

**TESTING AND MAPPING SATURDAY CREEK: THE 1999  
FIELD SEASON OF THE VALLEY OF PEACE  
ARCHAEOLOGICAL (VOPA) PROJECT**

Report submitted to the Department of Archaeology, Ministry of Tourism  
Government of Belize

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Edited by  
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## 1999 Expenditures in Belize

	<u>\$(BZ)</u>
Total room and board (three project members)	3000.00
Labor (Zedikiah Scott and Cleofo Choc, Valley of Peace) (including social security)	1404.90
Vehicle costs:	
vehicle purchase (1990 Nissan 4 cylinder 2 wheel truck)	6000.00
insurance	106.00
fuel	561.80
misc. (e.g., oil change, repair, parts, tools, registration, etc.)	1075.38
Supplies (maps, phone card, xeroxing, etc.)	224.80
Email costs	40.00
<i>Subtotal</i>	<i>12,412.88</i>
<i>truck sale price (sold at end of season)</i>	<i><u>-7000.00</u></i>
<i>Total</i>	<i>5412.88</i>
Administration and Consolidation fees (1137.94 paid in kind with supplies, 868.00 in cash)	2006.00
<b>Grand total</b>	<b>7412.88</b>

## **Chapter 1**

### Ritual and Power in the Valley of Peace Area: 1999 Field Season

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#### **Introduction**

The nature of Classic (c. A.D. 250-850) Maya rulership and the basis for power have long fascinated Maya archaeologists, especially given the seeming contradictions between the ornate physical manifestations of royal power and the apparent lack of bureaucratic institutions (military, markets, administration). In addition, the challenges of acquiring power in the face of the centrifugal tendencies of a dispersed economic landscape were immense (Dunning 1995). Emerging elites were able to achieve political domination through their appropriation of traditional rituals; they did this in larger and larger scale settings (e.g., houses to shrines to temples) using domestic rites (e.g., propitiation of ancestors) that integrated larger groups of people (Cohen 1974:37-39; e.g., McAnany 1995; Walker and Lucero n.d.).

Results from the 1999 field season (May 11-July 1, 1999) provide the necessary data -- detailed chronological information -- to begin to assess ritual appropriation. Specifically, we test excavated 10 structures at the river center of Saturday Creek, central Belize (Figure 1). Ancient Maya river centers are particularly suited to address the proposed research because they were among the first areas settled in the Maya lowlands and typically had long occupation histories, at least 1500 years (e.g., Barton Ramie). Results will provide information necessary to select structures for extensive excavations that will be conducted in field seasons.

#### **1999 Season**

##### **Staff**

The 1999 VOPA crew consisted of myself (PI), Andrew Kinkella (California State-Northridge graduate student), New Mexico State University graduate student Jane Arie, and two employees from the Valley of Peace, Clefo Choc and Zedikiah Scott. All of us participated in excavation, the clean-up of looters trenches, and mapping.

For two days, Dr. William Poe, professor of archaeology, history department, Sonoma State University and Dr. Susan Hayes, professor of agricultural economics, economics department, Sonoma State University assisted us with their GPS experience and equipment at Saturday Creek, for which we greatly appreciate.

## **Funding**

Funding for 1999 was provided by private donations by Mr. Robert Vitolo and personal funds of PI.

## **Background**

The research area (c. 200 sq. km; see Figure 1) is located in central Belize in the more hilly areas (40-120m asl) north of the Belize River. It is considered both geographically and socio-politically part of the eastern periphery of the central Maya lowlands. The area falls within the drier subtype of the humid tropics. Vegetation is classified as Quasi-Rain forest, predominantly consisting of deciduous broadleaf forests with lime-adapted species and intermittent stands of high marsh forests (Lundell 1942; see Fedick 1988 for detailed soil and vegetation descriptions). As with much of the eastern lowlands, the study area lies on a limestone platform (Fedick 1988:76; West 1964).

## **Previous Research**

Preliminary survey results from the first field season (June 1-July 10, 1997) demonstrated a dispersed settlement pattern away from rivers, and more dense settlement along rivers (Lucero 1997; Lucero and Fedick 1998). The major goals of the 1998 field season (May 23-July 7) were four, three of which focused in the Cara Blanca area: 1) survey for pools, caves and nearby settlement (Lucero 1999a); 2) test excavate a presumed ceremonial structure at the edge of a pool (Kinkella 1999); 3) explore a pool for offerings (Osterholtz 1999); and 4) map the river center of Saturday Creek (see Figure 1) (Lucero 1999a; Lucero and Kinkella n.d.).

## **Ritual Appropriation**

The tremendously varied economic landscape of the Maya lowlands had a major impact on ancient subsistence practices and techniques, and on concomitant settlement distribution and sociopolitical organization (Demarest 1996; Dunning et al. 1998; Fedick 1996; Pyburn 1998). With our growing knowledge of prehistoric subsistence techniques, it is clear that ancient farmers used a myriad of strategies including intensive house gardening, short-fallow infield and long-fallow outfield farming, and the use of terraces, dams, canals, raised fields, and drainage systems (e.g., Dunning et al. 1998; Fedick 1994; Harrison and Turner 1978; Killion 1990; Pohl et al. 1996). As a result, many ancient Maya farmers lived dispersed throughout the lowlands in farmsteads (e.g., Fedick 1988; Ford 1986; Puleston 1983). The diverse economic and social landscape of the Maya lowlands partly account for why anthropologists have proposed several models to explain ancient Maya political organization (not necessarily mutually exclusive). These models include viewing the Maya systems as city-states (e.g., Webster 1997), superstates (e.g., Martin and Grube 1995), centralized regional states (e.g., A. Chase and D. Chase 1996; Marcus 1976, 1993), weakly centralized segmentary states (e.g., Fox and Cook 1996), galactic polities (theater-states; e.g., Demarest 1996), and feudal states (e.g., Adams 1996).

Recent models are beginning to explore the relationship of the varied landscape, dispersed population, and the challenges emerging elites faced in acquiring power,

specifically, the importance of using centripetal strategies, such as ceremonies and other public rituals, that served to bring people together (e.g., Demarest 1996; Freidel 1981). For example, Lucero (1999b) and Scarborough (1998) have proposed models of the rise of political power that take into account both the control of a critical resource, artificial reservoirs located next to monumental architecture, and the control of critical rituals having to do with the water itself. Water management and ritual were key, especially in areas without lakes and rivers during the annual, four-month drought. It is no surprise that the largest Classic polities developed in areas that required water management, including polities centered at Tikal, Calakmul, and Caracol. Such models can also account for the typically smaller river-based centers (e.g., Piedras Negras, Yaxchilan, Altar de Sacrificios, Palenque), where water management was less of an issue (Lucero 1999b). If we are going to understand fully the nature, development, and maintenance of Classic Maya polities, we must understand how economic and ideological sources of power articulated.

Economic power is “based on the ability to restrict access to key productive resources or consumptive goods” (Earle 1997:7; cf. Blanton et al. 1996). The physical distribution of resources and people across the landscape affects the ability of leaders to communicate ideas and to conduct large-scale integrative activities (political rallies, feasts, and work parties) (Roscoe 1993; cf. Flannery 1972; Gilman 1981). Ideological power can be defined as the ability to re-define world views and codes of social behavior to explain “why specific rights and obligations exist” (Earle 1997:8, 143, 149; cf. Blanton et al. 1996; Joyce and Winter 1996). The growth and maintenance of political power require the legitimation of social inequities through a politically instituted ideology (DeMarrais et al. 1996). To accomplish this, elites sponsor feasts and other public ceremonies that bind people together (Bourdieu 1977:183-184, 1990:109-110; Cohen 1974:82; Earle 1997:151; Giddens 1979:188-195, 1984:257-261). Ceremonies touch emotions that unify and provide sponsors a stage to advance their own political agendas (Cohen 1974:136-137; Kertzer 1988:67-76). Elites, however, are not ‘pulling the wool over the eyes’ of their subjects. Rather, they are promoting solidarity because it “is produced by people acting together, not by people thinking together” Kertzer (1988:76). But how do these ritual events expand and become forums to advance the interests of a particular group?

The process of social change is accretional and comes from within the social group (Giddens 1979:223, 1984:247; cf. Flannery 1972; Weber 1958:58-59), and ritual serves as an ideal forum for specific interest groups to assert their agendas through the appropriation of familiar domestic ritual practices (cf. Weber 1958:55). For example, T’ang (A.D. 618-906) imperial rites in China originated in earlier dynastic ceremonies (e.g., Chou, 1121-220 B.C.) which, in turn, drew upon earlier ancestral cults (McMullen 1987). The significant issue is that political leaders take over existing “principles of legitimation” (Earle 1989). The successful application of culturally acceptable, albeit re-interpreted, traditional ritual activities resulted in the legitimation of elite authority, the control of critical resources, and the ability to acquire tribute from others.

For the ancient Maya, this strategy worked to a point, but early had to deal with the scattered distribution of laborers and arable land. Unable to centralize either, they could not develop a strong foundation from which to acquire centralized power. However, the combined control of specific types of resources (e.g., water, land) and the appropriation of traditional rituals did provide the means to achieve some degree of power (Lucero 1999b; cf. Scarborough 1998). This may have been more common in prehistory than we realize,

and political theorists need detailed case studies of such processes, especially on the transition from egalitarian or ranked systems to stratified complex societies.

I attempt to show that this process was gradual and accretional and began with family-level rites that were extended further for elites (Late Preclassic, c. 400 B.C. - A.D. 250) and even more so for royals (Late Classic and Early Classic, c. 400 B.C. - A.D. 550), culminating in the direct association of royal families with the divine (Late Classic, c. A.D. 550-850). Specifically, I will attempt to show that early Maya leaders appropriated traditional or known rituals, especially termination and/or dedication rituals, renewal ceremonies, and ancestor veneration rites (e.g., McAnany 1995).

### **Exploring Prehistoric Ritual Appropriation**

To investigate whether ritual appropriation was used by early elites to acquire political power, we need to assess if the scale and nature of ritual activities changed over time. Specifically, is there variation in scale and quality of deposits between houses, elite residences, and temples? Is there variation in content or context of deposits between houses, elite residences and temples? If there is variation between houses, elites residences, and temples, does this variation become more marked over time? Was there ever a time when elites or rulers were able to institute different or new and exclusive rituals?

If ritual appropriation was used as a strategy to gain power, the earliest evidence for ritual activities should occur in all domestic contexts (Middle Preclassic, c. 900 - 400 B.C.). With the appearance of elite architecture (e.g., elite compounds and small temples) beginning in the Late Preclassic period (c. 400 B.C. - A.D. 250), we might begin to see more exclusive caches and burials at elite residences and temples, while small houses might not have any ritual deposits, or they might have deposits that are remarkably smaller and of lower quality. The analysis of ritual activities from different architectural types with adequate time-depth, in view of the proposed questions and expectations, is key to shed light on the development of political power.

The major objective for the 1999 field season was to test mounds at Saturday Creek to ensure they have the necessary time-depth to address ritual appropriation, and will set the stage for extensive excavations planned in 2000. Saturday Creek also has the necessary structure types: small houses, elite compounds (plazuela or patio group), range structures (several connected rooms built on top of an elevated platform), and temples. Finally, understanding the role of ritual in the political development of a river-based center can be compared to areas with hydraulically engineered landscapes (e.g., Tikal), where the types of rituals were more varied (e.g., water rituals).

### **1999 Goals and Results**

The major goal of the 1999 field season (May 11-July 1) consisted of collecting chronological data from the river center of Saturday Creek (see Figure 1) through a test pitting program, described below. In addition, a brief return trip was made to Cara Blanca,

Pool #1 to collect additional chronological data (see Kinkella, this volume). We also continued mapping Saturday Creek (see Poe, Arie, this volume).

Saturday Creek (UTM 1916N-312E) consists of dense settlement along the Belize River with numerous architectural types from temples (c. 10 m high), range structures, and large plazuela groups (4-5 structures facing a plaza) to small solitary mounds (Figure 2). Saturday Creek has over 100 structures on the north side of the river, 70 of which we mapped in 1998 and nine of which we mapped in 1999 (through SC-85). Most of the site is located in a plowed field, although a large portion of it (c. 350 x 300 m) has not been plowed and shows little evidence of looting. Surface ceramics demonstrate at least Middle Preclassic through Postclassic occupation (c. 900 B.C. - A.D. 1450). Saturday Creek, with its long occupation history and architectural diversity, provides an ideal settlement system to assess the history of ritual appropriation and the emergence of early Maya leaders.

James Arie showed us a very useful and simple way to measure vertical distances using two poles (one measured, for us at 2 meters, and one short), string, and a line level. Andrew, Jane and Clefo used a Brunton, tripod and 30 meter tape to map in all the mounds (see Appendix A for a complete listing of mound heights).

SC-1 = 10.2 m

SC-2 = 2.8 m

SC-3 = 7.19 m (3.38 for the platform, 3.81 for the structure on top)

SC-4 = 9.76 m

SC-42 = 4.0 (west side), 4.35 (east side) m

SC-43 = 3.59 (west side), 5.38 (east side) m (adding the height of the platform, 5.72, the total height is 11.1 meters)

SC-64 = 2.0 m (and 6.9 to bottom of platform)

SC-76 = 2.0 (west side), 7.72 (east side to bottom of platform) m

SC-77 = 2.0 m

SC-78 = 3.2 m

SC-79 = not determined since likely is a bulldozer dirt pile

SC-80 = 1.16 m

SC-81 = 1.2 m

SC-82 = 1.1 m (north side); 1.95 m (south side)

SC-83 accidentally skipped this number

Looking toward SC-64 from SC-18, I noticed that the platform upon which 64, 42, 43, etc. lies distinctly ends on its south side, before SC-4, 1, 2, and 3. It appears that the platform is artificial. It looks like the ancient Maya took advantage of the terraces and re-formed them to suit their purposes (terraformed, as Bill Poe says). For example, it looks like SC-76 (the platform) appears to be at the same level as the upper terrace. Clefo has found what appears to be the southeastern side of the large platform upon which a large part of Saturday Creek appears to lie. We also noted two to three large mounds in the unmapped southeastern section, one at least 7 meters in height. The vista from this last mounds allows an unrestricted view of the area which was inundated in 1998, and which is completely dry this season. And there are definitely no mounds present in this low-lying area. Sue Hayes, an agricultural economist, also thinks that the lower terrace, because it is inundated parts of the year, would be suitable for year-round farming, which may have been the case prehistorically. The main goal using the GPS system was to demarcate the river in relation to the site, as well as to map the upper and lower terraces (see Poe, this volume)

### Three Sisters

Three Sisters is located about two kilometers southwest of Saturday Creek and about half a kilometer west of the Belize River (UTM 1914.8/310.3) and probably comprises part of the Saturday Creek settlement system (settlement is found all along the river). This is the same site that Willey et al. (1965) called Cocos Bank in their Belize settlement monograph:

A small ceremonial group was visited by us at Cocos Bank, a part of the Banana Bank Estate of the Belize Estate and Produce Company. Cocos Bank is about 20 km. northeast of Barton Ramie air line distance, but over 40 km. via the river. The terrain is flat alluvial soil. The ceremonial group is raised on a square, probably earth-filled, basal platform which is about 100 m. across and about 5.00 m. high....Four rectangular mounds are placed on the edges of the basal platform so as to form a plaza group. The highest of these, on the east side, rise 4.00 to 5.00 m. above the plaza and is thus 9.0 or 10 m. above the ground level. A bulldozer cut at one corner of this highest mound shows rubble and earth fill with boulder retaining walls. The other mounds are a meter or so high and have signs of smaller superimposed platforms. Traces of stone pavement, at ground level, can be seen adjacent to the east side of the Cocos Bank group. On the north, west, and south sides of the group are deep pits from which soil was probably for the construction of the mounds. These depressions now form small ponds. In addition to the ceremonial group, house mounds and occasional "plazuelas" are scattered on the flat alluvial terrain both at Cocos Bank and at the near-by Banana Bank [Willey et al. 1965:313].

The immediate settlement consists of dispersed mounds in a plowed field that surround the unplowed Three Sisters. Monumental architecture cluster on top of a large flattened hilltop (c. 195 x 180 m) near a natural or artificial *aguada* (Figure 3). The largest structure, TS-1 (c. 35 x 15 meters, 5 meters high) has at least four vaulted rooms, which Adams and Jones (1981) would define as a palace structure.

The goal in the 1999 season was to get an idea as to chronology and architectural orientation (Arie, this volume). We cleaned up two of the three looters (upper and lower east) trenches to get some orientations on the south wall (and diagnostic ceramics). Both trenches are about 2 meters wide and 3 meters high (Figure 4).

Summary of TS-1 East lower looters trench:

Level 1 (20-50 cm thick) consisted of topsoil with cobbles, pebbles, and clay loam.

Level 2 (c. 40 cm thick) consisted of mostly cobbles and pebbles.

Level 3 (c. 30 cm thick) consisted of limestone boulders. A secondary chert flake and four body sherds were noted. Boulders were loosely packed within a sandy loam matrix.

Level 4 (1-8 cm thick) consisted of a plaster floor with a thick ( cm) compact pebble ballast/fill. It runs east 64 cm and terminates just before the edge of a boulder.

Level 5 (40 cm thick) consisted of a plaster floor about 20 cm below level 4 with a compact Pebble fill/ballast.

Level 6 (c. 40 cm thick) consisted of a plaster floor against west wall with compact pebble fill; it runs east about 40 cm before abutting a boulder underneath level 5. Two small rims (too small to analyze) were collected from near the floor of level 7 toward the east/unexposed area (see Appendix B for a complete list of artifacts collected in the 1999 season).

Level 7 (unexposed) consisted of a limestone floor at bottom of trench.

While the upper east looters trench was not cleaned or profiled, it was clear that it consisted of two levels, topsoil (about 50 cm) and boulder fill.

An attempt was also made to clean up an area around the 'collapsed room' on the southern end of TS-1. The goal was to attempt to find the wall of the uncollapsed room immediately north. We did uncover what might turn out to be the southern edge of the top of a roof? It is really too early to say--we did not expose enough.

## **Yalbac**

Although Yalbac (UTM 1922.7N/294.5E; see Figure 1) is not part of the Valley of Peace Archaeology research area, due to the fact that it is right outside the western boundary, I like to visit the site at least once a year. Kinkella drew a map of part of the core area using pace and compass (Figure 5). The major center of Yalbac minimally has four large plazas, or actually four smaller plazas surrounding the main plaza, which is at least 100 meters in length. We were able to determine the height of one of the highest, if not the highest, structures at Yalbac, what we have designated Str. A1. Including the bi-level platforms, we are talking a total height of 18.62 meters. The structure alone is 13.22 meters. One of the looters trenches on one of the Str. A1 exposed a very well constructed and well preserved corbel arch ceiling room with some incredible red plastered walls.

## **Significance and Concluding Remarks**

Maya archaeologists are beginning to realize that the varied economic landscape in the Maya lowlands also mirrors the different types of ancient Maya political systems (see Lucero [n.d.] for a summary). The dispersed nature of economic resources (e.g., agricultural land) and settlement patterns presented a unique challenge to ambitious leaders: how to acquire and maintain the ability to extract tribute and institute labor demands. While the economic resources may have varied (e.g., water management), the processes of how leaders gained power was the same -- through ritual appropriation. To appreciate how this process occurred, however, we need to answer the questions posed earlier: is there variation in scale and quality of deposits between houses, elite residences, and temples? Is there variation in content or context of deposits between houses, elite residences and temples? If there is variation between houses, elites residences, and temples, does this variation become marked over time? To be able to answer these questions, we need a firm grasp on the history of ritual activities at the smallest house to the largest temple. Thus, data collected from the 1999 and future field seasons are vital to understand how ritual appropriation

worked. I can begin to assess if the nature of caching and burial practices changed over time, whether or not these ritual activities disappeared from domestic contexts, whether or not they became exclusively practiced in increasingly grander scales through time, or if elites, and later perhaps rulers, began to institute new rituals. Expected results will contribute significantly to our understanding of how emerging leaders worked within traditional structures and under specific economic conditions to acquire political power.

### **ACKNOWLEDGMENTS**

I would like to thank the Department of Archaeology for their continued support, especially Acting Archaeology Commissioner Allan Moore and Brian Woodye. Long-term support has also been provided by David Brennan and Robert Vitolo, without whose financial support I would not have been able to conduct the 1999 season. I also want to thank John and Carolyn Carr for providing housing at Banana Bank Lodge, friendship, support, and wonderful food. In addition, I want to thank Banana Bank staff Antonio and Albert, my employees Zedikiah Scott and Cleofo Choc of the Valley of Peace village for their assistance, and Mrs. Scott for her wonderful breakfasts and lunches. Special thanks go to Bob and Jo Asprey, who kindly flew us over the VOPA area in their twin engine Cessina, and to Dr. James Arie, who helped us measure vertical heights at Saturday Creek and Yalbac. Thanks also go to William Poe, professor of archaeology, and Susan Hayes, professor of economics, both at Sonoma State University for their willingness to brave the open fields to map the Belize River and other contours with their Trimble base station and roving GPS unit. Finally, I want to thank Dr. Jaime Awe for taking time from his busy schedule to share his ceramic and excavation expertise with us.

**APPENDIX A**  
**Saturday Creek Mound Heights**

SC-1 = 10.2 m  
SC-2 = 2.8 m  
SC-3 = 7.19 m (3.38 for the platform, 3.81 for the structure on top)  
SC-4 = 9.76 m  
SC-5 = 1.40 m  
SC-6 = 0.62 m  
SC-7 = 1.20 m  
SC-8 = .43 m (connect platform to SC-7)  
SC-9 = .05 m  
SC-10 = .10 m  
SC-11 = .20 m  
SC-12 = .20 m  
SC-13 = .36 m  
SC-14 = .81 m  
SC-15 = .34 m  
SC-16 = .56 m  
SC-17 = 1.01 m  
SC-18 = 1.16 m  
SC-19 = 1.81 m  
SC-20 = .20 m  
SC-21 = .50 m  
SC-22 = .60 m  
SC-23 = .92 m  
SC-24 = .60 m  
SC-25 = .30 m  
SC-26 = .50 m  
SC-27 = .68 m  
SC-28 = .73 m  
SC-29 = .25 m  
SC-30 = .23 m  
SC-31 = 1.53 m  
SC-32 = .08 m  
SC-33 = .61 m  
SC-34 = .26 m (connect platform to SC-33)  
SC-35 = .39 m  
SC-36 = .54 m  
SC-37 = .59 m  
SC-38 = 1.20 m (platform, .7 m)  
SC-39 = .58 m  
SC-40 = 3.50 m ?  
SC-41 = accidentally re-mapped SC-37  
SC-42 = 4.0 (west side), 4.35 (east side) m  
SC-43 = 3.59 (west side), 5.38 (east side) m (adding the height of the platform, 5.72, the total height is 11.1 meters)  
SC-44 = 1.12 m  
SC-45 = 1.57 m  
SC-46 = 1.96 m  
SC-47 = 3.50 m  
SC-48 = 3.30 m  
SC-49 = 1.16 m  
SC-50 = 2.34 m  
SC-51 = .46 m

SC-52 = 2.34 m  
SC-53 = 2.47 m  
SC-54 = 1.51 m  
SC-55 = .85 m  
SC-56 = .47 m  
SC-57 = .64 m  
SC-58 = .22 m  
SC-59 = .34 m  
SC-60 = .63 m  
SC-61 = .17 m  
SC-62 = .54 m  
SC-63 = .38 m  
SC-64 = 2.0 m (and 6.9 to bottom of platform)  
SC-65 = .19 m  
SC-66 = .79 m  
SC-67 = .66 m  
SC-68 = 1.40 m  
SC-69 = .80 m (connected platform to SC-68)  
SC-70 = .67 m  
SC-71 = .29 m  
SC-72 = 1.50 m  
SC-73 = .28 m  
SC-74 = .15 m  
SC-75 = .31 m  
SC-76 = 2.0 (west side), 7.72 (east side to bottom of platform) m  
SC-77 = 2.0 m  
SC-78 = 3.2 m  
SC-79 = not determined since likely is a bulldozer dirt pile  
SC-80 = 1.16 m  
SC-81 = 1.2 m  
SC-82 = 1.1 m (north side); 1.95 m (south side)  
SC-83 accidentally skipped this number  
SC-84 = 1.33 m  
SC-85 = 1.26 m

## APPENDIX B

### Artifact List

Valley of Peace Archaeological (VOPA) Project

Permit No.: 282/7/99

Accession No.: 10048

Principal Investigator: Lisa J. Lucero

Bag#	Catalog #	Material	Quantity	Provenience	Description
1	SC64TP-2	granite	1	SC-64 TP, Level 2	mano frag
2	SC64TP-2	ceramics, obsidian, flake, bone	6	SC-64 TP, Level 2	2 rims, 2 obsidian blades, 1 chert flake, 1 bone
3	SC64TP-3	ceramics	4	SC-64 TP, Level 3	rims
4	SC64TP-4	ceramics	2	SC-64 TP, Level 4	rims
5	SC64TP-5	ceramic	1	SC-64 TP, Level 5	rim
6	SC64S2-4	ceramics, bones	5	SC-64, Section 2, Level 4	3 rims, 2 bones
7	SC64S2-8	ceramic	1	SC-64, Section 2, Level 8	rim
8	TS1LLT-6	ceramics	2	Three Sisters TS-1 lower looters trench, Level 6	rims
9	SC64S2-5	ceramics	10	SC-64, Section 2, Level 5	rims
10	SC64S1-2	ceramics	6	SC-64, Section 1, Level 2	rims
11	SC64S1- 4C	ceramics	4	SC-64, Section 1, Level 4, pottery concentration	rims
12	SC64S1-4	ceramics	18	SC-64, Section 1, Level 4	rims
13	SC64S1-5	ceramics	10	SC-64, Section 1, Level 5	9 rims, 1 base
14	SC18TP-1	ceramics	2	SC-18 TP, Level 1	rims
15	SC18TP-2	ceramics	3	SC-18 TP, Level 2	rims
16	SC18TP-3	ceramics	3	SC-18 TP, Level 3	rims
17	SC18TP-4	ceramic	1	SC-18 TP, Level 4	rim
18	SC18TP-5	ceramic	1	SC-18 TP, Level 5	rim
19	SC18TP-6	ceramics	8	SC-18 TP, Level 6	rims, 1 neck, 1 base
20	SC18TP- 6C1	ceramic	1	SC-18 TP, Level 6, Cluster 1	rim
21	SC18TP- 6C2	ceramic	1	SC-18 TP, Level 6, Cluster 2	rim
22	SC18TP- 6C3	ceramics	7	SC-18 TP, Level 6, Cluster 3	rims
23	SC18TP-8	ceramics	10	SC-18 TP, Level 8	rims
24	SC3LT-1	ceramic	1	SC-3 LT, Level 1	rim
25	SC3LT-1	ceramics	4	SC-3 LT, Level 1	1 plate
26	SC18TP- 12	ceramics	5	SC-18 TP, Level 12	body
27	SC18TP- 13	ceramics	2	SC-18 TP, Level 13	rims
28	SC18TP-9	ceramics	4	SC-18 TP, Level 9	rims
29	SC18TP- 10	ceramics, bone	5	SC-18 TP, Level 10	1 bone, 1 spindle whorl,

					3 rims
30	SC18TP-10	ceramics	11	SC-18 TP, Level 10	1 jar
31	SC18TP-7	ceramics	11	SC-18 TP, Level 7	rims
32	SC18TP-11	ceramics	3	SC-18 TP, Level 11	1 body, 2 rims
33	SC7TP-2	ceramics	2	SC-7 TP, Level 2	rims
34	CB1LT2	ceramic	1	Cara Blanca Pool #1, Str. 1, LT2	rim
35	CB1LT1	ceramic	1	Cara Blanca Pool #1, Str. 1, LT1	rim
36	SC85PH	ceramic	1	SC-85 Posthole, 50 cm below surface	rim
37	SC85-TP-3	ceramic	9	SC-85 TP, Level 3	vase frags
38	SC3LT-1	bone	2	SC-3 looters trench, Level 1	1 bone frag, 1 cut skull frag
39	SC3LT-1	ceramics	2	SC-3 looters trench, Level 1	rims
40	SC68TP-2	ceramics	3	SC-68 TP, Level 2	rims
41	SC3LT-2	ceramics	2	SC-3 looters trench, Level 2	1 rim, 1 flange
42	SC68TP-3	ceramics	2	SC-68 TP, Level 3	rims
43	SC85TP-4	ceramics, obsidian	22	SC-85 TP, Level 4	1 ceramic bead, 9 rim, 3 flange, 8 body (including two from vase from level 3), 1 blade
44	SC85TP-2	ceramics	4	SC-85 TP, Level 2	rims
45	SC68TP-4	ceramics	10	SC-68 TP, Level 4	3 rims, 1 base, 1 flange, 5 body
46	SC85TP-3	ceramics, obsidian	8	SC-85 TP, Level 3	5 rims, 2 blades
47	SC68TP-5	ceramics	4	SC-68 TP, Level 5	2 rims, 2 body
48	SC68TP-7	ceramics	2	SC-68 TP, Level 7	1 rim, 1 base
49	SC68TP-8	ceramic	1	SC-68 TP, Level 8	rim
50	SC68TP-10	ceramics	2	SC-68 TP, Level 10	rims
51	SC68TP-11	ceramics	12	SC-68 TP, Level 11	10 rims, 1 base, 1 body
52	SC85TP-6	ceramics, bone	22	SC-85 TP, Level 6	1 base, 3 bone, 11 rims, 3 flange, 3 body, 1 clay ball
53	SC85TP-5	ceramics, bone	15	SC-85 TP, Level 5	9 rims, 4 body, 2 bone
54	SC85TP-7	ceramics	24	SC-85 TP, Level 7	1 spindle whorl, 14 rims, 2 bases, 1 pod, 5 body, 1 disk
55	SC68TP-6E	ceramics	9	SC-68 TP, Level 6, east wall concentration	8 rims, 1 body
56	SC68TP-9	ceramic	1	SC-68 TP, Level 9	rim
57	SC68TP-13	ceramics	9	SC-68 TP, Level 13	6 rims, 2 bases, 1 body

58	SC85TP-PH	ceramics, obsidian	6	SC-85 TP, Posthole test	4 rims, 2 bases, 1 body, 1 obsidian blade
59	SC68TP-PH	ceramics	2	SC-68 TP, Posthole test	1 rim, 1 body
60	CB1LT1-BF	ceramics	22	Cara Blanca, Str. 1, LT 1, backfill dirt	20 rims, 2 body
61	CB1LT2-BF	ceramics	14	Cara Blanca, Str. 1, LT 2, backfill dirt	13 rims, 1 base

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## **Chapter 2**

### **GPS Mapping at Saturday Creek June 16-17, 1999**

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#### **Introduction**

At the invitation of Lisa Lucero, Principal Investigator, I spent portions of two days, June 16 and June 17, 1999 evaluating the archaeological site of Saturday Creek for archaeological mapping. Particular attention was paid to the potential for the use of GPS receivers in mapping the site. As a part of the evaluation some preliminary GPS mapping was done. The site of Saturday Creek is located at approximately 17°19'30" N 88°46" W (UTM 16 N, NAD 27 Central America, N 1916100 E 312400).

#### **GPS Mapping**

##### **Equipment**

A Trimble 4000SE GIS Surveyor was used as the GPS base station. A Trimble 12-channel GPS Pathfinder Pro XL with a TDC1 Datalogger was used as the rover. A beta version of Trimble Pathfinder Office 2.5 was the software package used. The equipment and the software were provided by Trimble Navigation of Sunnyvale, California, USA.

##### **Personnel**

The survey was conducted by W. Poe with the assistance of S. Hayes and A. Kinkella.

##### **Base Station Reference Position**

The base station was located at a convenient but arbitrary point named Datum on the unnamed archaeological site. The base station reference position for all base files recorded was set as the average position recorded in the file for June 21, 1999. The base station recorded an average position of Northing 1916390.315, Easting 312309.449, HAE 121.589 to the antenna, with an antenna height of 2.26 m. This location is autonomous and the autonomous accuracy is that set by the U.S. Department of Defense for the L1 signal as 100 meters (2dRMS). If in the future a survey point of known position in the UTM system can be occupied then the precise location of the site can be defined. For the time being a local site grid based upon the UTM grid orientation as defined by the GPS survey will serve well.

##### **GPS Data Collection**

A continuous kinematic technique was used to map the limit of possible cultivation near

the upper edge of the north bank of the Belize river and several points thought to be useful in defining a local site grid as a subset of the UTM grid. The antenna was mounted on a two meter pole and the datalogger set to record positions at five second intervals. A limited amount of topographic data was also gathered on a river terrace for the purpose of demonstrating the technique.

### Local Site Grid

A local site grid has been created based upon the UTM Zone 16N WGS84 datum. In this local site grid Datum is the principal control point and has been assigned the values Northing 5000 m., Easting 2000 m., Elevation 100 m. A secondary control point used for orienting the existing site map and the UTM grid to the local site grid is the intersection of the farm track with Dead Dog Road. This position was occupied as a part of the stop and go kinematic file that also recorded the north bank of the Belize River. The intersection point was only occupied for twelve epochs, one minute. The coordinates are based on the value assigned to Datum and are recorded in the following table. An additional secondary control point was recorded at the top center of mound SC40. This position is useful in determining the orientation of the site map to the UTM grid. As in the case of the Dead Dog Road intersection, the coordinates are based on the value assigned to Datum and are recorded in the following table.

Point	Northing	Easting	Elevation	95% Precision <sup>1</sup>
Datum	5000.00	2000.00	100.00	Assigned value
SC40, top center	4952.70	2199.73	107.87	6.5 cm.
Dead Dog Road intersection	4512.72	1563.17	100.54	8.7 cm

### Map

The site map included with this report as a set of ArcView files is based upon the map of the mounds and roads created by Lisa Lucero and reoriented to match the GPS data. The map was scanned and the resulting bitmap was used as an base layer in Corel Draw™. A vector map of the mounds was constructed in a layer overlaid on the bitmap base and this vector layer was exported as a DXF file. The DXF file was georeferenced based upon the locations of Datum and the Dead Dog Road intersection and imported into ArcView™. The GPS data was exported from the Pathfinder Office™ GPS postprocessing software as three-dimensional shapefiles for display in ArcView™.

### Evaluation and recommendations

From the perspective of mapping strategies there are two distinct zones to the Saturday Creek archaeological site. Much of the site is on cleared and plowed land. In that zone lines

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<sup>1</sup> The 95% Precision is a statistic reported by the Pathfinder Office™ differential correction processor. It closely approximates the 95% confidence interval commonly found in statistics, twice the standard deviation of the data. That is one can be 95% confident that the true position of the point is within the distance cited.

of sight are open for total station mapping and the sky is clear for GPS mapping. Since, however, that part of the site is being actively farmed there are two distinct constraints. One is operation within the normal cycle of farming activities and the other is the inability to leave permanent markers. Any point that needs to be reoccupied will have to be reestablished from permanent control points located outside the plowed zone. GPS mapping in this zone would be very rapid. The intermittent kinematic GPS data gathering technique could be used to record the top centers of the mounds, the contours of the mounds and the topography of area as a whole. In fact much of the topography could be recorded by fixing the magnetic mount of the GPS antenna to the roof of a farm vehicle or truck capable of negotiating the plowed field. Under these conditions a kinematic survey can be expected to produce 95% precisions, when differentially corrected with a nearby base station, of less than five centimeters. Obviously such a method would require coordination with the farmers to gain access to the fields when they were fallow.

Most of the monumental structures are located in a zone that is covered by dense jungle canopy. In this zone survey of any kind will be difficult. Forest canopy presents the principal problem of acquiring GPS data in this part of the site. At the same time the dense jungle makes long lines of sight with an optical total station impossible. An integrated strategy would be most productive in these difficult conditions. A static technique of recording GPS data is recommended. The GPS antenna would be mounted on a telescoping rod stabilized by guy ropes. Considerations of the accuracy of locating the antenna above the ground point and of the difficulty of setup suggest that locations should be chosen to minimize the height of the antenna. In the author's experience a 10.5 meter telescoping stadia rod was usable only with some difficulty. Where possible locations should be chosen where the GPS data can be acquired with masts no higher than five or six meters. Using the planning software to select optimal times for the GPS observation, a thirty to forty-five minute static occupation should produce data with which the GeoGenius™ program from Spectra Precision ought to be able to fix the integer ambiguity in the data and produce precisions in the neighborhood of a few millimeters.

## **Incidental Information**

### **Magnetic Declination**

Program *Geomag*<sup>2</sup> indicates that the magnetic declination at the location of the Saturday Creek archaeological site in June of 1999 is 02°35' east with an annual change of -6.4 minutes per year.

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<sup>2</sup> The GEOMAG program provides the field values computed from the geomagnetic reference field model (IGRF) applicable to a user selected date from 1995 to 2000. This program, provided by S.J. McLean of the WDC-A, is an abbreviated version of "Geomagnetic Field Models and Synthesis Software" for a selection of dates from 1900 until 2000. The complete package is available, with detailed documentation, at nominal cost from World Data Center A for Solid Earth Geophysics, NGDC/NOAA, 325 Broadway, Boulder, CO 80303, USA. NOAA requires "If the programs are incorporated into other software, a statement identifying them may be required under 17 U.S.C. 403 to appear with any copyright notice." The program file can be downloaded from the ftp server (ftp.ngdc.noaa.gov).

## APPENDIX

### Gathering and Processing GPS Data for Archaeological Mapping

#### **Accuracy and precision**

When used in the context of GPS mapping with Trimble's Pathfinder Office™ software and receivers, the term *accuracy* can refer to two different attributes. On the one hand the term refers to the confidence with which the absolute location of the receiver is known. If the base station is placed on a point of known location then the accuracy is determined by the confidence with which that location is known. If, however, the base station is placed on a point the location of which is unknown, then the base station reference position is determined autonomously and the accuracy is that defined by the department of defense for the L1 signal, 100 meters (2dRMS). On the other hand, the term *accuracy* refers to a capability of a particular GPS receiver and is usually expressed as a constant plus a function of the length of the base line between the base station and the rover expressed in parts per million (ppm).

The term *precision* refers to the confidence with which the base line between the base station and the rover is known. The precision of a position is expressed as a unit length that is the error of the position in the northerly direction, the easterly direction and the vertical direction from the position's displayed coordinate. The precision of a feature is expressed as the average horizontal and the average vertical precisions of the positions that comprise the feature. Precisions are expressed at a confidence level, 68%, 95% or 98%, representing respectively one, two and three standard deviations of the distribution of the data.

In this report all precisions are expressed in centimeters at the 95% confidence level.

#### **Differential Code and Carrier Phase Processing**

There are two methods of differential processing that can be used to process GPS data, code processing and carrier phase processing. Traditionally mapping grade single frequency GPS receivers were used to collect data that was code processed and produced precisions that were better than 1 meter plus 2 ppm times the base and the rover given appropriate conditions of satellite geometry (PDOP) and signal to noise ration. Dual frequency survey grade GPS receivers were used with by land surveyors to collect data that was carrier phase processed producing far greater levels of precision.

Single frequency mapping grade GPS receivers are very practical for archaeological mapping purposes. Relative to dual frequency survey grade receivers they are economical, portable and rugged. They are very rapid to use to gather data that will be code corrected. This degree of precision is sufficient for a great number of archaeological projects, but it is insufficient for such tasks as the mapping of monuments, determination of alignments of structures, the fitting of a local site grid to the Universal Transverse Mercator Grid system, or the generation of positions for fine scale topography.

Software developments now make it possible to use the carrier phase method of data processing with single frequency receivers to achieve typical horizontal precisions of 2 to 2.5 centimeters and vertical precisions in the neighborhood of 5 to 7 centimeters. There are, however, more stringent requirements for data collection if one wished to use this method.

## Differential Code Correction

GPS receivers generate the identity codes for the satellites synchronously with the transmission of the codes by the satellites. For code processing the critical measure is the time offset between the satellite transmission of the L1 signal and the receiver reception of the signal. The receiver shifts its generated code in time to match the code received from the satellite. The time difference multiplied by the speed of light is the distance of the receiver from the satellite. The position of the receiver is determined by solving the intersection of four spheres, the centers of which are the known locations of four satellites at a given epoch and the radii of which are the distances from the satellites to the receiver. With differential correction, relatively short base lines, and good satellite geometry this technique can produce sub-meter precision.

## Differential Carrier Phase Processing

Carrier phase processing is an inherently more precise measuring device. The length of transmission of one bit of the code is 293 meters, whereas the L1 carrier frequency has a length of 19 centimeters. In both cases the signal is digitized and is phase modulated.

The distance from the satellite to the receiver can be thought of as being measured in a certain integer number of wavelengths of 19 centimeters each plus a fractional cycle. Since the signal is digital the fractional cycle is measured as the elapsed time since that last phase shift. The receiver can determine the fractional cycle or phase to within a hundredth of a cycle or about 2 millimeters.<sup>3</sup> The unknown number of full cycles between the satellite and the receiver is called the *integer ambiguity*.

The phase processor software is able to determine very precisely the location of the rover antenna by resolving this ambiguity. A search volume for the true position is created based upon the average and the standard deviation of the code solution. A least-squares approach is used to discover the unique set of assignments of integers to the satellite carriers that result in a single stable position. The three unknowns, the X, Y and Z coordinates of the rover receiver ought to be soluble from the carrier signals of three satellites.

However, instead of the carrier signals themselves, the program uses the differences between the carrier waves of pairs of satellites received by the base and by the rover receivers. These are called *double differences*. These are used because in the double difference expression the clock errors of the satellites and the receivers drop out of the equation. It requires signals from four satellites to produce three double difference equations. In order to be able to test statistically for the best solution the data must be over-determined. Thus data from a minimum of five satellites is required for a carrier solution. The solution is strengthened with a greater number of satellites.

For single frequency receivers to collect an adequate quantity of data to resolve the integer ambiguity the base and the rover must maintain carrier lock on a minimum of five satellites for a minimum period of about 45 minutes. The number of satellites cannot be less than five, although it does not need to be the same five satellites throughout the period.

Since all of the data are processed after the survey it is not necessary to resolve the ambiguities prior to gathering other data. The algorithm that the carrier phase software uses

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<sup>3</sup> The frequency of the L1 signal is 1575.42MHz. At the speed of light, 300,000 km/sec, it thus travels 190.425 mm for every shift in phase. It shifts in phase once every 0.63 nSec and the receiver clock can resolve to 0.01 nSec.

for resolving the integer ambiguity does not depend upon the rover remaining in the same location for the 45 minute period, only that it maintain the carrier lock. A great deal of planning and care in execution of the survey is required in most instances in order to avoid loss of carrier lock as the rover receiver is moved from place to place in conducting the survey. Fortunately planning software is available to aid this part of the process. The satellite signals are very weak and maintaining lock on the carrier phase is particularly difficult with any degree of canopy cover. While this method of data processing is very precise, it is only practical in very open situations.

The accuracy of carrier phase processing is also a function of the distance between the base station and the rover. For much acceptable code processing the base and the rover may be as much as 300 kilometers apart and still produce sub-meter results. With carrier phase processing the two must be much closer together. If the base is more than about 50 kilometers from the rover, the carrier solution will probably be no better than the code solution. For horizontal 95% confidence level precisions in the neighborhood of 2 centimeters or less it is necessary to occupy a position with the rover very near the base station, such as a few meters, for some significant period of time, such as 20 minutes, during the course of the survey.

### **Field procedures**

All field procedures for data gathering assume the following conditions:

PDOP  $\leq 4$

Signal to noise ratio  $\geq 6$

Rover satellite elevation mask of  $15^\circ$

Synchronized measurements between the base station and the rover. The usual data synchronization interval is 5 seconds. For code processing the base station receiver can be set to a multiple of the rover interval and the software will interpolate the intermediate correction. For carrier phase processing the synchronization must be identical.

### **Code**

If only code processing is to occur, carrier mode can be turned off on the datalogger, the mode can be set to manual 3D, and files can be opened, closed and reopened as convenient.

### **Carrier**

For all of the data gathering for carrier phase processing, the carrier mode must be turned on, the mode must be set to overdetermined 3D. Files need to be left open to maintain continuous carrier lock and a file may not be reopened.

### ***Static***

In the classic static method of gathering GPS data the rover, as well as the base station receiver, remains stationary on a point for some significant length of time. With single frequency receivers a minimum occupation of 45 minutes is recommended. Change in the satellite geometry enhances the resolution of the carrier phase ambiguity. A separate file is created for each station so occupied. Using this technique the software is typically able to process the GPS data to the point that the integer ambiguity in the number of wavelengths

cycles between the antenna and the satellite can be resolved. If this occurs then the precision of the baseline length and azimuth between the base station and the rover will be very small, typically a few millimeters. If the data can only be resolved to a float solution then the precision will typically be around 2 centimeters.

### ***Intermittent kinematic***

The intermittent kinematic method is often called stop-and-go kinematic. Characteristic of this method is the successive occupation of a number of points with the rover receiver while maintaining continuous carrier lock not only during the occupations but throughout the process of moving as well.

As with the static method, with single frequency receivers, it is recommended that the file be open for a minimum of 45 minutes in order to use the change in the satellite geometry to aid in the resolution of the integer ambiguity.

To be successful with this method the lines from point to point must have a good view of the sky. Careful planning and care in moving the rover receiver is also very important to the success of this technique.

The author has been able to secure horizontal 95% precisions of 2 cms or less and vertical 95% precisions of 5 cms. or less on a series of points by initially occupying with the rover a point only a few meters from the base station for a period of 20 minutes, then occupying each successive point for as little as 5 minutes.

### ***Continuous kinematic***

If the precision demands of the survey are not so great as to require the intermittent kinematic technique, it is possible to use a fully kinematic method that simply does not stop. This technique can be productive for such purposes as gathering topographic data for contour mapping. As with the intermittent kinematic method, it is crucial to maintain a clear view of the sky. It also remains important to keep the file open for a minimum period of about 45 minutes.

This procedure is sometimes referred to as ambiguity resolution on the fly (AROF) or simply on-the-fly (OTF).

Using this method the author typically obtains horizontal 95% precisions of 7.5 cms. or less and vertical 95% precisions of 22.5 cms. or less.

## Chapter 3

### River and Non-River Settlements in the Belize River Valley: A Site-Planning Comparison

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#### **Introduction**

In the past, ancient Maya river centers have not been given much attention because they are generally smaller than non-river centers like Tikal and Caracol. They typically have less imposing architecture and less evidence of hieroglyphic inscriptions. A recent model by Lucero (1999) proposes that river centers (e.g., Piedras Negras, Yaxchilan) were typically smaller because the presence of a permanent water source did not necessitate a water management system. Non-river centers, in contrast, were supported by extensive water management systems. The Maya elite centralized power by building water reservoirs in direct association with monumental architecture and then maintained power by appropriating rituals from the daily activities of non-elite (Scarborough 1998:155). Consequently in the Maya lowlands, the largest Classic polities arose through creating large reservoirs which allowed the control of water, a critical resource during seasonal drought. According to Lucero (1999), association with pure water through water symbolism and ritual was a way for rulers to strengthen their power. For example, water lily iconography is carved and painted on monumental architecture and portable wealth goods, which attest to the importance of water in political symbolism and ritual at centers with water management systems. During the dry season (December-May), clean water was a precious commodity, and the presence of water lilies indicates that the water was free of parasites and toxic chemicals typically found in standing water. Elites maintained a clean water management system in exchange for non-elite labor that built the Classic Maya infrastructure based on ceremony and ritual.

This report describes the mapping strategy and the orientation of architecture at the Valley of Peace (VOPA) river center of Saturday Creek and the ceremonial complex of Three Sisters and compares them to Yalbac, a non-river center outside the western boundary of the VOPA project area (Figure 1). A preliminary study of site planning at river and non-river centers in the Belize River Valley indicates variability in orientation among structures at the Saturday Creek river center. In this chapter, I explore if orientation of structures is correlated to whether settlements relied on a permanent water source (i.e., uncontrolled access) or a water management system (i.e., controlled access).

#### **Research Objectives: 1999 Field Season**

- 1) To develop a more extensive map of Saturday Creek. Part of the core area of Saturday Creek is located in a milpa that was cleared and burned at the beginning of the field season, which exposed more mounds than were previously mapped in 1998. In addition, other mounds were located in the uncleared area which increased the size of the core area and exposed new plazas.
- 2) To measure the orientation of exposed walls from different types of architecture at each site. Research goals of VOPA include the comparison of orientations within and between sites to better understand river and non-river site planning.
- 3) To present a preliminary scenario that places river centers in the broader perspective of ancient Maya centers.

### Mapping Strategy

At the beginning of the VOPA 1999 field season, a large portion of the northern portion of the core area of Saturday Creek had been cleared and burned for milpa farming. Five new structures were exposed that had not been visible last year because of thick jungle cover. A sixth range structure was identified outside of the milpa in a previously unmapped area. The five structures (SC-77, SC-78, SC-79, SC-81, SC-82) were mapped by first locating the structures that had been mapped in the 1998 field season (SC-42, SC-43, SC-64) (Figure 2). Using a Brunton compass on a tripod and a tape measure, the VOPA 1999 team mapped in the five adjacent structures and incorporated them into the Saturday Creek map. The sixth structure, SC-76, was mapped using distance and angular relationship to SC-1.

### Orientations

Orientations were collected by measuring the angle of an exposed wall of a structure with a string and Suunto compass. Exposed walls were found in test pits, trenches made by looters, a bulldozer, or naturally eroded architecture. The orientations were measured by placing a string at the angle of orientation and securing the position with a line level (Table 1).

Table 1. Orientations at river and non-river settlements

SITE	TYPE	LOCATION	ORIENTATION
SATURDAY CREEK	MINOR	RIVER	0°
SATURDAY CREEK			90°
SATURDAY CREEK			345°
SATURDAY CREEK			285°
SATURDAY CREEK			285°
SATURDAY CREEK			15°
SATURDAY CREEK			0°
THREE SISTERS	MINOR	RIVER	90°
THREE SISTERS			0°

YALBAC	MAJOR	NON-RIVER	0°
YALBAC			180°
YALBAC			0°
YALBAC			90°
YALBAC			90°
YALBAC			0°

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### **The River Settlement of Saturday Creek**

The Saturday Creek river settlement has been designated a minor ceremonial center, similar to Barton Ramie (Willey et al. 1965) in that it consists of settlement all along the river valley including a variety of structure types from temple structures to single mounds. We mapped the north side of the Belize River. The core area is located on a raised platform with two distinct plaza groups (see Figure 2). Below I describe the structures mapped in the 1999 season, as well as orientations when recorded (see Table 1).

### **SC-64**

Structure SC-64 lies on the edge of a platform and faces structure SC-43. It appears to be a range structure and is approximately 2.0 meters high. A bulldoze cut through SC-64 left exposed profiles on both the north and south walls. The orientation from the thick limestone wall jutting from the profile measured 0° or due north at c. 50 cm and extended to the floor at c. 240 cm.

### **SC-43**

Structure SC-43 is the northern structure of a large plazuela group, Plaza B, and measures 11.1 meter high from the bottom of the platform on which it stands. The orientation of 90° was taken from a segment of the wall that had been exposed by naturally eroding milpa debris at the top of the structure.

### **SC-18**

Structure SC-18 is a single mound within a plowed field 110 meters northeast of the core area. A 1 x 1 meter test pit was placed on top of the mound in the center of the structure. The wall found during excavation measured 345° or 15° off due north at level seven at c. 50 cm below datum.

### **SC-3**

Structure SC-3 is approximately 7 meters high including the 3 meter high platform and is located just off Plaza A. A large looters trench was cut the length of the structure and exposed two separate walls at different levels but both facing the same way. Measurements for Wall A, the north half of the trench, labeled level 1 (at c. 85 cm below datum) and Wall B at level 2, the south half of the trench, (at c. 150 cm below datum) were 285°, or 15° off due west.

### **SC-85**

Structure SC-85 is a single mound with a small platform 60 meters southeast of SC-4. A 1 x 1 meter test pit was placed at the top of the mound in the center and revealed a thick limestone wall. The wall measured 15° at the bottom of level 3 at c. 33 cm below datum.

### **SC-68**

Structure SC-68 is a single mound located 180 meters south of SC-85 in a plowed field. A 1 x 1 meter test pit was placed at the top center of the mound and revealed a solid limestone wall. The wall measured 0° or due north at the bottom of level 9 at c. 75 cm below datum.

## **The River Settlement of Three Sisters**

Three Sisters is located approximately two kilometers from Saturday Creek and less than half a kilometer from the Belize River (see Figure 1). The site consists of four structures centered around a small plaza and is believed to be an elite residence because of its moderate

size and the substantial stone construction of TS-1, the east building on the plaza. The site also has a small *aguada* nearby (Figure 3).

### **TS-1**

TS-1 is the largest structure at the site has at least four vaulted rooms. Two large looters trenches were located at the eastern side of the structure. The East lower looters trench had an exposed wall that measured 0° or due north at level six (see Table 1). A second measurement was taken from the top of the structure where a 1 x 1 meter test unit was placed. The wall exposed in the test unit measured 90°.

## **The Non-River Settlement of Yalbac**

Yalbac is located just outside the western boundary of the Valley of Peace Archaeological research area (see Figure 1). The site consists of monumental architecture located around at least four plazas on raised platforms and measures at least 100 meters in length. Only a small area of Yalbac was traversed and mapped (Figure 4). Orientations were taken from exposed walls due to extensive looting.

A total of six orientations were taken from exposed walls and corbel vaulted ceilings in five plazuela structures (see Table 1). The highest structure, Str. A1, is the only structure that has been labeled at present. Two orientations were taken from Str. A1. The first orientation was taken from the top of a corbel vaulted ceiling that measures north-south. The second was taken from a corner near the top of the structure that measures east-west. The third orientation was taken from a structure that connects to Str. A1 by a wing which was also oriented north-south. The three remaining orientations were taken from walls in looters trenches at other structures nearby Str. A1, all three measured east-west exactly.

## **Significance and Conclusions**

Quality of construction of monumental architecture seems to play a role in the orientation of architecture. At Saturday Creek there was much more variation in orientation, while at Yalbac and Three Sisters all of the orientations measured north-south or east-west. The construction material of the monumental architecture at Yalbac and Three Sisters consisted of limestone walls and corbel vaulted ceilings. In contrast, architecture at Saturday Creek consisted of mud covered with stones on the exterior surface of the structure so as to simulate stone monumental architecture like that found at Yalbac and the neighboring Three Sisters.

Variation in orientation at Saturday Creek may be explained by the different types of architecture measured (i.e., single mounds, plazuela groups, and range structures). Continued study of the differences between core area architecture and single mounds will further address these issues. Further research into architectural orientation will address such questions as: what is the significance of variations in orientation? What is the significance of specific orientations? Do orientations correlate with chronology? Or are orientations purely functional? Do these patterns reflect other river and non-river centers? These questions can

be answered in part by applying Lucero's model which emphasizes the economic independence of river-based centers. Economic independence could account for varied architectural orientation at Saturday Creek, in contrast to the formalized or non varied site plan found at the major, more centralized centers such as Yalbac.

Past archaeological endeavors have placed much emphasis on larger ancient Maya centers, most of which are not located near permanent water and rely on water management systems (i.e., aguadas and reservoirs) for daily water needs. Major river centers such as Copan developed on large but constricted or concentrated alluvial soils where power was easily centralized. Studies of smaller river centers can be useful in studying contrasts with non-river centers and other larger river centers. Comparative studies are important to provide information on all spectra of ancient Maya life. Preliminary investigations within the VOPA research area indicate that river settlements participated in the larger economical, political, and social sphere indicated by the presence of monumental architecture and trade goods found at minor centers.

## **ACKNOWLEDGMENTS**

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## Chapter 4

### Test Excavations at Saturday Creek

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#### Introduction

In order to collect chronological data from several structures selected for future extensive excavation at Saturday Creek (see Chapter 1), we tested 10 mounds: seven solitary mounds, two mounds from patio groups, and one range structure (Figure 1). Saturday Creek has 53 solitary mounds (67% of the 79), most of which presumably served as residences. Of the 53, 33 (42%) were less than one meter high. Extensive excavations conducted elsewhere in the Belize Valley have demonstrated that the height of solitary mounds often relates to chronological depth; for example, the Belize River Archaeological Settlement Survey (BRASS) project exposed a series of 20 thin plaster floors, most superimposed, from a solitary mound two meters in height covering a 1500 year time period (Lucero 1994:108-131, 306-309). In contrast, a valley mound barely perceptible on the surface, when excavated, revealed a single component -- similar to one of the construction phases of the two-meter high mound. As a consequence, testing at Saturday Creek focused on mounds over one meter high, of which there are 20. I considered eight of them (10% of the 79) as possible small houses for test excavation based on their size (c. 10 m<sup>2</sup> in area) and surface artifacts (daub, grinding stone fragments, plain and decorated bowls, jars, chert tools, and obsidian cutting blades indicating a domestic function) (cf. Lucero 1994, n.d.; see Figure):

SC-18, height= 1.16 meters  
SC-17, height= 1.01 meters  
SC-7, height= 1.20 meters  
SC-85, height= 1.26 meters  
SC-5, height= 1.4 meters  
SC-80, height= 1.16 meters  
SC-84, height= 1.33 meters

The four plazuela groups (A-D; see Figure ) are each comprised of four to five mounds for a total of 15 mounds (19% of the 79). Artifacts noted from the surface include ceramic figurine fragments, decorated vase sherds, and an obsidian core; these types of artifacts obviously differ from the solitary mound structures and suggest a more wealthy residence. There are also at least two plazas, open areas surrounded by monumental architecture (Carr Plaza, Plaza B). There are a total of 11 structures associated with the two plazas (14% of the 79). Several groups have structures over a meter high, two of which we tested:

Plaza B (SC-64, height= 2.0 m)  
Group B (SC-68, height= 1.4 m)

Finally, a deep looters trench at a presumed range structure, SC-3 (height= 7.19 m), was cleaned up and diagnostic artifacts collected.

Unless otherwise noted, the following excavation techniques were used. A 1 x 1 meter unit was placed on the center top of structures to maximize chronological information (especially stratigraphic profiles and ceramics). Surface datum at each unit is the southwest corner. We excavated following natural stratigraphy, and all excavated material was screened through 1/2" mesh. We originally had planned to screen through 1/4" mesh, but we realized that the dry, hard, alluvial clays would make this a slow and inefficient manner of screening. Diagnostic ceramics (rim sherds) were collected. Body sherds, most obsidian and bone, and chert flakes were counted, but not collected. All features, profiles and plans were drawn and photographed. All test units were tied into one of the site datums with a Brunton compass and tripod (see Figure 1). Upon completion of excavation, all exposed surfaces were covered with plastic and backfilled. Laboratory work, which took place at Banana Bank, our home base, consisted of cleaning, cataloging, and bagging artifacts for storage in the Department of Archaeology, Belize (Accession No. 10048). We conducted ceramic analysis to determine structure chronology using the established ceramic chronology from Barton Ramie (Gifford et al. 1976).

On a general note, Jaime Awe informed us that due to the acidity of alluvial clays, plaster does not preserve as well. As a result, one typically only finds the ballast. This type of clay is also not kind to ash-tempered vessels. However, it is better for preservation (versus dry fill), particularly of charcoal, for example.

## Solitary Mounds

### SC-18

SC-18 is a solitary mound in the plowed field located northwest of the core/uncleared area (see Figure 1). It is oriented 20° east of north, 23 x 21 m, and 1.16 m high. The 1x1 meter test unit is located on the top center of the mound to collect as much information as possible on chronology and construction history.

Since this mound is located in a plowed field, it is possible that plowing has cut through one or more floors. This was indicated in the wall close to the surface with limestone flecks and pebbles. At least five floors were exposed, but most are quite ephemeral and composed of loosely packed limestone pebbles and cobbles. The only thick plaster floor and obvious ballast was exposed in wall profiles (Figure 2) at about 50 cm below datum which has been identified as a connecting wall. Immediately above/on top of this plaster floor were a series of ceramic clusters (three), part of level 6, described in more detail below. Clusters were designated based on dense concentrations of sherds, some from the same vessel (although none were complete). Also noticeable was the presence of charcoal directly on some of the vessel sherds. Throughout the unit we also noted charcoal flecks and chunks, daub fragments, limestone flecks, body and rim sherds, groundstone fragments, obsidian blade fragments, chert flakes (mainly below 60 cm), three phalanges (two possibly human), and *jute* shells below 70 cm. Regarding the presence of human phalanges, Chase and Chase (1999) have noted the caching of 'finger bowls' as part of a burial assemblage at Structure

B19, a building on the northern summit of Caana. Previous to this, they had only recovered finger bowl caches associated with the eastern buildings of residential compounds.

### Ceramic Types: SC-18

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
2	Belize Red	Spanish Lookout	Late Classic	c. A.D. 690-890	255
6	Garbutt Creek	Spanish Lookout	Late Classic	c. A.D. 690-890	230
6	Uacho Black-on-orange	Tiger Run	early Late Classic	c. A.D. 590-690	208
6, cluster 1	Saturday Creek polychrome	Tiger Run	early Late Classic	c. A.D. 590-690	198
6, cluster 3	Socotz striated	Hermitage	Early Classic	c. A.D. 290-590	187
7	Saturday Creek polychrome	Tiger Run	early Late Classic	c. A.D. 590-690	198
9	Balanza Black	Hermitage	Early Classic	c. A.D. 290-590	161
9	Balanza Black	Hermitage	Early Classic	c. A.D. 290-590	161
9	Jocote group	early facet Jenny Creek	Middle Preclassic	900-600 B.C.	63
10	Balanza Black	Hermitage	Early Classic	c. A.D. 290-590	161
10	Dos Hermanos Red	Hermitage	Early Classic	c. A.D. 290-590	160
13	San Antonio Golden-brown	Mount Hope complex	Late Preclassic/Protoclassic	c. 100 B.C.-A.D. 290	115
13	Hillbank Red	Barton Creek	Late Preclassic	c. 300-100 B.C.	104

Below is a brief description of each level:

Level 1 (11 to 19 cm thick) consisted of a clay loam with a few limestone pebbles and cobbles with a few artifacts (two rim sherds and two chert flakes). Also noted were charcoal flecks and a small amount of daub (see Appendix A, Chapter 1 for a complete list of artifacts recovered during the 1999 season).

Level 2 (8 to 18 cm thick) consists of a thin layer (c. 2 cm) of limestone pebbles and daub overlying a clay loam. Three rim sherds were collected, and 52 body sherds, an obsidian blade fragment and two chert flakes were noted.

Level 3 (10 to 13 cm) consists of clay loam with some sand. Flecks of daub and charcoal were noted, and fewer cultural remains than previous levels. The bottom of this level was identified based on the increased amount of charcoal, as well as pieces of limestone and daub, likely represent the next ephemeral floor. Three rim sherds were collected and 39 body sherds noted.

Level 4 (4 to 5 cm thick) consists of a limestone pebble ballast floor (in patches); it is also thicker in some places (pebble ballast) and thinner in others (clay ballast). Charcoal flecks and chunks were noted throughout the level. One rim sherd was collected, and 12 body sherds and one bone fragment noted.

Level 5 (1 to 5 cm thick) consists of a layer of limestone pebbles (a likely ephemeral floor) with burned daub and charcoal quite noticeable. Again the floor is inconsistent in presence and thickness throughout the unit. One rim sherd was collected, and 25 body

sherds and one obsidian blade fragment were noted. The bottom of this level consisted of a series of sherd concentrations at 48 cm below datum.

Level 6 (7 to 13 cm thick) consists of clay loam filled with stacked sherds (literally sherds on top of one another without any dirt in between). Charcoal is also found associated with the sherds, either in the matrix nearby, or encrusted on the sherds themselves. There are also patches of a plaster floor. No reconstructable vessels were present, although many of the sherds appeared to have come from the same vessel. Daub was also noted near the sherd clusters (three total). Outside of the clusters, six rim sherds, one base, and one neck were collected, and 79 body sherds, one chert flake, one obsidian blade, and 13 groundstone fragments (each about 2 cm in size) were noted. Level 6 ended at what appeared to be another ephemeral plaster floor.

Below are detailed descriptions of each of the sherd clusters found in level 6:

Cluster 1 is located near the east wall, center: There are six to seven body sherds that do seem to be from the same vessel, or type of vessel, none of which are rims. These pieces have a distinctive whitish underslip, perhaps indicating an Early Classic vessel. Also included is a likely basal flange, again an Early Classic marker. The only rim sherd from Cluster 1 is a polychrome vase sherd with what looks like to be a feather design of some sort, a possible Saturday Creek polychrome. There are a total of 32 body sherds (including four with the same paste and striation marks).

Cluster 2 is located near the south wall, center: Most of the body sherds (17) have a brownish slip on one side, and three are dark throughout (no slip). One base and one rim was found. There are a total of 21 body sherds.

Cluster 3 is located in the northwest corner: It has similar body sherds to that of Cluster 1 (e.g., seven striated sherds). It also has one brownish slipped sherd. There are seven rim sherds and 48 body sherds.

The other body sherds collected from level 6 (i.e., not in any of the three clusters) seem to show greater variety in paste, slips, and forms. There are six rim sherds and 79 body sherds. One of the neck/body sherds collected has a distinctive striation pattern and paste composition which we have tentatively identified as Socotz striated.

Level 7 (3 to 8 cm thick) consists of a plaster floor and limestone cobble ballast. Charcoal flecks and daub were noted throughout. Two large boulders were noted in the northwest corner, in between which we found a greater density of sherds and charcoal than the rest of the unit. We collected eleven rim sherds and noted 66 body sherds, an animal scapula bone, one chert flake, and one fire-cracked chert flake. The bottom of level 7 consisted of an increasing amount of flecks of plaster.

Level 8 (1 to 6 cm thick) consists of clay loam with plaster/limestone flecks and pebbles. Burned plaster and daub was noted in the north wall, as well as burned sherds. Finding more and larger chert flakes than in previous levels. Charcoal flecks and daub was noted throughout. Ten rim sherds were collected, and 58 body sherds, four chert flakes, and one obsidian blade were noted.

Level 9 (2 to 4 cm thick) consists of clay loam with specks of limestone and daub. Charcoal flecks noted throughout as well. Four rim sherds were collected, and 37 body sherds, 2 obsidian blade fragments, and one unidentified bone fragment were noted.

Level 10 (2 to 7 cm thick) consists of clay loam with daub chunks, between pebble and cobble size, charcoal, and limestone pebbles throughout level. The northeast corner yielded a burned flange and a burned sherd with charcoal on the surface. Burned plaster and daub

were also present, as well as a burned phalange (possible foot bone). A partially reconstructable narrow-necked jar was recovered from the southeast corner and collected (11 pieces). We also collected three rim sherds, one burned phalange, and one spindle whorl. We also noted 60 body sherds, two obsidian blades, three chert flakes, and one worked chert piece (possible small eccentric).

Level 11 (7 to 13 cm thick) consists of clay loam with limestone pebbles and charcoal and daub flecks (the latter more yellowish than previous levels, which was more orangish). For the first time, we are noticing the presence of *jutes*. Two rim sherds and one body sherd (the latter with waxy slip) were collected. In addition, 72 body sherds, four chert flakes, and two possible toe phalanges were noted.

Level 12 (16 to 25 cm thick) consists of a more sandy clay with fewer flecks of limestone, charcoal, and daub. The daub is orangey again. The range of materials found in this level vary much more than previous levels: *jutes*, crystalline limestone (pebble size), consolidated sand (pebble size), ocean shell fragment, a possible core (a few flakes taken off), one core tool, two biface thinning flakes, one obsidian blade fragment, and a total of 35 body sherds (five of which were collected since we did not find any rim sherds). This level terminated at a concentration of burned daub along the north wall and floor (about one meter below datum).

Level 13 (7 to 14 cm thick) consists of sandy clay with some charcoal flecks and *jutes*. We collected two rim sherds and noted one chert flake and two body sherds. As we dug deeper, artifacts decreased in number. When we had reached a depth of 1.11 to 1.18 below datum, we put in a post-hole test in the center of the unit. We took the post-hole a little deeper (1.49 m) than the height of the mound (1.16 m) to make sure we would not miss any cultural remains. Two rim sherds were collected.

### **SC-17**

SC-17 is a solitary mound in the plowed field located west of the core/uncleared area (see Figure 1). It is oriented east-west, 17.5 x 11.6 m, and 1.01 m high. The 1x1 meter test unit is located on the top center of the mound. By level 3, from 45 to 49 cm below datum, it became apparent that few artifacts or evidence for cultural activities was indicated. We then put in post-hole test in the center of the unit to a depth slightly lower (1.10 m) than the actual height of the mound to insure we did not miss any cultural evidence.

This mound appears to have only one major cultural stratum, which was noted in the post-hole test at 81 to 91 cm in depth below surface. The cultural layer consists of limestone pebbles and small cobbles, as well as ceramics (eight body sherds noted, and one chert flake). The rest of the unit, above and below the one cultural stratum, consisted of hard clay, nearly rock hard when dry. Levels 1 through 3 mostly consist of this clay, other than a few charcoal and daub flecks, and minute body sherds.

### **SC-7**

SC-7 is a solitary mound in the plowed field located northwest of the core/uncleared area (see Figure 1). It is 26 x 26 m, and 1.20 m high. The 1x1 meter test unit is located on the top center of the mound. It appears that the mound labeled on the map originally as SC-8 (height = .95 m) actually comprises the platform of SC-7.

Results were disappointing in that we did not find much in the way of floors. The first level, ranging in depth from seven to 13 cm, consisted of clay loam with limestone pebbles

and flecks of charcoal; there was also a few pieces of daub and a few limestone cobbles. Total artifacts noted include 19 body sherds, two chert flakes, one fire-cracked chert flake, one small rim fragment too small to collect, and one obsidian blade fragment. Level 2 (12 to 19 cm in depth) was defined as having more limestone cobbles. It is unclear, however, whether or not this actually is a different layer from level 1. Charcoal and limestone were also noted in the clay/clay loam matrix. The daub fragments, some with twig impressions, seem to have temper. The clay is very difficult to dig through--it is actually rock hard. We were able to collect two rim sherds (an additional one was too small to collect), and noted 16 body sherds, two obsidian blade fragments, one fire-cracked chert flake, one chert tool fragment, and one chert biface thinning flake. Even though we still continued to come upon limestone, charcoal, and daub flecks, and even though we did find one body sherd at about 30 cm below datum, we decided to put in a post-hole test to determine if indeed there were any further floors. The post-hole was the same depth as the height of the mound, 1.2 meters. Only a few body sherds were noted, as well as some daub and charcoal flecks, as well as a burned chert chunk.

It is interesting that we did not recover much in the way of cultural remains, especially given the fact that we noticed a high density of artifacts noted on the mound surface.

### **SC-85**

SC-85 is a solitary mound in the plowed field located on the edge of the southwest area of the uncleared area. It is 13.4 x 9.4 m (including the platform), and 1.26 m high (see Figure 1). It is one of only two tested mounds (the other being SC-84) which has not been plowed, and the only mound where we excavated a 1 x 1 meter unit. We put in a post-hole test at the center top of the main mound (9.4 x 8.4 m) to make sure it had several construction phases. The first floor (limestone cobbles) at about 18 cm in depth with two body sherds, daub, and one chert flake. At 33 cm, a very sturdy floor of limestone cobbles was found. At 42 cm we found unidentified bone, one chert flake, one chert blade, three body sherds, and one rim sherd (and charcoal). At 52 cm, we found lots of daub intermixed with dirt, body sherds, and a rim sherd (and charcoal). At 62 cm, a lot of daub and limestone pebbles, as well as a burned sherd. We stopped the test at 70 cm since we decided to put in a test unit at this mound. Total artifacts: 43 body sherds, one bone, one rim sherd (collected), one chalcedony flake, two chert flakes, and one chert blade. The test unit was located next to the post-hole.

In the test unit, there were a total of seven levels, as well as a post-hole test at the bottom of the excavated area. While no obvious plaster floors were found, we did note the presence of several possible pebble and cobble floor ballasts, as well as daub (Figure 3). The pattern was similar for every level, each of which started with concentrations of artifacts, daub and/or charcoal, and limestone pebbles and/or cobbles. We did find at the bottom of level 3 that might be part of a wall oriented 15° off north. Throughout the unit we recovered a large number and variety of artifacts, from marine shell, obsidian, bone, a clay ball, bead, and disk, and so. We also noted that the obsidian blades found at this mound are noticeably wider than those found at any other site tested this season. Previous research from the upper Belize River area shows that blade width appears to correlate with wealth of individual households where wider blades are found in more wealthy residences (Olson 1994). Below is a brief description of each level.

### Ceramic Types: SC-85 Test pit

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
2	Paxcaman Red	New Town, late facet	Late Postclassic	c. A.D. 1150-1400	294
2	Dolphin Head Red	Spanish Lookout	Late Classic	c. A.D. 690-890	227
3	Balanza Black: Lucha Incised	Hermitage	Early Classic	c. A.D. 290-590	164
7	Hillbank Red	Barton Creek, late	Late Preclassic	c. 300-100 B.C.	101
7	Sampopperro Red	Jenny Creek, late facet	Middle Preclassic	c. 600-300 B.C.	77
7	Reforma Incised	Jenny Creek, late facet	Middle Preclassic	c. 600-300 B.C.	75
7	Reforma Incised	Jenny Creek, late facet	Middle Preclassic	c. 600-300 B.C.	75
Post-hole	Chaccinic Red-on-orange-brown	Jenny Creek, early facet	Middle Preclassic	c. 900-600 B.C.	69
Post-hole	Chaccinic Red-on-orange-brown	Jenny Creek, early facet	Middle Preclassic	c. 900-600 B.C.	69

Levels 1 and 2 (16-21 cm thick) was a clay loam topsoil from which four rim sherds were collected. Other artifacts noted include 92 body sherds, four obsidian blades, one possible chalcedony scraper, three chert flakes, and one chalcedony flake.

Level 3 (8-12 cm thick) was defined as a noticeable presence of daub. The clay loam matrix had a high density of artifacts, including two rims and nine body sherds from a black fluted vase with a cartouch design around its neck. Some of the sherds have charcoal on them, although no charcoal has been noted in the soil. Large chunks of daub are present. Most of the artifacts came from the west side of the unit within what might be a wall (see Figure 3), including six large body sherds from one vessel (no rims). We collected five rims (in addition to all the vase sherds) and two obsidian blades, and noted 84 body sherds (not counting the six from one vessel), one chert core, 2 worked flakes with wear, one chert flake, and one bone fragment.

Level 4 (13-22 cm thick) consisted of the obvious presence, for the first time, of charcoal, in addition to daub. Some of the charcoal chunks were quite large (e.g., 3 cm diameter). We excavated the west side separately (inside the wall) where we found a ceramic bead (c. 2 cm in length shaped like a coil), a marine shell, burned body sherds (9), 43 body sherds (including two from the fluted black vase from level 3), four chert flakes, one obsidian blade, and one fire-cracked chert chunk. The east side had fewer artifacts. The level terminated when we came upon an increasing presence of limestone flecks and some cobbles. We collected a total of nine rims, three basal flanges, eight body sherds (including two from vase from level 3), one clay bead, and one obsidian blade. We also noted a total of 87 body sherds, two bone fragments, and one marine shell.

Level 5 (5-12 cm thick) consisted of a clay loam matrix with limestone flecks and some cobbles. A burned distal bone of some type was found in the center of the west wall near a cluster of three cobbles. In the vicinity of the burned bone, another bone was found, this

time of a human phalange (finger bone). This level terminated at a concentration of mention daub, charcoal, and burned plaster and sherds. We collected nine rim sherds, two bone pieces, and four body sherds. We also noted 121 body sherds, as well as 18 orange paste sherds (an increasing number of these were noted at level 5), one obsidian blade, and one burned chert flake.

Level 6 (8-10 cm thick) begins with the noticeable presence of sherds, daub, and charcoal. We found part of a long bone that had been cut, polished, and burned in the southwest corner, as well as a clay ball (c. 1 cm diameter). For the first time, limestone flecks were quite noticeable (see Figure 3). We ended up collecting one base, three bone pieces, 11 rims, three basal flanges, three body sherds, and one clay ball. We noted 132 body sherds, 22 orange paste sherds, two bases, one chert biface thinning flake, one fire-cracked chert biface thinning flake, one fire-cracked chert flake, and three chert flakes.

Level 7 (5-10 cm) was defined as further limestone flecks and cobbles in a clay loam matrix. In the upper 3-5 cm we continued to find lots of artifacts including a clay disk (c. 1 cm diameter), a spindle whorl, a ceramic foot pod, and more. We also found a concentration of sherds in the northeast corner. In the lower 3-5 cm, we found fewer evidence of limestone and artifacts. We collected 14 rims, five body sherds, one clay disk, one spindle whorl, 1 ceramic pod, and two ring bases. We noted 124 body sherds, 26+ orange paste body sherds, three marine shell fragments, one obsidian blade, and six chert flakes.

We decided to put in a post-hole test in the bottom center of the unit to see if we had hit sterile. We found artifacts until 1.35 below datum; the height of the mound, or so we thought, is 1.26 meters (including the platform). Specifically, we found additional floors at 1 meter (mostly daub) and 1.13 meters (limestone flecks and cobbles) below datum (see Figure). Due to time constraints, we were unable to expose the floors. However, we were able to collect four rims, two bases, one body sherd, and one obsidian blade, as well as noted 36 body sherds. We backfilled SC-85; it took us awhile because the backdirt pile was wet, heavy, and sticky; at the bottom, we put two plastic bags and an empty bottle of Marie Sharpes habanero sauce.

### **SC-5**

SC-5 is a solitary mound in the plowed field located on the edge of the southwest area of the uncleared area. It is 26.5 x 26 m, and 1.4 m high (see Figure 1). We put in a post-hole test on the top of SC-5, in the middle of the 1x1 meter unit we had set up earlier. The mound was measured as being about 1.4 meters in height. We encountered a plaster floor about 20, 50, and 75 cm below surface. We did not find, however, many artifacts. We did find a base, or likely basal flange, about 1 meter deep. Through the 1.08 deep test, we found flecks of daub, limestone, and charcoal. I decided to stop even though we continued to find artifacts; it was clear that this mound might be a good candidate for future testing. We found a total of 4-5 body sherds (including the base/possible basal flange), one chert flake, and one chert chunk.

### **SC-80**

SC-80 is a solitary mound located within the southwest corner of the uncleared area. It is 20 x 18 m in size, and 1.16 m high (see Figure 1). We put in a post-hole test at the top center to a total depth of 1.14 m. At about 30 cm, one small sherd and one chert flake about 4x5 cm in size were found, as well as some daub. At 60 cm, there is no further evidence in the

walls of much cultural activity; only one sherd was noted. At 90 cm there were a few flecks of daub. The only possible floor might be at 22 cm where we found a couple of sherds and about three or four pebbles, not all of which were limestone (river cobble), as well as the remains of either a piece of wood/root. It was decided that this mound would not be a good candidate for a 1x1 meter unit.

#### **SC-84**

SC-84 is a solitary mound located within the southwest corner of the uncleared area (see Figure 1). It is c. 12 x 9 m in size and 1.33 meters in height. We put a post-hole test on the top center of the mound to a depth of 1.14 meters. A possible floor was noted 78 cm below surface consisting of limestone flakes and pebbles. The first shovel full consisted of red ants. Mr. Scott then told us that the entire mound was actually an ant hill. I bought the explanation for the first 50 cm or so. Two limestone cobbles came out of the post-hole at about 80 cm. The sidewalls show nothing; we decided to backfill this unit after digging about 90 cm.

### **Plazuela Groups**

#### **SC-64**

SC-64 is part of a large plazuela group (Plaza B) near the main core of the site in an area that last season was uncleared (and unmapped). Shortly before arriving this season, landowner John Carr gave a local worker permission to cut down the north uncleared area for a milpa. This provided greater visibility and allowed us to map the largely uncleared area. It is largely oriented north south, 23.7 x 8 m, and 2.0 m high. This mound has been heavily damaged by bulldozing and looting (Figure 4). The resulting exposed surfaces have, however, provided important information about chronology and construction techniques. We also put in a 1x1 meter test pit on the top of the mound. In addition, we were able to clean and collect artifacts from two sections in the east-west bulldoze cut on the south wall.

#### SC-64 Test Pit

We did not locate the test unit (SC-64 TP) on the center of the mound because of the bulldoze cut. Instead we excavated the 1x1 meter unit on the north side of the east-west bulldoze cut. This unit had a total of six levels, the last of which (level 6) we post-holed to a depth of 2.09 meters (Figure 5). All but level 1 (topsoil) was screened using 1/2" mesh. Burned materials was noted throughout the unit. This test pit seems to represent a series of construction floors/living areas beginning in Late Preclassic through Late Classic periods.

### Ceramic Types: SC-64 Test Pit

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
2	Belize Red	Spanish Lookout	Late Classic	c. A.D. 690-890	255
4	??? or Aguacate orange	Tiger Run or Floral Park	early Late Classic or Late Preclassic/Protoclassic	c. A.D. 590-690 or c. A.D. 0-290	135
5	Saturday Creek polychrome or Gavilan Black-on-orange	Tiger Run or Floral Park	early Late Classic or Late Preclassic/Protoclassic	c. A.D. 590-690 or c. A.D. 0-290	198 or 142

Level 1 (20 to 35 cm thick) consists of overburden/topsoil, which we did not screen or collect artifact (only a few were noted). It consisted of a dark clay loam with limestone cobbles and pebbles.

Level 2 (c. 20 cm thick) has an obvious presence of cultural remains (daub, obsidian, ceramics, mano, charcoal flecks, etc.). The clay loam is of a slightly different color than and consistency (more cobbles) than level 1. It terminated at what appeared to be a plaster floor. We collected two rim sherds, two obsidian blades, one chert flake, one bone, and one mano.

Level 3 (c. 30 cm thick) consists of the plaster floor (no cultural remain recovered) and the underlying stratum, which consisted of a silty loam with limestone pebbles, artifacts, daub, and charcoal flecks. We collected four rim sherds and noted two pieces of bone. Interestingly, the floor does not appear in the west wall profile. Level 3 terminated at a definite plaster floor, which at first appeared to have a hole cut through it.

Level 4 (11 to 18 cm thick) started to get confusing -- one moment there seemed to be two floors, the next just one floor. When assessing the profile of level 4, it appears that there are at least two construction events, the floor/ballast/fill being earlier than the clay loam. We collected two rim sherds. Level 4 terminated at another plaster floor, which again does not appear obvious in the west wall profile.

This fact is surprising since Level 5 consists of the plaster floor and a relatively thick cobble ballast (together about 10 cm in depth). We collected one rim sherd. Based on the north wall profile drawn in the 1998 season (Lucero 1999:Figure 8), the level 5 floor is the same as Floor C noted on the north-south bulldoze cut. Assuming this is the case, the next floor is 62 cm lower (Floor D).

Rather than dig to this depth (over two meters below surface), we excavated level 6 from 0 to 14 cm before using a post-hole digger to test the center of the unit an additional 70 cm. One body sherd was noted. The bottom of the test pit was lined with tin foil and plastic bags and backfilled.

The test pit at SC-64 exposed a series of constructions floors/living areas. In addition, burned areas/charcoal was noted throughout. However, relatively few artifacts were noted from the test pit. In contrast, we noted and collected many artifacts in the cleaned and tested sections on the south wall of the east-west bulldoze cut.

### Sections 1 and 2

The sections are each about 1 meter wide or so and about 2 meters high (see Figure 4).

Section 1 has 8 levels, while Section 2 has 9. It appears that at least the first four levels are the same, as described below. In addition, we only cleaned what the bulldozer exposed, and did not excavated any deeper.

*Section 1:*

Section 1 is located on the west end of the south wall of the east-west (Figure 6). It is .90 meters wide and 2.30 meters high. Each level was excavated about 5-10 cm in, and material was not screened.

Ceramic Types: SC-64 Section 1

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
2	Roaring Creek Red	Spanish Lookout	Late Classic	c. A.D. 690-890	240
2	Mount Pleasant Red	Tiger Run	early Late Classic	c. A.D. 590-690	196
4	Saturday Creek polychrome	Tiger Run	early Late Classic	c. A.D. 590-690	198
4	Mountain Pine Red	Tiger Run	early Late Classic	c. A.D. 590-690	194
4	Uacho Black-on-orange	Tiger Run	early Late Classic	c. A.D. 590-690	208
4	Uacho Black-on-orange	Tiger Run	early Late Classic	c. A.D. 590-690	208
4	Uacho Black-on-orange	Tiger Run	early Late Classic	c. A.D. 590-690	208
5	Saturday Creek polychrome	Tiger Run	early Late Classic	c. A.D. 590-690	198

Level 1 (10 cm thick) consists of topsoil. We did not screen or collect material.

Level 2 (25 cm thick) consists of clay loam and lighter brown than lower levels. It was interspersed with limestone cobbles. Six rims were collected and 44 body sherds noted, as well as a chert flake.

Level 3 (10 cm thick) consists of a plaster floor and cobble ballast loosely packed. No artifacts were noted.

Level 4 (45-68 cm thick) consists of clay loam with small limestone pebbles, some daub, and charcoal flecks throughout. In the upper west corner, a layering of sherds was noted (collected separately, four rims and 23 body sherds, the latter not collected). A short, thick fibula was also noted, believed to be from a short and heavy animal such as a peccary. Another unidentified burned partial bone was also located. Eighteen rim sherds were collected, and 188 body sherds were noted, as well as four chert flakes.

Level 5 (36-57 cm thick) consists of clay loam with daub, limestone cobbles, and charcoal flecks. Noticeably dense presence of sherds (and one primary flake). The cobbles that make up the top of level 5 seemed to have slumped a little to the east. Nine rims and one base were collected and 114 body sherds noted, as well as one chert flake.

Level 6 (10 cm thick) consists of a plaster floor and cobble ballast; no artifacts were recovered.

Level 7 (70 cm thick) does not have much in the way of a cultural deposit -- a few charcoal flecks and pieces of daub; no rim sherds were found, but 13 body sherds were noted; it was mostly clay with thick bands of alluvial sand.

Level 8 (c. 10 cm thick) consists of a plaster floor and cobble ballast, relatively thin, but was pretty solid (compact). No artifacts were noted.

*Section 2:*

Section 2 is located on the east of Section 1 3.2 meters (see Figure 4). It is .70 meters wide and 2.00 meters high (Figure 7). Each level was excavated about 5-10 cm in, and material was not screened.

Ceramic Types: SC-64 Section 2

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
4	Saturday Creek polychrome	Tiger Run	early Late Classic	c. A.D. 590-690	198
5	Garbutt Creek	Spanish Lookout	Late Classic	c. A.D. 590-890	232
5	Dolphin Head Red	Spanish Lookout	Late Classic	c. A.D. 590-890	227
5	Sibal Buff polychrome or Caldero Buff polychrome	Tiger Run or Hermitage	early Late Classic or Early Classic	c. A.D. 590-690 or c. A.D. 290-590	209 or 179
5	Macal Orange-red or Dos Hermanos	Tiger Run or Hermitage	early Late Classic or Early Classic	c. A.D. 590-690 or c. A.D. 290-590	214 or 160
8	Garbutt Creek or Dolphin Head Red	Spanish Lookout	Late Classic	c. A.D. 590-890	232 or 227

Level 1 (20 cm thick) consists of topsoil/overburden, which we did not test.

Level 2 (20 cm thick) consists of clay loam with cobbles (tightly packed) and artifacts. Three body sherds were noted.

Level 3 (c. 10 cm thick): Tail end (?) of plaster floor and ballast (yellowish). One body sherd was noted.

Level 4 (45 cm thick): Clay loam with cobbles and lots of artifacts and some charcoal flakes. We collected three rim sherds and noted nine body sherds and one chert flake. The sherd concentration that was noted in Section 1 level 4 did not show up in this level. We did collect three rim sherds and two bone fragments (a possible wild turkey wing bone and skull fragments).

Level 5 (30 cm thick) consists of clay loam with cobbles, artifacts, daub, charcoal flakes separated from the above stratum by a noticeable increase in sherd density, and a greater number of large cobbles, tightly compact. Ten rim sherds were collected and we noted 2 obsidian blades and 70 body sherds.

Level 6 (5 cm thick) consists of a plaster floor and ballast (about 10 cm in depth). Two small body sherds and chert flakes were noted.

Level 7 (55 cm thick) consists of tightly packed cobble/boulder fill (almost cement-like). Only two body sherds were recovered.

Level 8 (15-30 cm thick) consists of sandy clay fill with limestone pebbles and some artifacts. One rim sherd was collected, and one body sherd noted.

Level 9 (uncleared/unexposed) consists of a thick plaster floor (c. 10 cm). Two body sherds and chert flakes were noted.

The test pit and sections are located about seven meters apart, which resulted in a major difference in the artifact density, and even in apparent construction events.

## SC-68

This platform mound is 26 x 23 meters in size (including the platform) and 1.4 m in height. SC-69, originally labeled a separate mound (23 x 14 m), was redefined as the platform to SC-68. It is located in the plowed field southwest of the core area and is defined as part of a group (Group A) with three structures oriented towards each other. We put in a post-hole unit on the top of the main part of the mound (23 x 14 m) to 1.03 in depth. We did not take it any deeper since we realized that this mound would be an excellent candidate for further testing. In the post-hole test, a plaster floor was noted at about 26 cm below datum. We also found many more artifacts than previous post-hole tests, as well as charcoal. We dug out a small limestone boulder at about 40 cm, below which looked like another floor. We noticed lots of big chunks of daub, as well as charcoal flecks and chunks. There were floors at 26, 50, and 79 cm. We also counted 14 body sherds and five daub chunks (two of which are burned). Limestone boulders are noticeable in the walls at about 75 cm below datum, as well as daub and charcoal. Incised pottery sherds and basal flange sherds were recovered between 85 and 95 cm in depth. More limestone boulders were noted about 1 meter deep, at which time we decided to stop digging because the post-hole digger could go no deeper. We counted 21 body sherds and two rims.

The 1 x 1 meter test unit was located on top of the main mound near the post-hole test. The first few levels had very ephemeral floors, that is, limestone pebbles and flecks in clay loam that suggested the presence of a cobble and ballast floor (Figure 8). Level 3 yielded 11 rims. At level 4, the south and north halves were distinct from one another; the south half consisted of limestone cobbles and a darker clay, whereas the north half consisted of a lighter clay loam with river cobbles instead of limestone. By level 5, however, this distinction disappeared. Level 5 was distinguished by three large boulders in the center of the test pit. While *jutes* first appear by level 7, ceramics decrease in number and in quality. Floors also became more substantial further down in the unit; level 9 yielded the most substantial floor this season and consisted of a cobble and pebble ballast (with some plaster still remaining). Subsequent levels continued to yield ceramics, charcoal, daub, and some chert. Below level 13 (c. 1.05 m), another floor was found. Due to time constraints, we were unable to excavate any further. However, we did put in the post-hole test at the center bottom of the unit (this was done the last day in the field) which revealed at least three more floors. We could dig no further due to the presence of a large burned piece of daub or plaster at 1.56 m. Before backfilling, we placed a pigtail (5-gallon) bucket. Below is a brief description of each level.

Ceramic Types: SC-68 Test pit

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
2	Paxcaman Red	New Town, late facet	Late Postclassic	c. A.D. 1150-1400	294
4	Belize Red	Spanish Lookout	Late Classic	c. A.D. 690-890	255
10	Aguacate Orange	Floral Park	Late Preclassic/Protoclassic	c. A.D. 0- 290	134
13	St. Hermans Impressed	Hermitage	Early Classic	c. A.D. 290-590	159
Post-hole	Paradero Fluted	Hermitage	Early Classic	c. A.D. 290-590	165-66

Level 1 (3-7 cm thick) consists of disturbed plow zone clay loam with a few limestone boulders and cobbles. Ten body sherds and 2 chert flakes were noted.

Level 2 (8-12 cm) has burned and unburned daub and limestone pebbles and may still comprise part of the disturbed plow zone. Six body sherds were noted, and three rim sherds were collected.

Level 3 (3-7 cm thick) was designated based on an increased presence of limestone cobbles and pebbles in a clayey/sandy loam. In addition to daub and limestone, charcoal was also noted. Two rim sherds were collected, and eight body sherds, two chert flakes, and one chalcedony biface thinning flake were noted.

Level 4 (6-9 cm thick) consists of the first obvious floor consisting of more compact limestone and river cobbles and pebbles. Three rims, one base, one basal flange, and five body sherds were collected, and 42 body sherds were noted.

Level 5 (7-10 cm thick), underneath or the lower part of the above ballast, consists of river and limestone pebbles and cobbles with slightly fewer artifacts. We collected two rims and two body sherds, and noted 30 body sherds, one chert flake, and a small bone fragment.

Level 6 (8-11 cm thick) was defined based on the noticeable presence of charcoal and burned and unburned daub. Three large boulders were found near the center of the unit, near and under which the majority of artifacts were found. Eight rim and one body sherds were collected, and 66 body sherds were noted.

Level 7 (3-10 cm thick) consists of clay loam with *jutes*, charcoal and burned and unburned daub. One rim sherd and one base were collected, and 27 body sherds were noted.

Level 8 (3-9 cm thick) consists of clay loam with charcoal and burned and unburned daub. Likely the same stratum as Level 7. One rim sherd was collected and 29 body sherds noted.

Level 9 (5-10 cm thick) consists of the most obvious floor ballast excavated at Saturday Creek. It is compact limestone pebbles and cobbles located on the north section of the unit. Daub and charcoal was noted throughout the northern section with the floor as well as one rim (collected) and 20 body sherds. South of the ballast was clay loam with slightly more artifacts (39 body sherds).

Level 10 (7-9 cm thick) consists of the clay loam below the thick floor ballast. Daub, large chunks of charcoal (1-1.5 cm diameter), and limestone pebbles were also present. Two rims were collected, and 36 body sherds, one chert flake, and *jutes* were noted.

Level 11 (3-7 cm thick) is a possible ephemeral floor based on the presence of limestone and a few river cobbles, daub, and charcoal in the clay loam matrix. Ten rims, one base, and one body were collected, and *jutes* and 27 body sherds were noted.

Level 12 (4-10 cm thick) has been defined as another ephemeral floor, based on what was found in level 11. One rim sherd and 36 body sherds and one mano fragment were noted.

Level 13 (6-9 cm thick) consisted of clay loam. Six rims, two bases, and one body were collected, and 48 body sherds and one thick biface thinning flake were noted. The level terminated at another more obvious floor. However, due to time constraints, we put it a post-hole test in the center of the unit, where we found at least three more floors, at 1.18, 1.29, and 1.43 below datum. We also hit either burned daub or burned plaster at 1.50 and could go no further than 1.56 below datum. One rim sherd and one body sherd were collected, and 55 body sherds were noted.

### SC-3

This platform mound (total height 7.2 m) is one of the few structures at Saturday Creek that shows looting. We cleaned up and profiled the east wall in order to get a better understanding of the building's construction phases and chronology. The trench is located on top of the mound and runs roughly north-south, beginning at the base of the structure on top of the platform, and ending at the top center for a total length of 10 meters (Figure 9). The height of the trench varies from 2.5 meters to one meter.

There is an obvious wall splitting the trench into two halves; the north half has been labeled level 1 and the south half level 2. The upper boulder wall in level 1 runs 15° off of east-west. Most of level 1 consists of fill, a sandy clay loam. There is another, lower, wall in level 2, and perhaps a third wall near the north end of the looter's trench, perhaps the north side of the same construction phase connecting to the center wall in level 1. A large polychrome plate was found in the west wall about 85 cm below datum and collected (part of level 1). The wall in level 2 was more substantial than the wall in level 1; it consists of limestone cobble and boulder fill.

A few rim sherds were found, along with an obsidian blade, and metate fragment, and a piece of cut bone (possible human skull), but overall the artifacts were few and far between. There is an interesting burned corozo nut floor (with shell) near the center of the LT underneath construction, 1.5 meter below datum, signifying its purposeful deposition. There are also burned layers at the southernmost end of the looters trench, located between two different phases of wall collapse, again signifying a purposeful event. This same burned stratum is also found on top of what appears to be the last construction phase. These burning episodes may indicate termination and/or renewal rituals.

Ceramic Types: SC-3 Looters Trench

Level	Type or Group	Complex	Period	Dates	Gifford et al. 1976 page #
1	Humes Bank Unslipped	Spanish Lookout	Late Classic	c. A.D. 690-890	286
1	Dolphin Head Red	Spanish Lookout	Late Classic	c. A.D. 690-890	227
1	Dos Arroyos Orange-polychrome	Hermitage	Early Classic	c. A.D. 290-590	174
2	Alexanders Unslipped	Spanish Lookout	Late Classic	c. A.D. 690-890	284

Former inhabitants of Saturday Creek used the surrounding alluvial clay as fill and used boulders, some cut, as a façade. The same appears to be the same at the other large structures, SC-1 and SC-4.

### Concluding Remarks

The goal of the test-pitting programs was to collect chronological data from diverse structure types at Saturday Creek in order to insure that structures selected for future

intensive excavations have the necessary occupation history to assess how ritual and political change correlate. Specifically, the long-term goal is to evaluate whether or not early Maya leaders and later rulers appropriated traditional rituals to suit political ends.

That data demonstrate that Saturday Creek, like most Maya centers, was occupied a long period of time. Significantly, ceramic analysis demonstrates that selected structures were occupied before, during, and after the advent of rulership. Consequently, it will be possible to assess if and how ambitious elites replicated and expanded domestic rituals as a means to acquire power.

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## Chapter 5

### Return to the Sacred Pools: 1999 Reconnaissance and Excavation at Cara Blanca, Cayo District, Belize

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The 1999 Valley of Peace Archaeological Project (VOPA), under the direction of Dr. Lisa Lucero of New Mexico State University, continued its study on ancient Maya settlement within the Valley of Peace area in the Cayo District of Belize, Central America. Using a model developed by Scott Fedick (Fedick 1996), where settlement can be predicted based on a five tier rating system of the quality of soil (Class I is best, Class V is worst), we have begun to explain the dispersal of settlement over the landscape. This report describes our reconnaissance, mapping, and excavations at the Cara Blanca site, and applies these findings to a broader framework with the hopes of clarifying current understanding on Maya settlement and identifying future research questions.

#### **Location**

Cara Blanca Pool 1 is located approximately 9 kilometers north-northwest of the Valley of Peace Village in the Cayo District of Belize (UTM 1927N/301E; Figure 1). A map compiled by Bryson Geological Services for Anschulz Corporation in 1974 shows an east-west fault, with the north side being uplifted (Robert Johnson, Castle Belize Ltd., personal communication 1998). The two rock types at the fault are defined as Kbc (Barton Creek Formation limestone and dolomite of the Cretaceous age, 65-70 million years) and Trb (Redbank Formation clay, sands, and gypsum of Miocene-Pleistocene ages, 25-2 million years).

The pool is a natural spring located at the base of a steep cliff (fault), part of a string of 22 pools that run east-west along the southern edge of a natural limestone ridge. The water is supplied via an underground water system, evident by the small stream running out from the southernmost edge of the pool (and continuing in a south-easterly direction), but there is no stream running into the pool. Thus, the excess water must be coming from underground.

The closest large ceremonial center to Cara Blanca is the center of Yalbac, located some seven kilometers to the southwest (UTM 1922.7N/294.5E). The minor river center of Saturday Creek is also nearby, at about 11 kilometers to the southeast (UTM 1916N/312E).

The site itself consists of seven structures, ranging in height from one to four meters (Figure 2). The four largest structures are situated around a freshwater pool, with dimensions of approximately 100 meters east-west and 60 meters north-south. The remaining three smaller structures of Cara Blanca are clustered roughly 125 meters east of the eastern edge of the pool.

#### **Research Goals**

There was one overriding goal for Cara Blanca in the 1999 season—to gain better chronological data. Upon the perusal of our data from the 1997 and 1998 seasons, we discovered that our reserves of good chronological data were low. To remedy this, we would collect as many datable rim sherds as possible, from the best contexts that we could find. This would be done by clearly exposing the looters' trench side walls, and noting the location of any rim sherds that we came across in the profile. The information gained from the looters' trenches would provide a sample of potsherds that could be used as a datable estimate of occupation history. The second goal was to monitor looting activity by checking for any new looters' trenches, or expansion of old ones from previous years.

Before presenting 1999 results, I summarize previous research.

### **Cara Blanca Pool 1 Settlement**

#### **Structure 1**

Structure 1 is the largest structure at Cara Blanca. It appears to be a range building consisting of six rooms, three on a side, radiating out from a series of four pillar-like central wall which run the length of the building. It is approximately 15 meters wide, 22 meters long, and four meters tall. The orientation of the long axis is roughly north-south. This structure has lost its northeast corner due to severe erosion into the adjacent freshwater Pool. It contains two large looters' trenches, appropriately titled Looters' Trench 1 (LT 1), and Looters' Trench 2 (LT 2). Although the actions of the looters have brought an unfortunate amount of destruction to the mound, at least the location of walls and floors can be seen in the looters' trench side walls.

Looters' Trench 1 runs east-west on the west side of the central axis. It is oriented a bit to the south of the center of the building, and gives us a good cross-section of the mound. Within the north wall of LT 1, two walls are easily discernible, the outer one lower than the inner one, indicating a possible platform/range structure design (Figure 3). It is also important to note that the east wall of LT 1 contains a nicely preserved wall which runs north-south, quite a bit longer than the pillar-like walls that are in line with it on the north-south axis. There were several weathered faced stones strewn about, some about 0.5 meters in length (rectangular in shape).

Looters' Trench 2 runs east-west on the east side of the central axis (see Figure 3). It is about five meters north of LT 1, and on the opposite side of the mound, facing out towards the Pool. It provides an excellent vantage point of one of the pillar-like spine walls. Pieces of two other pillar-like walls can be seen, helping the viewer become oriented to the overall plan of the building. The north face is two meters in length and the south face is four meters in length (the shorter wall has collapsed into the pool) and 2.5 meters wide. In the north wall appears to be c. 0.8 meter wide wall with shaped stones, underneath which is a plaster floor with a cobble ballast.

#### **Test Pit**

In 1998, a 1 x 1 meter test pit was placed at the top of Structure 1, between LT 1 and LT 2 (see Figure 2). Natural levels were used. The soil was dark and organic near the surface, changing to a typical gray sandy loam in the lower levels.

Level 1 contained only two body sherds, the average depth of this deposit being between 17 cm and 20 cm thick. Materials excavated from Level 2 include 23 pottery sherds, some of which were identified as the Belize Red: Belize Variety of the Spanish

Lookout Complex, indicating Late Classic occupation (c. A.D. 700-900) (Figure 4). Eight of these sherds were obviously from the same vessel (a jar). Level two's average deposit depth was between 25 cm and 31 cm thick. By the time we hit the bottom of Level 2, we could begin to see the general outlines of one of the central pillars running along the north-south axis of the building, and an abutting eastern perpendicular wall. Level 3 was dug in order to solidify our assumptions of this fact. It consisted of more compact matrix and contained 15 sherds, and had an average deposit depth of between 5 cm and 58 cm thick. Once we were deep enough to get accurate measurements of the pillar and abutting wall, the unit was closed. We were able to uncover at least five courses of the north-south wall, and two courses of the east-west perpendicular wall: one wall runs at 20 degrees, and the other at 120 degrees. The north-south one looks like it may be a corbel going north, but it is hard to say. The maximum depth, recorded at the northeast corner of the unit, was approximately 1.1 meters below ground surface.

### **Structure 2**

Structure 2 is the second largest mound of the Cara Blanca site, located five meters to the southeast of Structure 1, and 15 meters due south of the edge of Pool 1. It is about 2 meters tall, and has a footprint of about 5 x 10 meters, oriented roughly east-west (height = 1.7m). Structure 2 has been devastated by looting, with the entire top resembling a bomb crater. In 1998, we were able to recover five potsherds from the looters' side walls, three from a possible upper construction phase, and two from an earlier construction phase. One of these from the earlier phase was datable to the Alexander's Unslipped Beaver Dam Variety of the Spanish Lookout Complex, c. A.D. 700-900 (Late Classic) (Figure 5).

### **Structure 3**

Structure 3 lies 17 meters east of Structure 1, and four meters northeast of Structure 2. When viewed together, Structures 1 through 3 form three-quarters of a plazuela group. It is about 10 meters square at the base, and only about .75 meters tall. Structures 1-3 are located on a platform, and obviously comprised a patio group of some sort.

### **Structure 4**

Structure 4 lies at the southeast corner of Pool 1. It is solitary, being 55 meters away from Structure 3, and 90 meters away from Structure 1. It appears that Structure 4 is also eroding into the Pool, but not with the severity found in Structure 1. It is approximately 15 meters by 11 meters at the base, oriented upon an east-west axis, and about 1.5 meters tall.

### **Structures 5, 6, and 7**

Structures 5 through 7 appear to be average housemounds, ranging in height from 0.8 to 1.9 meters, and instantly discernible as "typical" to anyone who has worked elsewhere in the Belize Valley. Although these three mounds are located in the same general area, Structure 5 seems to be an independent unit, while Structures 6 and 7 were probably closely interrelated because of their close proximity to one another (7 meters). Structures 6 and 7 also delineate the easternmost known limit of the Cara Blanca site.

## **Underwater Explorations**

In 1998, two crew members conducted preliminary exploration of Pool 1 by scuba diving to a depth of about 20 meters (Kinkella 1999; Osterholtz 1999). A sounding of the pool undertaken earlier gave its deepest depth at about 40 meters, but the dive crew was not able to explore that far down, as their limited light source was not able to illuminate the surroundings below about 20 meters. Two potsherds were found at about a 10 meter depth, their chronology uncertain at best. The sherds were both found immediately under Looters' Trench 2 of Structure 1, so as to indicate that they were probably from looters' debris, and not a part of any offering made in prehistory.

### **The 1999 Field Season**

Unlike past years at Cara Blanca, where many different investigations were undertaken, the 1999 season consisted of only one goal: To find good chronological data in order to better date the occupation history of the site. Only two crew members, Kinkella and Choc, ventured to the Cara Blanca site this season, as the road was impassable for even 4 wheel drive vehicles. Bicycles were used to cross the tough terrain, and were eventually jettisoned in favor of walking.

#### **Sherd Collection**

It was decided that our plan would be to find and collect only rim sherds and diagnostic body sherds in order to ascertain the chronology of this site. We collected sherds only from Structure 1, because this structure is much more voluminous than the others. A careful survey of the surface of the looters' trench within Structure 2 was undertaken, but not a single diagnostic sherd was seen.

The sherds from Structure 1 were separated into two categories. The first category delineated sherds found in Looters' Trench 1 from those found in Looters' Trench 2. The second category differentiated sherds found in the looters' backdirt from those taken directly out of the trench side walls.

#### **Sherd Measurement**

Each of the 36 sherds collected was measured for rim diameter and neck diameter (if applicable). They were also measured for height, length, and width, and drawn at a 1:1 scale in cross section, and also in plan view if such information was relevant. Special attributes were also noted, such as bichrome, polychrome, presence of slip, and slip color. Sherds were catalogued using Gifford and others' analysis of Barton Ramie ceramics (Gifford et al. 1976), and all chronological interpretations stem from their categorizations. The following data was extrapolated from the sherds:

#### **Structure 1, LT 1:**

1. jar rim/27cm22cm/orange unslipped
2. jar rim/20cm17cm/grey unslipped
3. rim/17cm/red slip
4. bowl rim/25cm
5. dish rim/30cm/red slip on interior
6. jar rim/19cm16cm/grey unslipped
7. jar rim/18cm16cm/orange-grey unslipped; blackish on inside (burned?)
8. jar rim/16cm14cm/orange unslipped
9. jar rim/17cm15cm

10. jar rim/20cm18cm/pie crust rim
11. dish rim/23cm/red slip
12. dish rim/25cm/red slip on outer side
13. dish rim/32cm
14. jar rim/21cm18cm
15. jar rim/23cm21cm
16. jar rim/21cm19cm
17. jar rim/18cm15cm/Tutu Camp Striated
18. jar-censor rim/25cm/Pedregal Modelled Carved
19. dish rim/27cm/Mountain Pine Red
20. bowl rim/21cm/Black on Red
21. body sherd/polychrome
22. body sherd/polychrome
23. bowl rim/14cm/DolphinHeadRed/inner slip 25YR46/provienianced-10048#35

### **Structure 1, LT2:**

1. jar rim/20cm15cm/Earlyish Hermitage/provienianced-10048 #34
2. jar rim (3 piece)/22cm18cm/Yaha Creek Cream/paste 10YR66
3. jar rim/24cm21cm
4. jar rim/21cm17cm
5. jar rim/20cm17cm/crumby
6. bowl rim/40cm/with fix-it hole/incised/Belize Red/ash temper
7. jar rim/23cm19cm
8. jar rim/18cm15cm
9. bowl rim/33cm/Belize Red
10. plate rim/28cm/Belize Red
11. jar rim/18cm
12. jar rim/25cm22cm/broken
13. plate base/base dia=13cm/slip/Mountain Pine Red

### **Discussion**

We are lucky in our past hypotheses, as they continue to correspond with current investigations, with one important exception. We had originally dated this site as having a lengthy chronological history, from Middle Preclassic all the way to the Late Classic. This assumption was made based on preliminary dates from several small sherds found in 1998. Further analysis has shown that this site is much more narrow in its chronology, centering around the Late Classic (c. A.D. 600-900). This seems to agree with dates found at many other secondary sites and household groups of the area (see Awe 1984).

### **Conclusions**

From the chronological interpretations of the potsherds, it appears that the Cara Blanca site was inhabited mainly during the Late Classic (AD 600-900). It was most likely related to the major center of Yalbac, located just 8 kilometers to the southwest. It is unique in location, as the rarity of natural springs of this size attest in the Maya area.

Fedick's soil model appears viable in this case (1996). Although the Cara Blanca settlement is built upon Class V soil, which is the very worst in the Maya area, the good Class II and III soils are located less than a kilometer away. It seems the Maya are getting the most out of their available resources by building their dwellings upon poor soils adjacent to good soils, so as to be close to good farm land while not covering it up with living space.

We have speculated that this site may have been used as a pilgrimage center during prehistory, as it is associated with a freshwater pool containing an underground water source. The Maya viewed anything pertaining to the underworld as sacred (Bassie-Sweet 1996), and this may have been seen as a portal to that world. Natural Pools of water such as the ones in the Cara Blanca area often contain ritual offerings; so the presence of multiple Pools in this area may earmark it as a very unique location (Andrews and Corletta 1995). With an extremely reliable supply of fresh water, and good soil (Class II and III) only a short distance away, the relative lack of settlement is surprising. This could be explained by not classifying this as a pilgrimage center, but instead as a Late Classic elite compound, where plentiful resources were restricted due to the relative ease of control. Since the primary water source is a pool and not a river, the entire water source could have been delineated for the elite, while the commoners were forced to share nearby Labouring Creek.

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