿Le gustó trabaja en ese sitio?

C. Si su respuesta fue no, ¿le gustaría trabajar a un sitio arqueológico?

5. ¿Parece que las culturas antiguas de Belice son importantes para entender, conocer, y preservar?

Sí No No importa

Respuesta:

6. ¿Tiene interés en las culturas antiguas?

Sí No No importa

Resuesta:

7. ¿Que sabe de las culturas antiguas?

8. ¿Como aprendió de las culturas antiguas? (Marque los que apliquen)

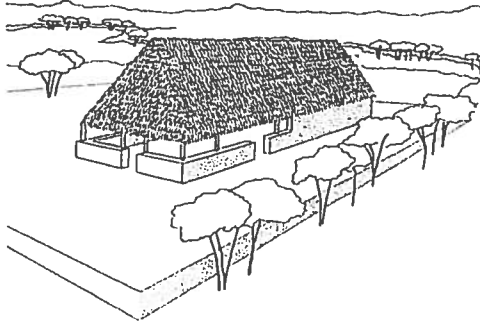
Escuela Museo Lecturas públicas Conocimiento común
 Otro (Especificado por favor)

Respuesta:

9. Como le dio cuenta de los descubrimientos arqueológicos?

Por Televisión Por radio Por periódicos Por revistas
 Otro (Especificado por favor)

Respuesta:



Chapter 17

A River Runs Through It: Oral Histories and Perspectives

Elizabeth Dembrowsky

Introduction

The Sibun River and its watershed represent many different things for the people who live and work along it. This paper examines the opinions and stories of an eclectic group of individuals whose lives are affected by and whose lives affect the river and its vicinity. By discussing the thoughts and experiences of these people, it is possible to identify the strength in the diversity of the people who live along the river, as well as to find a balance between the various plans for the river's future. It would have been logistically impossible to speak with each of some two thousand people who live near the Sibun River, but a eight people from different backgrounds were contacted and interviewed.

I contacted and scheduled interviews with several of the residents of the Sibun River Valley. At least one hour was spent with each of these individuals, and an interview was obtained. During the interviews several predetermined questions were asked. Individual interviews also involved slight variations; different questions were asked depending on the individual. An example of a general question is "What is your opinion about attempts to protect the river?" The interviewees were questioned about their relationship with the river and about their opinions concerning different issues. All of the interviews were filmed by Wardell Eisner and will be part of a planned documentary describing the various uses of the river over time. As such, this paper is part of a larger project.

In attempting to glean from these individuals an overall context for their experiences, it is of vital importance to examine their backgrounds. Knowing what brought each person to where they are presently helps to provide a perspective from which to understand the views that they now hold. Merely dedicating a few lines of text would not do justice to these peoples' lives, but even a small attempt will provide a better insight to who they are and where they are coming from. Context is an integral part of understanding opinions and views of any person.

Three of the individuals interviewed have lived their entire lives in Belize and define the Sibun River as their one true home. Samuel Oshon, an eighty-one year old Creole man, is one of these individuals. He has lived in the same house along the Sibun River since 1941. Oshon has a long history with the river and has seen it change over the years. His perspective is based on his experiences, and as a community elder, his stories are an important part of learning about the river's relatively recent past.

Augustine Obispo is another Creole man who has lived in Belize his entire life. In fact, all sixty-three of his years have been spent living in the same house on the Sibun River in Freetown. Being the oldest of seven children, he inherited the home from his parents. Augustine's home is located in an interesting spot, on the "other side" of the river, meaning that it is on the opposite bank from road transport. Most of the men and women who live along the Sibun do not live on the southern side. Augustine and his wife, Millicent, are two of the few residents who do. If Augustine or his wife needs to go into town, they must row their canoe across the river to where their truck is located. This allows them a fairly isolated lifestyle, as no one comes to their home by any means other than by crossing the river.

A third man who has spent his life living along the Sibun River is Patrick Scott, a sixty-two year old Creole man, originally from the village of Gracy Rock. He spent his "youthful life" living there and now lives along the Hummingbird Highway while still owning and maintaining a small farm in Gracy Rock. Patrick Scott is both a native of Belize and an active conservationist. In a sense, he serves as a liaison between the two groups. Currently, Scott is the Project Support Coordinator of the Sibun Watershed Association (SWA). This non-governmental organization works to create a balance between the different groups of people and their varying plans for preserving and utilizing the river. His love for the river is inspired by a lifetime experience of living by it. The work he is now doing will hopefully help others to have the opportunity to love the river as he does.

Two other conservationists were interviewed, both of them were born in the United States and now view Belize as their home. Ed Boles has made his major focus to gather information about the watershed and to disseminate this knowledge to people who live near the river. He hopes to "bring about awareness for issues that a lot of people aren't really concerned about." Boles serves as a Watershed Consultant for SWA. He has been involved with the SWA since 1994, when it was no more than an idea. Now, only five years later, Boles has helped to make the association a reality.

Matthew Miller, also from the United States, came to Belize for the first time in the 1980's as a Peace Corp volunteer. He now manages Monkey Bay, a 1000 acre wildlife sanctuary. He and his family live at Monkey Bay and are working to build a self-sustainable home for themselves. They utilize solar energy, rainwater collection systems, and a "biogas" methane-to-butane converter. Miller is a member of the Coordinating Committee of the SWA as well as being a co-founder of the SWA.

Another interviewee who is not a native of Belize is Percy Chastinet, a Guinean man who made Belize his home in 1964. He cites the reason he migrated to Belize to be the commonalities between Belize and his homeland. He left his country when a communist government gained power. In 1991, he moved to his present home which is located along the Sibun River.

One married couple who moved together to Belize is Jack and Dixie Vandervinnie. Originally from Holland, the Vandervinnies were living in Canada fifteen years ago when they decided to move to the Sibun River valley. They are citrus growers and have an interesting perspective to share. Dixie is an active member in SWA and serves as the representative for the local businesses. She and Jack help to operate a citrus farm along the river.

The river serves as a multifunctional resource, meaning different things to all of the people who use it. From fishing and traveling to bathing and drinking, the river is the site of many different activities. In order to form a clearer picture of the relationship between the Sibun River and the people who live along it, it is important to learn about the different roles of the river.

Samuel Oshon speaks of paddling a canoe along the river during the course of his lifetime. He brags about how he was a champion paddler in his youth and boasts that if he had his eyesight (Oshon went blind several years ago), he would still be winning canoe races. In his words, he has “witnessed a lot of good things on this earth,” and his experiences serve as an education to the younger generation.

Patrick Scott also remembers the importance of the Sibun River as a constant influence that has continued throughout his life. He grew up in Belize before a highway connected Belize City to his village, Gracy Rock. He tells of how the river was the major mode of transportation before the Western Highway was built. He and his family would use the river as a “highway” on which to travel east to Belize City in order to transport fresh produce for sale in the city. He would bring citrus, cacao, and Maya apples, along with other crops.

Scott also uses the river for recreation, and he has been paddling on the river since the age of ten. He also uses the river for hunting and fishing, very common practices among the community elders. Augustine Obispo also shared his fishing and hunting experiences on the river. Obispo tells stories of hunting armadillo, gibbon, and deer near the river. He also tells of the days when “there was a lot of Hickatee,” and how he would dive for the Hickatee turtle, something he no longer does, nor encourages.

In addition to providing a corridor of transport and an opportunity for hunting, the river is a valuable source of water for the people who live along it. The common bond that local people share is using the river for its water. By bathing, clothes washing, drinking, or all three, everyone uses the river’s water. Dixie Vandervinnie shared that she and her husband use river water for drinking only in the dry season. During the wet season, rainfall catchment systems provide a ready source of fresh water as Dixie explained: “[in the wet season] it’s a lot easier. It falls off the roof and you watch it, you don’t have to go and haul it.”

Dixie’s husband, Jack, says another use for the river is irrigation. His citrus trees receive its benefits. He also uses the river for bathing, in his words, “every afternoon, toward sundown, we go down to the river and bathe right there.” Dixie and Jack’s use of the river as a place to bathe is also a shared practice with Matthew Miller. Miller uses the river in a “daily ritual” in which he and his family go there to bathe. He speaks of getting his “family time” when he goes to the river to cool off, “get the dust off, “ and relax. He describes his river time as a “great time to meet our neighbors” and speaks of it as a “little social gathering.”

Matthew Miller claims that he and his family “rely on the river for so many things, that it would be a long, long list.” He also uses the river for water, and is dependent on the water supply, as he hauls water daily during the ten weeks of the dry season. This water is used for bathing, dish washing, laundry, and gardening. Miller says, “And I can say this, that if the Sibun River wasn’t within a mile and a half of where we live, we wouldn’t be living here.”

Percy Chastinet has another perspective to share about the river. He recalls that “during the rainy season we had some adventures with the twisted bends and eddies, boy it was tough.” His way of talking about the river is more focused on the recreation activities he associates with the river. He described his favorite place along the river near a “big sprawling tangerine tree.” He has the area well cleaned out and enjoys afternoons spent sitting there by himself. The river serves as a place of reflection for him. Chastinet’s words add another level to the understanding of the river—it has a very personal meaning as well as a practical one.

The Future of the Sibun River

As described in examples above, the river is a multi-dimensional resource, used for both survival and recreation. Knowing that the river can be a meeting place makes it easier to understand the importance of preserving it.

The individuals discussed here all have very different views about life on the river and about what needs to be done for it in the future. Knowing both the background and the present practices of these people makes it possible to better understand the reasons and motivations behind their personal opinions. Yet, a common theme can be found throughout the process of collecting people’s thoughts—the need to preserve the river. Every individual consulted feels that he or she has an obligation to help conserve the river, but each has a different perspective on how the river should be protected. A look at each individual’s opinion concerning preservation will help to make this common theme more visible.

Each person does his/her own part to help to conserve the river and its resources. Augustine Obispo is part of the Hickatee Conservation Group that he helped to initiate. He was concerned about what he viewed as a misuse of the river and a tendency of people who used the resources of the river to be “greedy” and over-exploit the now-endangered Hickatee turtle. “If the Good Lord would love us to see another generation, they won’t know what is Hickatee.” This is Obispo’s prediction for the Hickatee population along the Sibun if people do not change their behavior. He does not believe that Hickatee hunting should be completely ended, but he wants to allow the Hickatee “to grow.” He hopes that the government will change the law regarding Hickatee. “It’s nice to want, but it is disgraceful to want things too much, because you are not putting in anything, you are only taking out. God put man here to take and to use, not to abuse.”

Augustine Obispo is definitely not the only member of the community who wishes to influence other people’s actions along the river. Matthew Miller, manager of Monkey Bay Wildlife Sanctuary says, “What I’ve learned over the past ten years living here is that we’re not managing wildlife. . . really we’re in the people management business.” Miller sees a lot of change along the river, “some of them for the better, some of them for the worse.” He holds that Belize is “able to balance out all of this. I feel like we have enough awareness about conservation among our Belizean decision makers...that’s what inspires me and my family to continue living here,” Miller says.

But Miller is not completely satisfied with all of the use practices along the river. He describes stream gravel mining as “probably the worst practices that we could do in our river.” Gravel mining is a process by which gravel is taken from the riverbed in order to be used in the production of concrete. Miller is not alone in his dislike of the industry. Ed Boles also warns against

the negative effects of gravel mining. He feels that education is of vital importance, and he works to educate the community and heighten awareness of the deleterious effects of over-exploitation of river resources. The organizing that Boles does with SWA is to “provide a common network for folks to work through.” It is a “chance for community members to both understand the situation and to come together and decide what the real issues are and perhaps to decide what the possible solutions are.”

Patrick Scott thinks “it’s necessary that we continue this watershed movement” and believes that education is the key. Scott shares this opinion with Dixie Vandervinnie who believes that “law[s] won’t help, because there is no way to enforce them,” but instead feels that “education will...Education is the only thing that will really get through.” She thinks that preservation is “very necessary, because if we don’t keep things in check, there won’t be a river again for the next generation.” She suggests education in school, distributing of pamphlets, and personally talking to people as a beginning of education for the community.

Dixie Vandervinnie has an interesting perspective to share because she is the business representative for SWA, so she has a double role to fill, as both conservationist and businesswoman. In her opinion, “it’s not only the businesses that are ruining the river, it’s also the people.” She does not hold businesses blameless though, stating that “businesses also need to be limited in what they’re doing.”

Dixie’s husband, Jack, also believes that preservation is “a very good idea.” He feels that “it’s a little bit of stumbling along, but at least we’re starting, and we’re doing something.” He shares the view that there is a “need to educate everyone who lives along the river and everyone who visits the river.” He shares with his wife the opinion that “to set up a set of rules and regulations...is very wrong.” He uses the dilemma of gravel mining as an example:

“It seems the river is the only source of gravel we have. Now, if we say we don’t mine gravel anymore, we can’t make concrete, so we have to use wood. And then, we destroy the forest, so I think we have to make a choice and try and get equilibrium some place. The gravel we need [sic], and we can’t go without it.”

Here, Jack Vandervinnie’s words strike upon a central dilemma of conservation, finding the balance. Vandervinnie is concerned about the river, but he is also concerned about the businesses in the area. He holds faith that organizations such as SWA will work to find the equilibrium.

Percy Chastinet feels that “people don’t use it [the river] as they should.” “Many people don’t realize that the river is a vital source of life and energy.” Chastinet believes that farming is part of the solution. But others see Chastinet’s hope for more farming as a threat because more of the forest along the river would be destroyed by farming. The issue of a balance between ecology and economics arises again.

This is the most poignant dilemma that surrounds the river today, finding the balance. The people who live along the river need to survive, and the resources of the river are what many of them depend on for livelihood. Restrictions have been made on the amount of hunting, diving, and fishing that can be done. These practices of moderation are enforced in order to ensure that animal life remains in “healthy numbers” along the river. Farming practices are monitored as well; laws exist

that forbid farming within a certain distance from the river. This law protects the riverbanks and the riparian forests that mark the water's edge. Another restriction that applies to farming centers on concern about pesticides. It is important that the river water remain clean of dangerous pollutants, such as pesticides and other chemicals. Gravel mining is yet another issue that concerns both the river and the people who live along it. Mining results in changes in the riverbed, and this in turn alters the river's pathway, consistency, and wildlife. These restrictions are pertinent to the protection of the river, but they do make it more difficult for businesses to maximize their profits.

Everyone interviewed expressed concern for the river, but no one agrees on exactly what ought to be done. It is important for groups such as SWA to involve a variety of people with very different roles and backgrounds. The river is important for many reasons, and taking into account all of the different perspectives will help to find the best solution. It is important to assert that there is no simple solution, rather it is a complicated issue that requires answering smaller problems individually. The fact that the population living along the Sibun River is relatively small is an asset to problem solving. With such a small group, it is possible to address the problems on an almost individual basis, and that is what SWA is able to do. SWA has succeeded as a grassroots organization. Yet, SWA is still a young group and is only beginning to take modest steps towards achieving their goals.

No one is a fortune-teller with a crystal ball to foresee the future, but people have predictions, hopes, and fears about the future of the river. It is important to examine what people wish the river to become because it is the motivating factor behind many of their actions. Knowing the hopes of an individual makes it easier to predict what will happen.

Augustine Obispo wishes to have the chance, once again, to travel the river, paddling the same path that he took as a younger man. He wants to "go over it again," and to get a new experience of how the river has changed over his lifetime. He has a love for the life that the river has given him, and he wishes to protect his home for future generations. His work with Hickatee preservation and as community leader in Freetown shows his dedication to both the river and the people who live along it. His actions display his hopes and predictions for the future, as he stays optimistic in his work.

Another individual who uses an optimistic mind frame to inspire his work is Matthew Miller. Miller's vision of the Sibun watershed is of a "pristine river where wildlife populations are in good healthy numbers because we're not over harvesting any longer. . . where we care for the earth and we care for the poor."

Dixie Vandervinnie's predictions for the river are not as optimistic as those of Obispo and Miller. She feels that the river's future "depends on how well Belize takes care of its river." She thinks the river will stay beautiful only if it is kept clean. She warns that although "it isn't bad right now," actions must be taken "before it gets bad. . . .As the population increases there will be more development, and it may get worse," Vandervinnie fears. It is mainly for this reason that she works with SWA; she wishes to be a part of an active force that is working to protect the river.

Dixie's husband Jack is more optimistic than his wife is as he predicts that there will be both more fish and more animals within and along the Sibun. He thinks that this will be even more of a possibility if the "corridor gets connected." The corridor is a nickname for the proposed strip of

protected land that will span one end of Belize to the other, allowing for the free travel of wildlife throughout the country. Jack Vandervinnie shares with Percy Chastinet a hopeful outlook on the river's future; the latter sees Belize as being on a "progressive route."

A positive path for both the river and Belize is predicted by Patrick Scott who states that, "the world is growing and the world is wide. We expect that there will be big changes." He sees educational changes as a part of that route of progress and foresees students having a "wider scope of knowledge, on the environmental aspect and on everything." Ed Boles feels that "as time goes on we are going to be seeing more and more ecologists, conservationists, and agriculturists working together to try to preserve the resources that we have today."

Overall, the individuals interviewed expressed an optimistic outlook, outlining the positive possibilities for the river. It must be noted that positive thinking is in no way a correlate to positive results; it is merely a small part of the formula. What is of greatest importance is the action that these individuals take in support of their thinking. It is never enough to hope for the best and not to simultaneously be acting to achieve that. The individuals with whom I spoke, although certainly not an unbiased sample of Sibun Valley residents, do a variety of things that demonstrate their commitment to the river and to its preservation.

Meeting with and talking to all of these individuals has taught me a lesson in diversity and balance. Each individual displayed unique opinion, and my understanding increased by speaking with each person. Because communication is both the key to understanding and the main ingredient in forging a successful compromise, it is necessary for individuals to share their experiences by means of open dialogue. All of the people interviewed had very similar concerns for the river and for their land, but each individual had a different background, experience, and knowledge about the situation. No one alone could solve the challenges, but a combination of knowledge and perspective may enable a positive and practical future for the Sibun River. Organizations such as the Sibun Watershed Association attempt to use communication and inclusiveness as a tool. Every one of the residents of the watershed is automatically a member of SWA. The Sibun Watershed Association symbolizes the infancy of a group that hopefully will mature to include the perspectives and teachings of the whole community in a progressive movement that balances the protection of the environment with modern changes.

The Sibun River represents an entire community of people and a variety of wildlife and resources. The river valley has a long and interesting past. Since Maya times the river has been a lifeline for both people and animals. Now, in what has been called the "Citrus Times," the balance between people and environment is still being sought.

"I still drink the water and I would like to see that continue. I did it when I was a little boy, over fifty years ago, and I think I would like anybody fifty years from now to be able to go and drink the water."

Patrick Scott