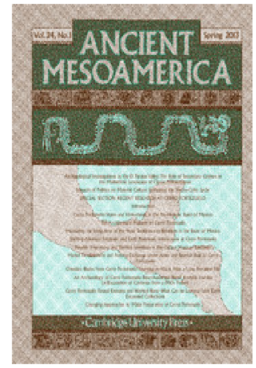

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DATING THE RISE AND FALL OF XUNANTUNICH, BELIZE

A Late and Terminal Classic Lowland Maya regional center

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Abstract

This article presents the chronological framework used to reconstruct the political history of the ancient Lowland Maya site of Xunantunich in the upper Belize River valley. Extensive excavations from 1991 to 1997 by the Xunantunich Archaeological Project produced the ceramic, architectural, and epigraphic data needed to place the site within a temporal context. Refinement of the Barton Ramie ceramic chronology was the first step toward clarifying the Xunantunich chronology. Seriation of well-known Spanish Lookout types and modes from stratified deposits established a framework for understanding Late and Terminal Classic assemblages. Twenty-two radiocarbon samples place these ceramic complexes in absolute time. Obsidian hydration and masonry techniques were found to be less reliable chronological markers. The results indicate that Xunantunich emerged as a regional center during the Samal (A.D. 600–670) and Hats' Chaak (A.D. 670–780) phases of the Late Classic period. Arguably, this rapid growth and florescence was initiated under the auspices of nearby Naranjo. Although the polity achieved political autonomy in the following Tsak' phase (A.D. 780–890) of the Terminal Classic period, civic construction diminished and rural populations declined until the site collapsed sometime during the late ninth or early tenth century.

The collapse of southern Lowland Maya society during the Late and Terminal Classic periods (A.D. 600–900) was not a uniform process, nor did it take place simultaneously in the many separate polities found across modern-day Guatemala, Belize, Honduras, and Mexico. Documenting the developmental histories of individual sites and reconstructing the processes that shaped them are critical, therefore, in testing broader models for the decline. Here we present our view of the rise and fall of Xunantunich, a medium-size center located in the upper Belize River valley (Figure 1). Its developmental sequence supports a balkanization model that postulates the rise of secondary centers at the expense of failing primary capitals (Culbert 1991; Dunham et al. 1989; Willey 1974). The precise timing of events at Xunantunich has allowed us to suggest a specific relationship between this provincial center and the larger kingdom of Naranjo and to discuss the implications of this trajectory for the upper Belize River valley.

In this report, we present a reconstruction of Xunantunich's political history and the chronology that has made this fine-grained interpretation possible. A substantial portion of the text is dedicated to reporting the ceramic seriation, radiocarbon dating, and textual information that form the foundation of our detailed chronology. This temporal sequence facilitated the testing of a model first developed by Wendy Ashmore and Richard Leventhal (1993) that outlined Xunantunich's place within the cyclic buildup and breakdown of eastern Peten polities during Late and Terminal Classic times. Here it is important to make the critical distinction between the Terminal Classic as a phenomenon, characterized by a set of social, political, and economic strategies associated with the collapse, and the Terminal Classic as a temporal designation associated with archaeological remains dated to that time span between the eighth and tenth century A.D.. Although we present our interpretation of Xunantunich's cultural history before the chronological evidence, we do so to provide a context for the data.

Evidence derives from mapping and extensive excavations of Xunantunich from 1991 to 1997 by members of the Xunantunich Archaeological Project (XAP), co-directed by Richard Leventhal and Wendy Ashmore. Research centered on understanding the nature of political power during the Late and Terminal Classic periods, while also developing the site for tourism (Leventhal 1992, 1993, 1996, 1997; Leventhal and Ashmore 1994, 1995; see also Braswell 1998; Connell 2000; LeCount 1996; Robin 1999; VandenBosch 1999; Yaeger 2000). The Xunantunich Settlement Survey (XSS) combined a systematic pedestrian survey and opportunistic testing of select sites to better understand Xunantunich's position within the regional landscape (Ashmore 1994, 1995, 1996, 1997; Ashmore et al. 2002; see also Leventhal and Ashmore 1994, 1995; Leventhal 1996, 1997). Extensive excavations at nearby communities such as San Lorenzo (Yaeger 2000), Chaa Creek (Connell 2000), and Chan Nóohol (Robin 1999) and in other small sites (VandenBosch 1999) yielded complementary data for compara-

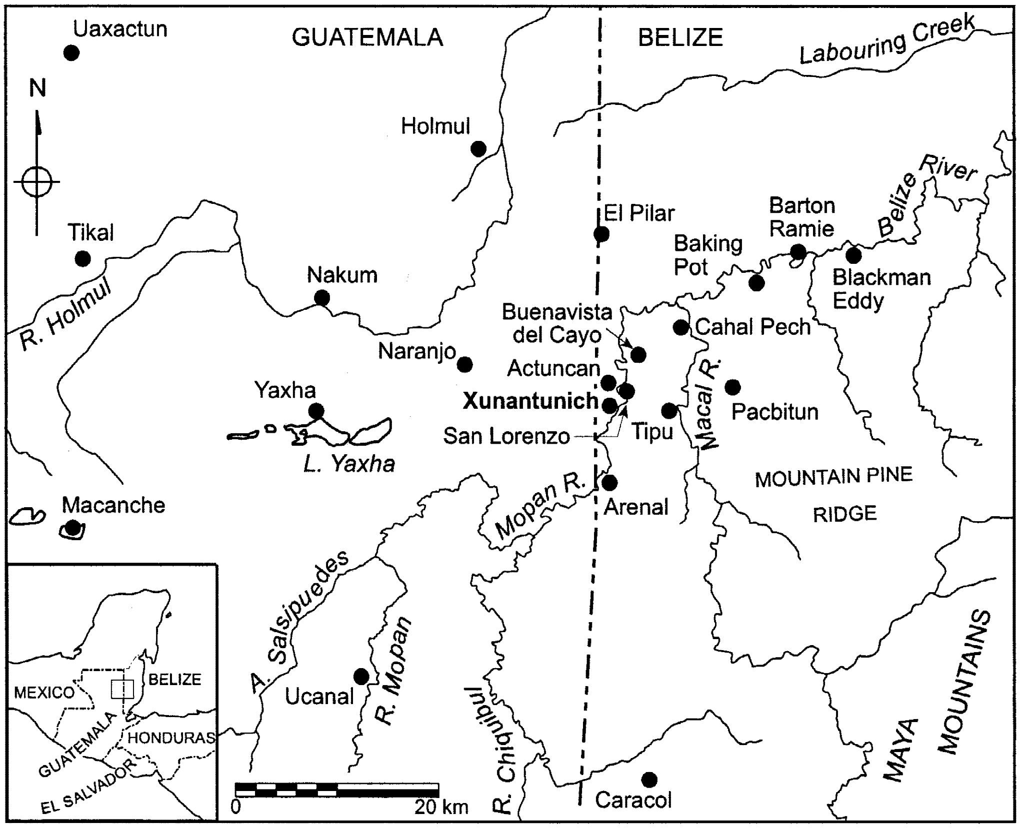

Figure 1. Classic-period sites in the upper Belize valley, Belize, and western Guatemala.

tive analysis with material gathered at Xunantunich. Our reconstruction also benefits from the efforts of many archaeologists who worked at Xunantunich over the course of the twentieth century (Anderson 1966; Ball and Taschek 1991; MacKie 1961, 1985; Pendergast and Graham 1981; Satterthwaite 1950a, 1950b; Schmidt 1974; Thompson 1942). The aggregate evidence leads us to suggest that the site was deliberately placed and rapidly constructed within an existing Late Classic settlement landscape in the upper Belize River valley, over which its rulers could hold sway well into the Terminal Classic period (Table 1).

SITE DEVELOPMENT AND POLITICAL HISTORY

Xunantunich does not exhibit the occupational history characteristic of many Late Classic Lowland Maya centers, in which long building sequences result in the accretional growth of architecture and a complex civic layout. Although the ridge top had a long history of occupation, architecture predating the Late Classic was minimal. The earliest known deposits lie under the Castillo, the primary ceremonial structure at the site. We use the name Castillo to refer to the entire multi-platform, multi-structure architectural complex; particular structures located on the complex are specified by structure number, such as Structure A-6 (the two-story summit building). Tunneling into the basal terrace of the Castillo (Miller 1995, 1996) revealed a shallow lens of occupation material associated with the early Middle Preclassic Cunil complex, the earliest known ceramic assemblage in the upper Belize River valley (Awe 1992; Cheetam 1998; Healy 1999). Excavations in Plazas A-I and A-III (Yaeger 1997) uncovered occupation deposits containing ceramics associated with the Jenney Creek complex of the Middle Preclassic period (see Gifford 1976). Although Jenney Creek diagnostics are ubiquitous in the fill of Classic structures, these loci represent the extent of early in situ deposits at Xunantunich proper (Keller 1997:107). The densest Preclassic settlement may have been located approximately 800 m east of Group A, on a lower spur of the ridge in a complex we call Group E. This concentration of architecture consists of two pyramids, a group of ten small mounds, and a single, 13-m high platform, which may date to the Middle Preclassic (Robin et al. 1994). Because of its distance from Group A, we consider it a separate site.

Evidence of Late Preclassic through Early Classic occupation of the civic core is equally sparse. Excavations into Plazas A-I and A-II encountered shallow stratigraphy and bedrock no more than

Table 1. Current chronology for Xunantunich and nearby sites

Phase	Date	Political History
Tsak'	A.D. 780–890[a]	Balkanization and collapse
Hats' Chaak	A.D. 670–780	Growth of provincial capital
Samal	A.D. 600[a]–670	Initial construction of Late Classic civic center

[a]Date is tentative.

1 m below the present-day surface. The deepest fill deposits lie along the eastern periphery of Group A plazas and contain mostly Late Classic pottery, mixed with a few earlier materials. Despite the fact that a chultun in the Northeast Complex contained a primary deposit of Late Preclassic artifacts (Keller 1995), to date no Late Preclassic structures have been identified at Xunantunich. An Early Classic platform, however, was located underneath the Castillo during tunnel excavations. Unfortunately, very few architectural details concerning this one-meter-high platform can be gleaned from the limited confines of the tunnel excavation. Although this platform rests on the Cunil deposit described earlier, no intervening Middle or Late Preclassic strata separate the Cunil and Early Classic deposits. Of course, it remains possible that construction dated to this time span might be located elsewhere under the Castillo. Early Classic diagnostics also occur consistently in the Late Classic fill of Sacbe I and in Group D's central platform (Structure D-8) and ancestor shrine (Structure D-6).

The overall paucity of evidence for occupation from the Late Preclassic to Early Classic, however, leads us to conclude that Xunantunich was not a major center at this time. Populations in the upper Belize River valley appear instead to have been concentrated at the site of Actuncan. This site is arguably one of the largest and most impressive Late Preclassic centers in the upper Belize River valley and has a substantial Early Classic component (McGovern 1994). Its early date and prominent location on a ridge 2 km north of Xunantunich led Ashmore (1998:173) to suggest that Actuncan was perceived as the ancestral predecessor of Late Classic Xunantunich.

Construction at Xunantunich began in earnest during the early portion of the Late Classic period in the Samal ceramic phase (A.D. 600–670), and construction projects over the next 200 years would result in an architecturally impressive, but relatively uncluttered, center (Figure 2). Ashmore and Leventhal (1993) have linked the rapid development of Xunantunich to events at Naranjo. This conclusion was also reached by Joseph Ball and Jennifer Taschek (1991), who called Xunantunich a "fortress stronghold" of Naranjo. Indeed, hieroglyphic and ceramic evidence situate this part of the upper Belize valley within the Late Classic Naranjo polity (e.g., Houston et al. 1992; Martin and Grube 2000; Taschek and Ball 1992). But regional political flux characterized the seventh century, and the period of Samal phase ceramics at Xunantunich encompassed dynastic florescence, defeat, and resurgence at Naranjo (Martin and Grube 2000:71–73). Buenavista, a scant 5 km north of Xunantunich, constituted a provincial rival. Xunantunich constructions within the span might relate to the end of the long reign of the Naranjo sovereign, Aj Wosal, which ended about A.D. 615. At least as plausible, however, the rise of the new center could pertain to the decades following Naranjo's conquest and defeat by Calakmul and Caracol, decades in which authority in the Xunantunich area may also have been contested. Evidence for our interpretation derives from the timing of the initial construction of the civic center, its architectural layout, and the sculptural style of its stelae.

Initial construction of the Late Classic center focused on the Castillo and a large, uninterrupted plaza that stretched north from its base during the Samal phase. Besides those Samal-phase deposits found buried deep inside the medial terrace of the Castillo, few primary deposits dating to this short but critical time span have been found. The open plaza, however, might have been bounded on the west by Ballcourt 2 and on the east by three pyramidal structures, all of which contain evidence of early construction (Jamison and Wolff 1994). Sacbe I, which connects the local, non-royal elite residents of Group D to the civic center, may have also been built at this time (Keller 1994:86). Given this reconstruction, Xunantunich appears to have been a relatively small center in comparison to Pacbitun (Healy 1990) and Buenavista (Ball and Taschek 1988), whose rulers sponsored substantial construction programs during the contemporaneous Tiger Run phase.

Xunantunich grew to maximal size and architectural grandeur between A.D. 670 and 780 during the Hats' Chaak ceramic phase. As the focus of civic and religious attention, the Castillo underwent massive renovations, including the addition of *audiencia* structures, such as Structures A-26 and A-32, on its medial terraces. Crowning this multitiered architectural temple complex was an impressive plaster frieze that encircled the top of the multiroom summit building, Structure A-6-2nd. The deep-relief stucco sculpture presented a program of political legitimization whose iconography denoted acts of creation and ancestor worship (Fields 1994). Its rooftop position on the 39 m high Castillo made this monument widely visible across the upper Belize valley, as it is today.

Excavations in the royal compound, consisting of Structure A-11 (the royal residence) and Structures A-10, A-12, and A-13, reveal that it was built primarily in a single construction episode sometime during the Hats' Chaak ceramic phase (Yaeger 1997). Structure A-11 consisted of a lower gallery of three rooms and an upper gallery with at least five rooms. Room layout and possible sculptural elements of the royal residence (MacKie 1985; Yaeger 1997:34–35) mimic the Castillo in shape and style, arguably creating a tie between the royal family's residence and the primary ceremonial structure at the site. Immediately to the east of the compound was a set of three low platforms (Structures A-23, A-24, and A-25) that functioned as a service area for the royal family (Jamison and Wolff 1994; LeCount 1996). Another large civic-construction project of the Hats' Chaak phase was Structure A-1. As with many monumental structures at Xunantunich, the bulk of this massive pyramid was completed in a single building phase. Its placement divided the previously open central plaza into two distinct public zones: Plaza A-I and Plaza A-II (Jamison and Leventhal 1997). Other public or administrative structures built at this time include Sacbe II, the Northeast Complex (Keller 1995, 1997), Structure A-15 (MacKie 1985), and much of Group C (Church 1996).

Ashmore (1998) suggests that the layout of Xunantunich displays strong similarities to Naranjo. The arrangement of Xunantunich's civic buildings mirrors Naranjo's Group B, specifically the position of Structure A-1 between the royal residence and the Castillo. The period of Hats' Chaak ceramics at Xunantunich witnessed dramatic dynastic renewal at Naranjo, as well as restoration of the latter's alliance with the distant superpower of Calakmul (Martin and Grube 2000). Buenavista remained subordinate to Naranjo rule (Ball and Taschek 1991; Taschek and Ball 1992). Ashmore has contended that the visible architectural arrangement of Xunantunich marks its rulers' conscious effort to draw on Naranjo's heritage and prestige as a way to legitimize a new regime (Ashmore 1998; Ashmore and Sabloff 2000). Although she initially viewed this building program as signaling local independence, she recognizes that the mimicry in layout could alternatively signal emulation of a still potent Naranjo (cf. Ashmore 1987). Further affinities between the two sites can be seen in the timing of subsequent stelae erection and the possible representation of a Naranjo emblem glyph on a Xunantunich stela (Houston et al. 1992), to be discussed later in more detail.

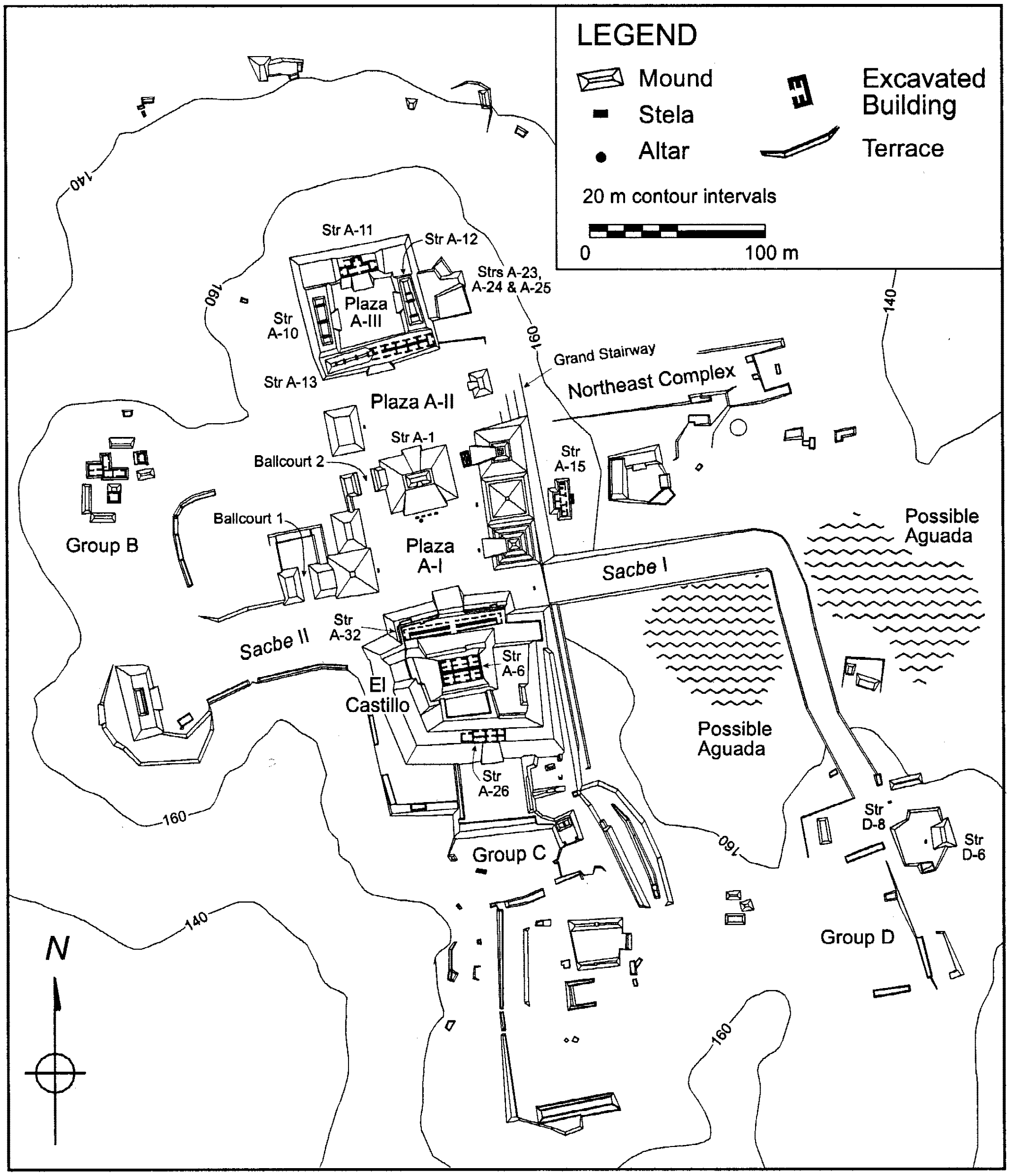

Figure 2. The Classic-period site of Xunantunich (map prepared by Angela Keller; modified by Jason Yaeger).

Xunantunich was clearly an independent polity by the Terminal Classic period, when rulers proclaimed their authority by modifying civic architecture and, beginning in A.D. 820, by erecting stelae. We suggest that the Tsak' ceramic phase started as early as A.D. 780 and lasted until at least A.D. 890, a block of time associated with the Terminal Classic period at Xunantunich. During the initial part of this phase, leaders initiated a number of construction projects that appear symbolically to have terminated their link with Naranjo. Three sides of the central superstructure of the Castillo were covered over with Structure A-6-1st, eliminating three-quarters of the frieze on Structure A-6-2nd. A new frieze was apparently placed on this last phase of construction (Yaeger 1997). The royal compound had been abandoned by this time, but this action appears to have been orderly and nonviolent. Except for the upper gallery of Structure A-11, plaza floors and palace rooms were swept clean. Euan MacKie's (1985:47) excavations in the upper gallery revealed that its floor was littered with broken pots apparently broken in situ by fallen vault stones. XAP excavations in the central room of the lower gallery found its floor swept nearly clean, its wall intentionally dismantled to waist height, and the room filled with construction debris. Jason Yaeger (1997:36) has proposed that this modification may have been an intentional dismantling and sealing of the ritually charged rooms of the lower gallery on abandonment of the royal compound.

The political heyday of Xunantunich's autonomy was short-lived, and the site appears to have gone through a phase of decline and diminution in the Tsak' phase. Public-access staircases were dismantled, peripheral areas on the edge of the core were abandoned, and small internal walls restricting access through the civic core were built. Despite this decline in civic building, the last stela was dedicated in A.D. 849. This action may have signaled a final attempt by Xunantunich's rulers to consolidate power by displaying strength in the face of internal or external threats. Although it is clear that Xunantunich was undergoing severe political, social, and probably economic stress, we have never found evidence of violence and very little evidence of civil disruptions during the Terminal Classic period. No squatters built small ephemeral structures in the plazas; nor were trash disposal patterns disrupted in residential quarters such as Groups B and D. Middens continued to accumulate in the same places as always, and little sheet trash—often suggested to be a sign of squatters—was detected. Exceptions to these patterns were found in two locations at the site by previous researchers. MacKie (1985:88) found evidence to suggest that the Maya lived among Structure A-15's tumbled walls and threw trash down the central stairs. Peter Schmidt (personal communication, 1995) also found sheet midden strewn across a floor in Structure A-6-1st. But this pattern was not widespread at Xunantunich, unlike at other sites, especially Caracol (Chase and Chase 1994).

CERAMIC CHRONOLOGY

This reconstruction is based fundamentally on ceramic chronology, which for many Lowland Maya archaeologists is the primary basis for assigning architectural sequences and excavation lots to a given temporal phase (Figure 3). Pottery of the upper Belize River valley and eastern Guatemala has been the focus of intensive study (Awe 1992; Brady et al. 1998; Cheetam 1998; Laporte 1995; LeCount 1996; Smith 1955; Thompson 1942). Currently, James Gifford's (1976) Barton Ramie scheme enjoys widespread popularity among archaeologists working in the area. Many of the Xunantunich ceramic group and type names are based on the Barton Ramie typology.

Although Gifford's work has contributed significantly to our understanding of the upper Belize River valley ceramic sequence, many complexes remain poorly characterized. This is especially true for little-known phases or facets such as those associated with the Terminal Classic period. At Barton Ramie, the low frequency of Terminal Classic deposits did not allow Gifford (1976:226) to separate sufficiently the early from the late facet of Spanish Lookout Complex. He noted that late-facet diagnostics were "very few in number and disturbingly restricted, even though the levels involved produced good material in sufficient quantities" (Gifford 1976:226). A similar situation exists in northern Belize, where at sites such as La Milpa and Blue Creek, no clearly distinguishable Terminal Classic assemblage has yet been identified (Laura Kosakowsky, personal communication, 2000). At Xunantunich and the nearby hamlet of San Lorenzo, however, excavations yielded

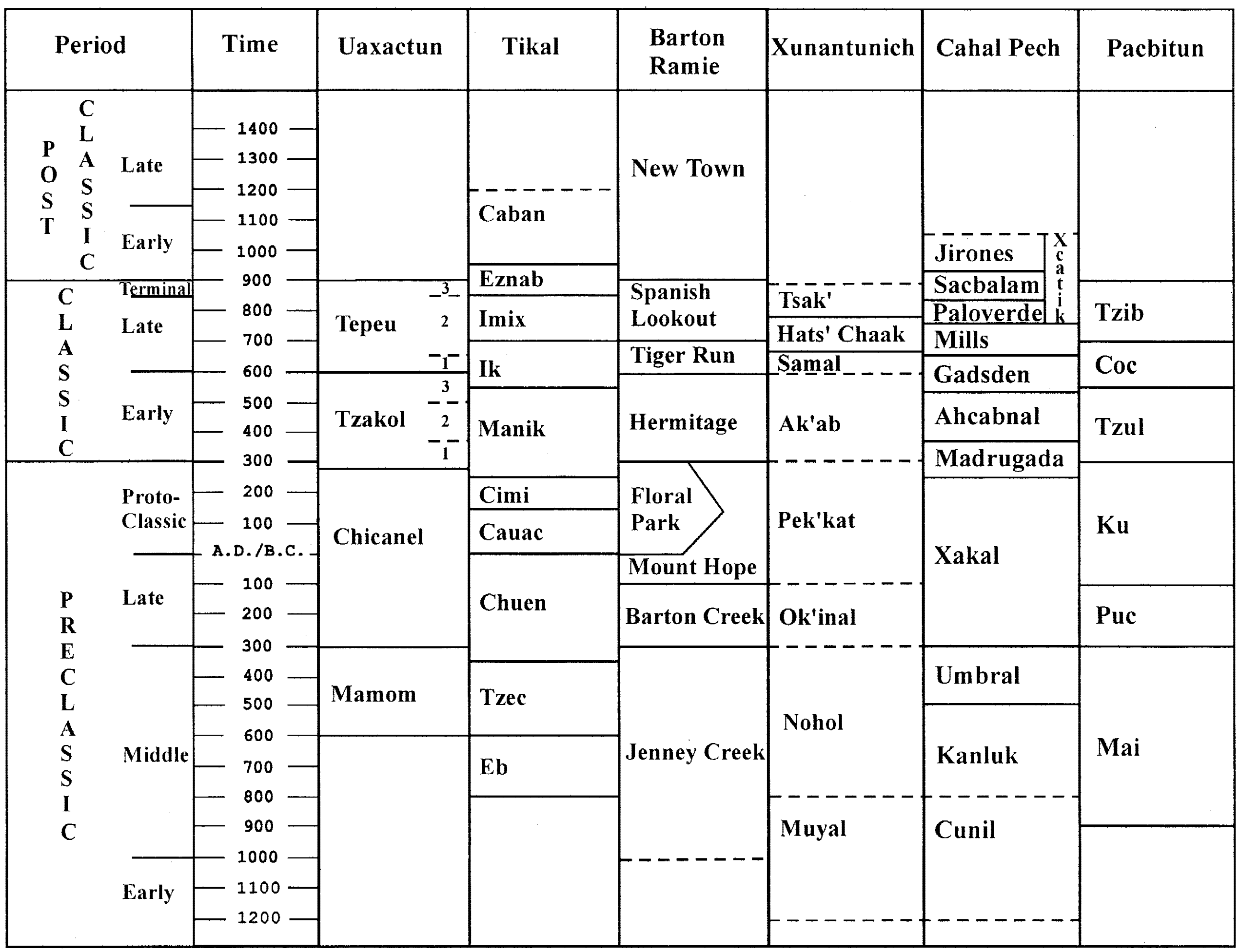

Figure 3. Chronology chart of the ceramic complexes from the eastern Peten and upper Belize River valley.

abundant, highly specific diagnostics that differentiate the Terminal Classic from earlier Late Classic complexes. Our ability to recognize this transition may be linked to Xunantunich's continued political connections with central Peten sites. Radical shifts in social and political organization at Peten polities centered at Tikal (Culbert 1993), Seibal (Sabloff 1975), and Macanche (Rice 1987) were strongly reflected in their ceramic assemblages. Geographically more remote or politically more conservative polities may have continued producing pottery within a Late Classic tradition.

Seriation Methodology

LeCount (1996) initially separated Late and Terminal Classic ceramic complexes by tabulating the frequency of ceramic attributes from stratified deposits. Rather than performing a standard seriation that mathematically orders random excavation lots based on artifact content, she took advantage of matrix sequences and contextual information to document shifts in ceramic modes through time. Although many of Gifford's types are temporally sensitive, attribute analysis allows monitoring of small-scale diachronic trends, such as shifts in lip shape, body form, or background color, within established types or across them. It essentially microseriates modes derived from previously defined types and carries on the basic work of chronology building at a finer level.

Finely stratified deposits are critical for this methodology. Although some stratified deposits were located at Xunantunich, most civic buildings revealed either very short building sequences or highly mixed lots unsuitable for chronology building. Household excavations at San Lorenzo and Chan Nóohol, however, consistently revealed finely layered strata and long construction sequences at the junctions of platforms in multiple mound groups (Chase 1992, 1993; Robin 1999; Yaeger 2000). For instance, at one of the largest San Lorenzo mound groups, SL-22, a series of four floors and associated fill levels span the Samal and Hats' Chaak phases (LeCount 1996:135–136). Apparently, the ancient Maya dumped refuse off the sides of living platforms, where it accumulated and was used later as in situ building debris for architectural expansion. Thus, families used materials close at hand, gathered from localized deposits. Further, house-mound construction appears to have been linked to regular maintenance and family growth. Frequent household renovations resulted in temporally fine-grained, multilayered stratigraphic sequences excellent for seriation of ceramic complexes. In contrast, civic building strata are the result of large-scale projects that occur more infrequently. Civic fill also may be highly mixed by laborers scavenging materials from a wide variety of locales, making these contexts poor candidates for seriation.

Results of the Xunantunich seriation confirmed many diachronic trends first recognized by J.E.S. Thompson (1942) and Gifford (1976). Moreover, it succeeded in identifying some previously overlooked or underutilized attributes and types that proved reliable for assigning temporal designations to excavation contexts. The most useful type for microseriation was the Mount Maloney Black Type bowl sequence (Figure 4). Mount Maloney Black bowls are black slipped vessels with in-curving sides and truncated conical bottoms. Their temporally sensitive feature is lip shape, which through time gradually changed orientation from vertical to horizontal. Because these bowls make up approximately one-third of the recovered domestic assemblages, they are highly useful for assigning phase designations to lots that lack other, rarer diagnostics.

Characterizations of Xunantunich ceramic complexes are based on collections from single-component contexts. Single-component deposits are critical for describing assemblage composition because they provide more accurate ceramic ware, group, and type frequencies than do those derived from mixed deposits (Table 2). Single-component refuse was encountered in domestic contexts lying on plastered floors where stairs joined platform faces, in alleyways between structures, and piled up behind platform walls. Collapse debris from crumbling structures helped seal these accumulations between occupation surfaces and architectural fall, producing single-component deposits. In some cases, Terminal Classic material was found strewn across the tops of staircases.

Late and Terminal Classic Complexes

The Samal ceramic complex of the Late Classic will be left roughly sketched, because single-component deposits containing this material are scarce. Although little work has been done on this complex at Xunantunich, temporal diagnostics associated with it include easily recognized Barton Ramie types such as Sotero Brown, Silver Creek Red, and Platon Punctated-incised. Polychrome types are more common in this earlier complex than in later times. This is especially true for calcite wares, such as Saxche and Saturday Creek groups and unspecified cream slip polychromes. It is also evident, however, that ashware polychromes such as Benque Viejo and Vinaceous Tawny varieties are found in higher proportions in this assemblage than in the later complexes. In fact, ashware groups,

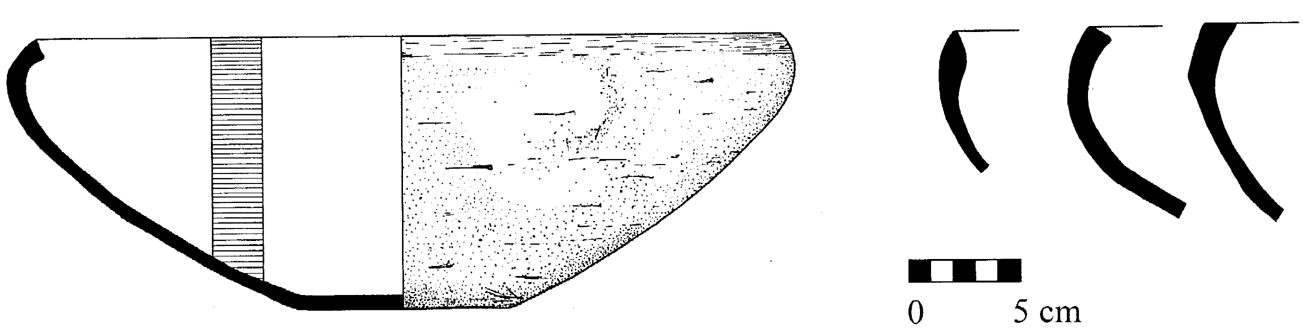

Figure 4. Mount Maloney Type bowl microseriation: In-curving bowl 79DD/3.7050 and examples of Samal lip variety 18E/7.1343, Hats' Chaak lip variety 22L/5.4708, and Tsak' lip variety 85G/3.6300.

Table 2. Frequency of ceramic groups, types, and varieties

Ceramic Group, Type, and Variety[a]	Samal	Hats' Chaak	Tsak'
Cayo Ceramic Group	22.4	18.1	24.8
Cayo Unslipped Type: Variety Unspecified	90	98.4	100
Cayo Unslipped Type: Incised Variety	5	.8	
Cayo Unslipped Type: Notched Variety	5	.8	
Tu-Tu Camp Group		.4	
Cambio Ceramic Group	1.2	3.7	4.4
Pedregal Modeled Type: Appliquéd Head Variety		100	11.3
Miseria Appliquéd Type: Variety Unspecified			88.7
Macaw Bank Ceramic Group	3.5	1.3	1.5
Dolphin Head Ceramic Group	7.1	4.3	.3
Dolphin Head Red Type: Plain Variety	66.7	53.4	100
Dolphin Head Red: Incised Variety		35.6	
Silver Creek Impressed Type: Variety Unspecified	33.3	11	
Vaca Falls Ceramic Group		.5	2.1
Vaca Falls Red Type: Plain Variety		83.3	85.7
Kaway Impressed Type: Variety Unspecified		16.7	14.3
Garbutt Creek Ceramic Group		.1	.5
Mount Maloney Ceramic Group	20	36.9	46.5
Mount Maloney Type: Variety Unspecified	100	99.8	100
Mount Maloney Type: Incised Variety		.2	
Chial Ceramic Group (Opaque Carbonate)	5.9	5.1	1.4
Xunantunich Red-orange Type: Plain Variety	80	95.2	88.9
Xunantunich Red-orange Type: Polychrome Variety	20		
Xunantunich Red-orange Type: Incised Variety		4.8	
Xunantunich Red-orange Type: Impressed Variety			11.1
Belize Red Ceramic Group	12.9	11.1	12.9
Belize Red Type: Plain Variety	63.6	37.9	24.4
Belize Red Type: Incised Variety	9.1	53.3	55.7
Platon Punctated-incised Type: Variety Unspecified	18.2	.7	1.2
Gallinero Fluted Type: Variety Unspecified	9.1	1.4	1.2
Martins Incised Type: Variety Unspecified		.7	
McRae Impressed Type: Variety Unspecified		4.9	17.5
Big Falls Type: Variety Unspecified		.7	
Chunhuitz Orange Ceramic Group	15.3	11.8	2.6
Chunhuitz Orange Type: Plain Variety	30.8	20.9	53
Benque Viejo Polychrome Types: Variety Unspecified	69.1	75.6	41.1
Benque Viejo Polychrome Types: Tooled Variety		3.5	5.9
San Lorenzo Black Ceramic Group		.5	.2
San Lorenzo Black Type: Plain Variety		33.3	
San Lorenzo Black Type: Channel-grooved Variety		66.7	100.
Peten Gloss Wares	2.4	00.2	
Undifferentiated cream slip polychromes	7.1	2.7	
Sotero Ceramic Group	1.1	.2	.1
Altar Fine Orange Ware (imported or imitation)			.6
Other	1.3	3.1	2.6
Total rims (single occupation, household contexts only)	85	1,220	665

[a]Frequency of each type is calculated as the percentage of the group.

such as Belize Red and Chunhuitz Orange, are routinely found in Samal phase lots at Xunantunich, a pattern not exhibited at Barton Ramie, where Gifford (1976:192) drew the line between the Tiger Run and Spanish Lookout phases based on the presence of this ware. Analysis of ceramic lots from architectural sequences in the medial and basal terraces of the Castillo lends evidence to suggest that, after their initial emergence in the Cunil complex (Cheetham and Awe 1996), ashwares made their reappearance in upper Belize River valley assemblages sometime during the Samal phase. In the earliest lots that contain ashwares, Chunhuitz Orange-group polychromes outnumber Belize Red-group monochromes three to one but later equalize in frequency. Also characteristic of this phase are highly diagnostic modes, including lateral ridges on open forms, pinched lips on jar forms, and simple silhouette-form dishes. Early Mount Maloney Black bowls have vertical, well-rounded lips, and Mount Maloney constricted jars have nearly vertical necks.

The Hats' Chaak complex of the Late Classic contains the greatest variety of wares, groups, types, and modal attributes (Figures 5 and 6). The most common domestic containers are Mount

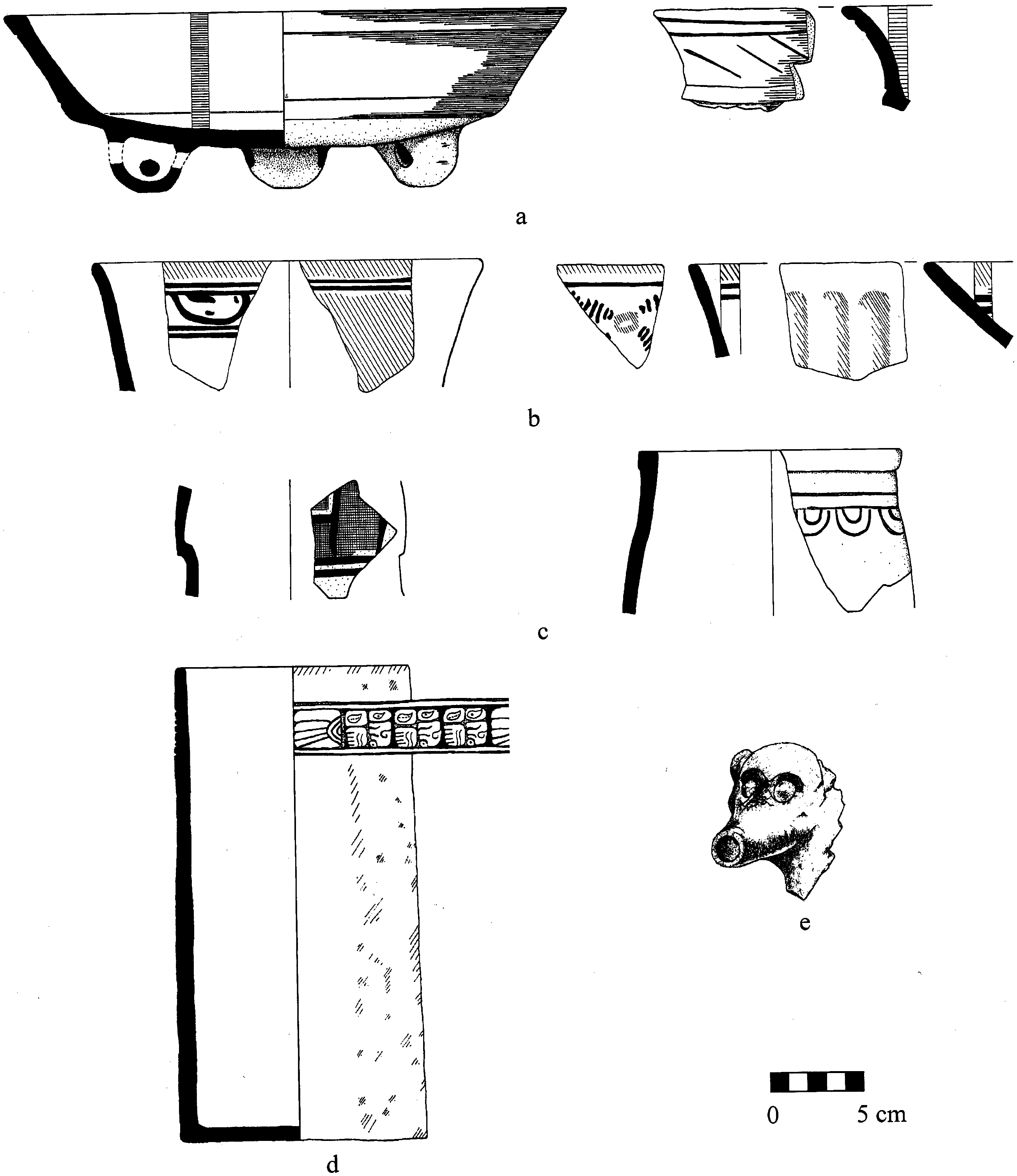

Figure 5. Late Classic Hats' Chaak diagnostics: (a) Belize Red Incised Type dishes 1E/12.20067 and 123A/11.11309; (b) Benque Viejo Polychrome Type (black and red on natural) 79JJ32.1550 and 79T/36.3829, and Benque Viejo Polychrome Type 117L/6.12992 serving vessels; (c) Chial-group drum 79BB/6.7033 and special form 39O/2.4233; (d) unspecified ashware pseudo-glyph cylinder vase 1E/12.20066; (e) ashware jar spout 74O/5.11509 (courtesy of Vickie Lippiard).

Maloney Black bowls with sharply tooled lips, beveled around 45°, Mount Maloney Black constricted necked jars, and Cayo group open-mouthed, unslipped jars. Combined, these multifunctional utilitarian forms make up more than half of the vessels in the recovered complex. Small plates, dishes, small bowls, and vases were made predominantly in ashwares, and of the serving vessels,

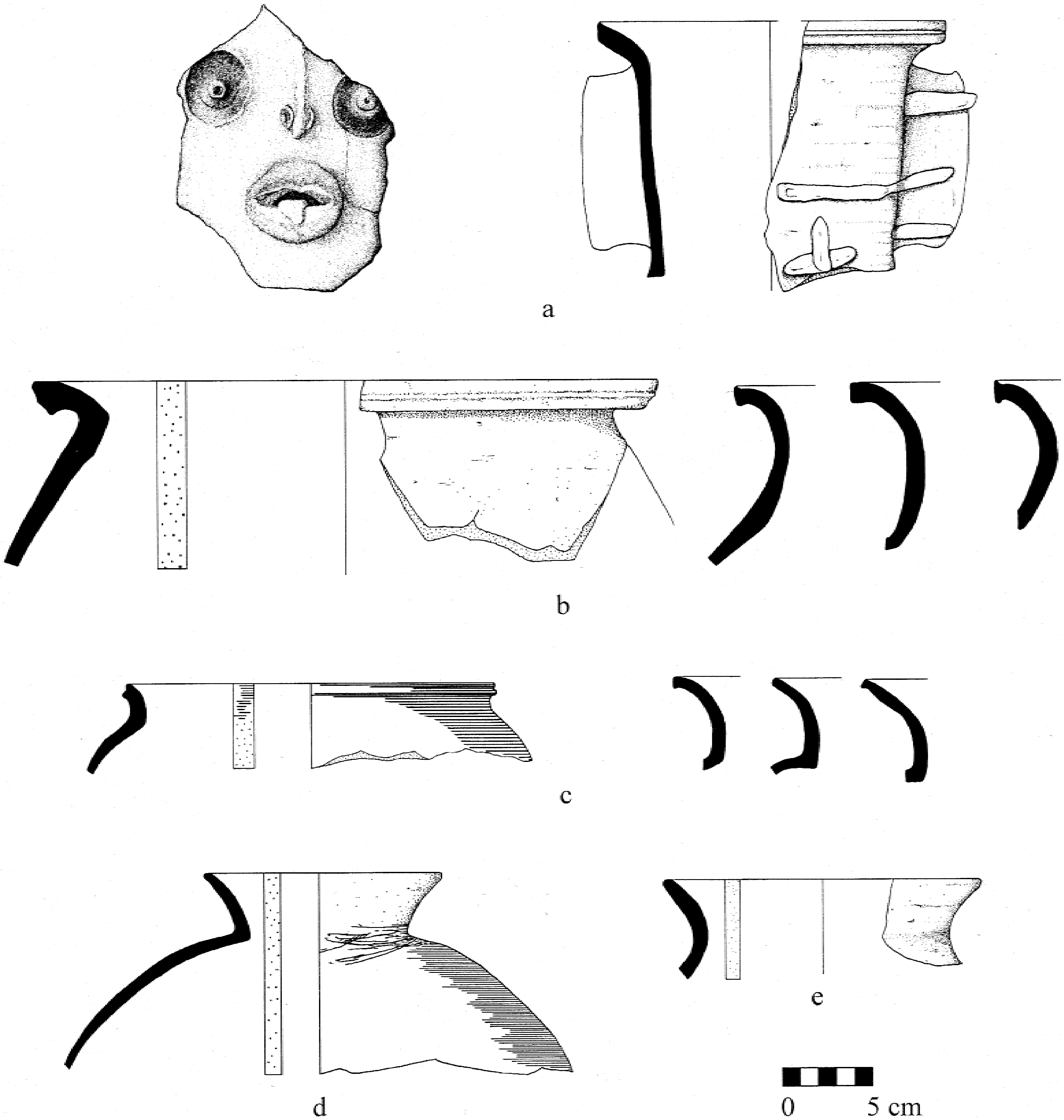

Figure 6. Late Classic Hats' Chaak diagnostics: (a) Pedregal Modeled-style censers 14Y/4.0000, 130A/2.12041; (b) Cayo-group unslipped jar 123C/4.11332 and formal variations 117I/4.10658, 117A/2.10522, 85J/1.6458; (c) Mount Maloney Black Type jar 90G/8.7552 and formal variations 90C/4.10243, 123C/6.11392, 123C/6.11316; (d) Chial Orange-red Type jar 40LL/2.8033; (e) Macaw Bank Type jar 116C/3.10875 (illustration of censer face courtesy of Sydney Cosselman).

Belize Red and Chunhuitz Orange groups make up roughly 25% of the archaeological assemblage (Figure 5a, b). Nearly 10% of the assemblage is composed of simply decorated serving vessels produced in sturdy calcite wares such as Dolphin Head Red and Chial Red-orange (Figure 5c). These large plates, dishes, and bowls most likely functioned as everyday service items.

The most diagnostic temporal markers of the Hats' Chaak complex are cylinder and barrel-shaped vase forms. At Xunantunich, very few vases exhibit intricately painted figural scenes and glyphs like those found on Holmul, Palmar, Cabrito, Chinos, or other high styles. The paucity of these vases and other obvious trade pieces indicates that Xunantunich leaders were not well placed with the larger political hierarchy to receive gifts from other regional elite. Despite the lack of glyphic and pictorial style, some noteworthy vase types occur, including Martins Incised, Big-Falls Gouged-incised, Benque Viejo Polychrome Type Tooled Variety, and San Lorenzo Black (Figure 5d). San Lorenzo Black is a reduced ashware with channel-grooving at or near the rim that is strikingly similar to Achote Black vessles found in the Peten and northern Belize.

The vast majority of Late Classic ritual and elite vessels follow pan–Lowland Maya stylistic canons, even though they were made locally. At Xunantunich, Late Classic censers were crudely produced in the Pedregal Modeled Head style, and like those found at other lowland sites, censer stands were shaped in the image of lords or gods (Rice 1999) with projecting facial features and flanged earflares, often post-fire painted blue (Figure 6a). Because most households, both elite and common, used them, these censers presumably were important ritual paraphernalia for "cult of the dead" lineage ceremonies (Chase and Chase 1994:60). At the site of Caledonia, at least four Pedregal Modeled Head–style censers were found smashed atop the final floor of Structure A-1, the main temple-pyramid, covering an elite family crypt (Healy et al. 1998). Serving vessels are also strikingly similar in form to those found across the Maya Lowlands. Tripod dishes and plates have hollow, oven-shaped feet, basal angles, and sag or flat bottoms; and vases can be barrel-shaped, cylindrical, or slightly in-curving. Decorative techniques and motifs applied to serving vessels emulate pan-Maya patterns but lack the diversity and complexity of designs found at Tikal, Uaxactun, and other Peten sites. Painted designs are simpler and more crudely rendered, but they mimic the layout and organization of central Peten styles. At Xunantunich, anthropomorphic and zoomorphic figures stand alone, not as part of a scene, and glyph bands often repeat individual symbols or stylized "psuedo-glyphs" (Figure 5d) like those described by John Longyear (1952:60) at Copan. Far more common are abstract and geometric polychrome designs like those illustrated by Robert Smith (1955:62–74) for the Uaxactun material. Brackets, parallel stripes, S shapes, St. Andrew's crosses, triangles, flowers, and U shapes appear on the sides and bottoms of Benque Viejo and Vinaceous Tawny serving vessels (Figure 5b). Effigy spouted jars, associated with both Chunhuitz Orange and Belize Red groups (Figure 5e), were molded in the form of howler monkeys and also appear to be very similar to those found at Uaxactun (Smith 1955:Figures 24/11b, 12b). Xunantunich artisans were successful in copying most pan-Maya features but lacked some of the finer skills and technical abilities to produce truly high styles.

The Tsak' complex of the Terminal Classic period represents a dramatic shift in wares and types (Figures 7 and 8). Overall, the assemblage displays far less formal and stylistic diversity than is evident in the preceding complexes. A close examination of ashware groups shows that Chunhuitz Orange, the group containing the fanciest painted local pottery, declined by more than 75% during the Tsak' phase. Benque Viejo Polychrome plates, dishes, and cylinder vases virtually disappeared, leaving the Chunhuitz Orange group composed predominantly of monochrome orange-slipped bowls. Similarly, less labor and skill were invested in the production of many ceramic types (LeCount 1996:221). Gone are the pseudo-glyph motifs and complex layouts painted or incised on serving vessels. For example, designs on barrel-shaped vases shifted from banded pseudo-glyphs to simple, stepped designs (Figure 7e). Formal attributes also suffer from a lack of skill. Mount Maloney in-curving bowls are crudely formed, with asymmetrical bodies and expediently rendered lips. LeCount (1999) has suggested that the decreased demand for fine wares was the result of a simplifying social order whose leaders abandoned rival wealth displays to consolidate community support.

The Tsak' assemblage should not, however, be characterized as an impoverished Late Classic complex. Domestic wares show extensive innovations in decorative techniques. Within the plain wares, the relatively simple rim treatments on Cayo Unslipped jars were replaced by dramatic flaring lips, some with piecrust decoration (Figure 8b–d). These large, plain ware jars would have served as long-term storage vessels, and their elaboration is plausibly interpreted as reflecting the increased social importance of stockpiling. Plain ware types were not the only vessels to display novel decorative techniques in the Tsak' complex. Belize Red vessels, a set of well-made and widely distributed types, generally were appliquéd and tooled (Figure 7a), but one Terminal Classic type, McRae Impressed, was far more elaborate than any of its Late Classic predecessors (Figure 7b). Embellishment of Belize Red–group serving vessels signals the continued importance of feasting as a mechanism for building and maintaining group solidarity in the Terminal Classic period. The notched and incised basal apron of the McRae Impressed Type becomes a hallmark design feature of many Postclassic ceramic types.

The Peten influence was still profound within the upper Belize valley during the Terminal Classic period. Censers, one of the most visible ritual ceramic items, shifted from the god-faced, Pedregal Modeled style to the spiked, Miseria Appliquéd style (Figure 8a). Likewise, serving forms continued to imitate Peten styles. For example, Belize Red Incised Type (Figure 7a) and local Tinaja Red–style (Figure 7c) dishes are very similar to forms associated with tripod dishes at Tikal (Culbert 1993:Figures 98 and 152). Imports from other regional centers were never abundant at Xunantunich, even during the Late Classic. At the very most, exchange items made-up less than 2% of the assemblage. For the Terminal Classic, Fine Orange Wares are the most easily recognized imported items.

The Tsak' complex is divided into early and late facets based on evidence recovered from stratigraphic deposits associated with Structures A-23, A-24, and A-25 in the civic center. Early and late facets are defined not only by shifts in the frequency of ceramic types and modes, but also, in the case of the early facet, by the presence of temporally diagnostic types. Although we cannot tie these pottery assemblages physically to actual political events such as the erection of the stelae, we provisionally associate the early facet with political autonomy and the late facet with the actual collapse and diminution of power wielded by the site. A primary deposit at a San Lorenzo mound group (SL-22, Str3) did yield early-facet pottery dated by radiocarbon assay to the very beginning of the Terminal Classic period (see Table 3, carbon sample 110BB/12-D1).

The early facet of the Tsak' complex contains both Late Classic and Terminal Classic diagnostics. Ashware polychromes, more typical of Late Classic complexes, are found in considerable frequencies, especially flat-bottomed plates with tall, hollow columnar feet. Belize Red Incised Type in-curving bowls with tripod feet appear first in the Hats' Chaak assemblage but gain popularity in the early facet of the Tsak' phase (Figure 7a). Common Terminal Classic types associated with the early-facet assemblage include a number of red-slipped calcite types such as Roaring Creek Red (Figure 8f), Kaway Impressed (Figure 7f), and Garbutt Creek Red. A new kind of Mount Maloney Black bowl is introduced in the form of a small globular bowl with a short flaring rim (Figure 7g). This rimmed bowl may be considered a prototype for the common Postclassic form that Prudence Rice (1987:140) calls a "collared bowl," which has a short to medium-height neck that is either approximately vertical in orientation or outflaring at about 30° from the vertical. Both flanged and spiked

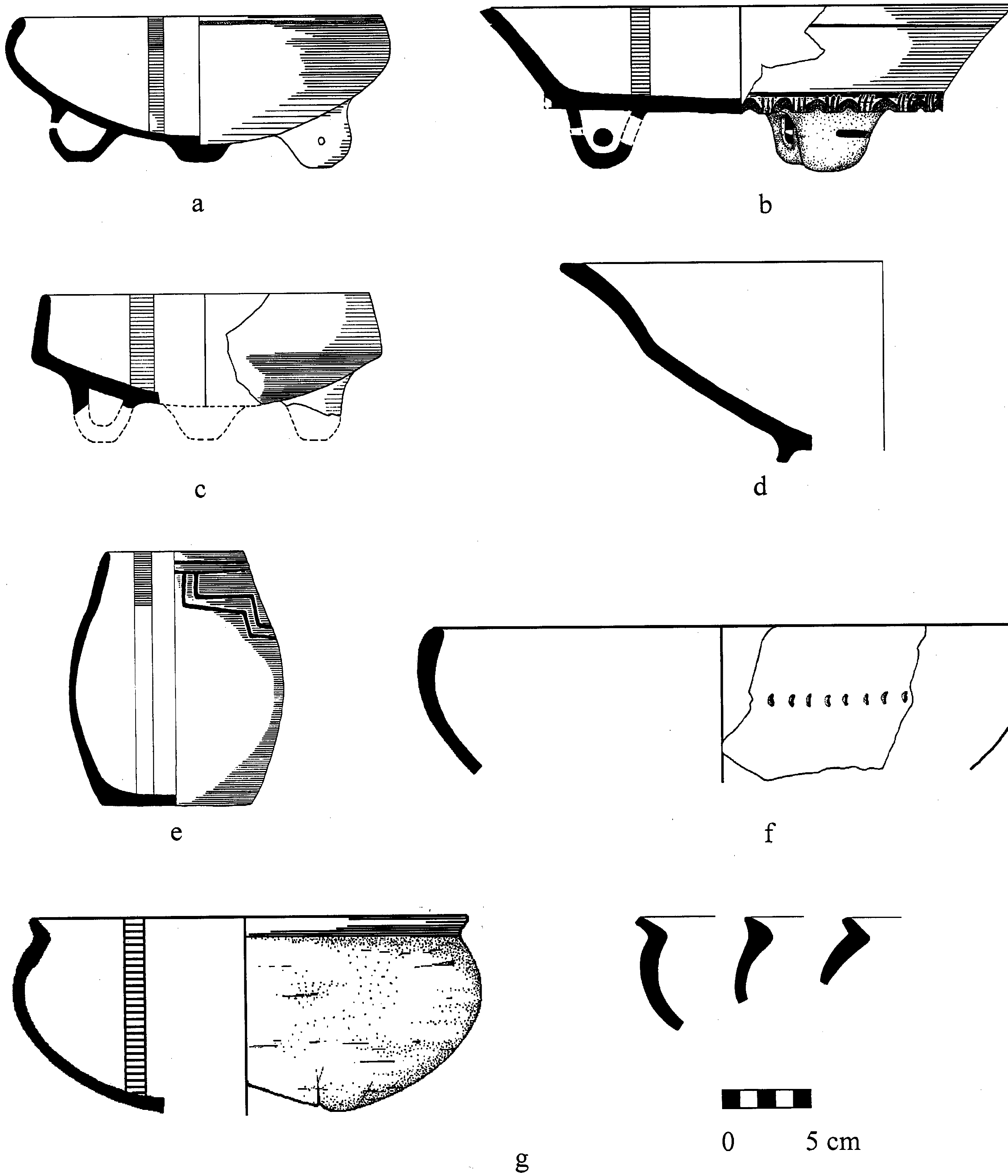

Figure 7. Terminal Classic Tsak' diagnostics: (a) Belize Red Incised Type bowl 123A/7.11197; (b) McRae Impressed Type dish 14MM/4.13126; (c) Tinaja Red-style tripod dish 110N/9.12424; (d) Roaring Creek Red Type bowl 74Q/2.11695; (e) Belize Red Incised Type barrel-shaped vase 85L/7.6596; (f) Kaway Impressed Type bowl 39N/1.4440; (g) Mount Maloney Black Type rimmed bowl 18C/5.4047 and rim variations 85C/1.6031, 123C/4.11324, 90F/1.8882.

incensarios appear to have been used contemporaneously in Tsak' phase ritual contexts at Group D, a secondary elite residential zone at Xunantunich (Braswell 1998:253). Jennifer Briggs Braswell notes that these two censer styles are also found concurrently in the Ixmabuy complex of the Dolores Valley (Laporte 1995). Although the early-facet Tsak' pottery may appear to mark a transi-

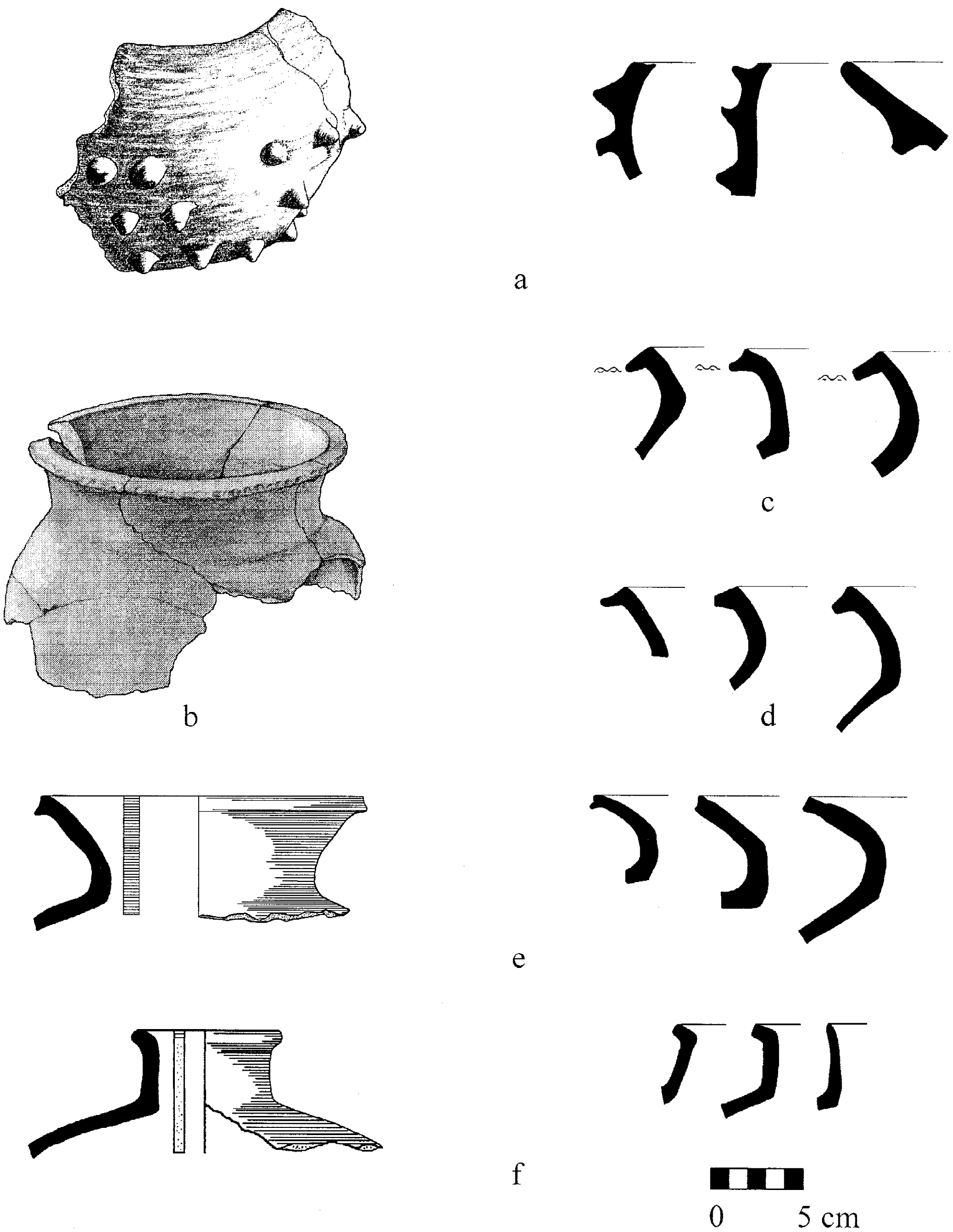

Figure 8. Terminal Classic Tsak' diagnostics: (a) Miseria Appliquéd-style censer 119B/1.14176 and formal variations 14M/2.131824, 14H/6.13186, 15M/5.13184; (b) Cayo-group unslipped jar with piecrust lip 123A/7.11193 (courtesy of Delia Cosentino); (c) Cayo-group unslipped jars with piecrust lips 22Q/6.4792, 85E/2.6150, 123A/8.11216; (d) Cayo-group unslipped jars with flaring lips 22L/4.4699, 22T/1.11452, 22V/2.11523; (e) Mount Maloney Black Type jar 22O/3.4464 and formal variations 90E/3.10023, 123C/4.11406, 85I/1.6418; (f) Roaring Creek Red Type jar 110A/4.12346 and formal variations 85O5/5.6742, 22T.11458, 104A/2.11868.

tional assemblage containing a mixture of both Late Classic and Terminal Classic diagnostics, it also exhibits a few temporally restricted diagnostics that support its recognition as a discrete assemblage. The most common of these diagnostics is Cayo Unslipped jars with unembellished flaring lips (Figure 8d).

The late-facet Tsak' assemblage is marked by a preponderance of Mount Maloney in-curving bowls with horizontal lips and Cayo Unslipped jars with piecrust lips. These two modes are found in early-facet Tsak' assemblages, but they occur more commonly in the late facet. Given that the late facet lacks a set of diagnostics distinguishing it from the early-facet assemblage, its identification is problematic outside stratified contexts. This is especially true for small lots that contain only the most common bowl and jar forms, which might be then mistakenly assigned to the late facet simply because of sample insensitivity. LeCount has inferred that the lack of diversity evident in the late facet is due to the dire circumstances that must have exemplified the final decades of occupation at Xunantunich. The truncation of the upper stratum of

Table 3. Summary of radiocarbon data from Xunantunich and nearby sites

Laboratory No.	Provenience	Site and Structure	Material	Cultural Context	Ceramic Complex	Conventional Date	Calibrated Age A.D.	1-σ Range Age A.D.	2-σ Range Age A.D.
AA22847[a]	102LL/3	Xunantunich Str. A-6	carbonized wood	occupation refuse	Hats' Chaak	1300 ± 55	682	657–774	640–780, 788–814, 815–833, 836–868
AA22849[a]	110BB/12-D1	San Lorenzo Site 22, Str. 3	carbonized wood	deposit on floor	Tsak' Early facet	1225 ± 45	776, 794, 797	691–700, 711–749, 766–783, 787–870	672–896, 922–940
AA22844[a]	110BB/17	San Lorenzo Site 22, Str. 3	carbonized seed	bench fill	Hats' Chaak	1240 ± 45	774	687–753, 759–781, 789–804, 822–828, 840–860	667–891
AA22848[a]	110BB/6	San Lorenzo Site 22, Str. 3	carbonized seed	construction fill	Tsak'	1170 ± 60	784, 786, 874	775–903, 917–962, 967–976	680–990
9373[b]	110CC/4	San Lorenzo Site 22, Str. 3	carbonized wood	dedicatory deposit/ postoccupation	Tsak'	1215 ± 75	814, 848, 852	710–747, 755–893, 939–940	663–994
AA22846a	110CC/5	San Lorenzo Site 22, Str. 3	carbonized wood	fill from step	Hats' Chaak?	1270 ± 45	692, 699, 712, 748, 767	673–777, 793–798	654–783, 787–872
AA22845[a]	110U/3	San Lorenzo Site 22, Str. 3	carbonized wood	material on bench	Hats' Chaak	1195 ± 40	780, 790, 804, 823, 827, 841, 857	774–889	688–704, 706–752, 760–904, 917–976
AA31355[b]	112M/1-D1	Actuncan Str. A-5	carbonized wood	termination deposit	Tsak'	1175 ± 60	884	784–899, 902–965	691–1002
AA22842[a]	113D/5-D1	San Lorenzo Site 22, Str. 1	carbonized wood	deposit on floor	Tsak'	1175 ± 70	783, 787, 871	772–905, 916–977	670–1000
9372[b]	123A/7	Xunantunich Str. A-24	carbonized wood	midden	Tsak'	1095 ± 75	976	885–1017	780–1044, 1103–1113, 1147–1152
AA22850[a]	123A/9	Xunantunich Str. A-24	carbonized wood	midden	Hats' Chaak	1290 ± 45	686, 754, 757	665–773	645–781,790–804, 823–827, 841–858
10121[b]	146E/4	San Lorenzo Site 24, Strs. 1 and 2	carbonized wood	material on floor	Tsak'	1245 ± 70	781	682–885	658–971
10122[b]	161UU/1	Chaa Creek Str. CC-5	carbonized wood	occupation material	Tsak'?	1365 ± 70	664	637–702, 750	565–581, 592–788
10123[b]	161WW/1	Chaa Creek Str. CC-5	carbonized wood	termination ritual	Tsak'?	1285 ± 75	715, 743, 761	665–823, 839–861	636–895, 917–953
AA22841[a]	177JJ/4-D1	Xunantunich Str. A-20	carbonized wood	feature in floor	Hats' Chaak	1290 ± 45	715	668–765	638–833
AA31356[b]	196D/3	Xunantunich Str. A-6	carbonized wood	structure fill	Samal	1405 ± 45	653	626–666	596–685
AA31357[b]	196D/5	Xunantunich Str. A-6	carbonized wood	structure fill	Samal	1420 ± 55	646	606–664	547–687
AA22851[a]	211M/8	Xunantunich Str. B1 and B2	carbonized wood	midden	Hats' Chaak	1230 ± 45	776, 794, 796	690–701, 709–750, 764–782, 788–812, 816–833, 837–868	670–894, 923–938
AA22843[a]	22Q/6-D1	Xunantunich Str. D-7	carbonized wood	dedicatory cache	Tsak'	1165 ± 45	784, 786, 885	778–792, 799–900, 919–943	694–696, 726–746, 768–984
AA31359[b]	247KK/13	Xunantunich Str. A-32	carbonized wood	structure fill	Hats' Chaak	1300 ± 50	690	668–779	653–874
AA31358[b]	266M/26	Xunantunich Str. A-6	carbonized wood	structure fill	Samal	1360 ± 50	665	651–686	615–776
10124[b]	266M/34	Xunantunich Str. A-6	carbonized wood	structure fill	Samal	1445 ± 90	632	546–667	425–774

Str. = Structure.
[a]NSF AMS Facility, Department of Physics, 118 E. 4th Street, University of Arizona, Tucson, AZ 85721, USA; calibrated age determined by Stuiver and Becker Radiocarbon Calibration Program version 2.0 (1987).
[b]Laboratory of Isotope Geochemistry, Department of Geosciences, Gould-Simpson Building, Tucson AZ 85721-0077, USA; calibrated age determined by Stuiver and Reimer Radiocarbon Calibration Program version 3.0.3 (1993).

society would have dampened demand for prestige goods, while the lower strata would have been too busy scrambling to survive to bother with acquiring fancy pottery. The late-facet Tsak' complex at Xunantunich, therefore, should be considered a very basic subset of a broader Terminal Classic assemblage, one that was composed mostly of utilitarian calcite bowls and jars. At other Belize sites, such as Lamanai and Tipu, elite styles and forms continued through the Terminal Classic and were the foundation for Postclassic assemblages (Graham 1987; Pendergast 1981, 1985).

RADIOCARBON DATING

Radiocarbon dating has been revolutionized since its development in the 1940s, with advancements in accelerator mass spectrometry (AMS) for dating small samples, more sophisticated decontamination techniques, and calibration programs to convert C-14 dates into calendar years (Stuvier and Reimer 1993). Despite this progress, radiocarbon dating is still underutilized. For establishing chronologies in newly researched places, many Mayanists rely heavily on ceramic cross-ties to long-established sequences, such as Uaxactun, San José, Seibal, or Barton Ramie. These seminal studies, most of which predate modern radiocarbon technology, fixed phase dates predominantly by linking ceramic caches or burial assemblages to calendrical inscriptions. Although this is a useful methodology, it is not always applicable because only a few ceramic types, much less whole assemblages, are associated with monument inscriptions. Radiocarbon dates can verify or correct previously proposed correlations between ceramic assemblages and calendrical inscriptions and tighten our chronologies.

We selected 22 carbon samples from stratified domestic middens, occupation contexts, and construction sequences in order to tie absolute dates to our ceramic chronology. Radiocarbon samples were submitted for analysis in two batches. Initially, we selected 13 samples to be analyzed at the University of Arizona laboratories. Based on the results of this first run, we submitted a second set of 9 samples to the same laboratory in an attempt to understand the gaps in the chronometric sequence. A great deal of care was taken to choose carbon samples from excavation lots yielding pottery of a single ceramic complex. As a result, calibrated ages are tightly linked to ceramic complexes (Table 3). Importantly, the resulting chronology conforms well to chronologies from Pacbitun (Healy 1990), Tikal (Culbert 1993), Uaxactun (Smith 1955), and Barton Ramie (Willey et al. 1965), although some of our Late Classic phases appear to be shorter in duration.

We recognize that, despite our scientific rigor, assigning absolute dates to ceramic phases is an inherently interpretative process. Our final chronology is the result of a two-step process involving both subjective and objective methods for analyzing a set of radiocarbon dates to construct a chronology. Initially, all radiocarbon dates were aligned in graph form based on 1-σ calibrated age ranges obtained from Stuiver and Reimer's Radiocarbon Calibration Program, version 3.0.3. Visual patterning among dates was quite strong (LeCount et al. 1998), but we were still uncertain about where to place the critical boundary between the Hats' Chaak and Tsak' phases. Due to the somewhat uneven clustering of 1-σ date ranges, the boundary line could have been placed anywhere between A.D. 770 and 805, and presumably the transition may have transpired across this 35-year time span. Although there is little validity in assigning a single calendar year as the definitive boundary between ceramic complexes, which are themselves arbitrary divisions of continuous stylistic change, for heuristic reasons we sought a more objective method to assign the beginning and ending dates to a phase.

C. E. Buck, C. D. Litton, and A.F.M. Smith (1992) introduced the Gibbs sampler as a method for interpreting sets of radiocarbon dates derived from archaeological sites. This technique has been applied successfully to the problem of estimating phase boundaries at Danebury, an Iron Age hill fort (Buck et al. 1996; Litton and Buck 1996) and for the Chancay culture of the Peruvian coast (Buck et al. 1994; Christen 1994). The OXCAL3 calibration program, written by Christopher Bronk Ramsey of the Oxford Radiocarbon Accelerator Unit, performs all statistical analyses of the Gibbs sampler method.

The Gibbs sampler method (Gelfand and Smith 1990; Smith and Roberts 1993) models phase durations by incorporating calibrated date distributions, archaeological information, and other probabilities associated with a specified ordering of events. It is an iterative simulation technique that uses a Markov Chain Monte Carlo procedure to rework original calibrated distributions and select a probability value for a given date. From this procedure, posterior distributions are produced and represented as a probability distribution with a mode, 1-σ, 2-σ range, and agreement index. Generally, the posterior distributions show a smaller range of variability than the original, thus providing a tighter date range. The agreement index indicates the degree to which the posterior distribution overlaps the original calibrated distribution, and if it exceeds a cutoff point of 60%, the sample is flagged as an outlier. These incongruent dates are subsequently deleted from the analysis. The remaining standardized dates are grouped into phases defined by archaeological data (in this case, ceramic complex), and phase boundaries are simulated based on sampling of the posterior distributions. Because phase boundaries also are represented as sampled distribution, we used the mode as the estimated boundary age.

Phase boundaries for the Samal, Hats' Chaak, and Tsak' ceramic complexes generated by the Gibbs sampler technique are similar to our original subjective dates. Dates for the Samal (A.D. 600–670), Hats' Chaak (A.D.. 670–780), and Tsak' (A.D. 780–890) ceramic complexes generated by the Gibbs sampler technique (Figure 9) are within ten years of our original subjective dates proposed in a paper presented at the Society for American Archaeology (LeCount et al. 1998). However, two issues remain unsolved by either method. We could not fix a beginning date for the Samal phase and an ending date for the Tsak' phase, because neither is bounded by radiocarbon samples from Early Classic or Postclassic phases. We recognize that the Terminal Classic period at Xunantunich may have extended well into the tenth century, but carbon associated with later occupations was likely destroyed or contaminated because it was located on or near the present-day ground surface. Likewise, the Early Classic period may have lasted well into the seventh century at the site, but again, little remains of this occupation phase at Xunantunich.

Incorporation of radiocarbon data from nearby sites with the Xunantunich samples can provide a regional view of the Late and Terminal Classic phases in the upper Belize River valley. Unfortunately, very few Classic-period dates exist from this region. There is one from Barton Ramie (Willey et al. 1965:29), which appears unacceptable, and there are seven from Pacbitun (Healy 1990:257). Pacbitun is a medium-size center located on the eastern edge of the valley near the base of the Mountain Pine Ridge. Excavations yielded four carbon samples associated with the Tzul phase, two associated with the Coc phase, and one associated with the Tzib phase. The incorporation of Pacbitun dates into the Xunantunich Gibbs sampler program resulted in no changes except for the beginning date of the Samal phase and the ending date of the Tsak' phase. Not surprisingly, these are the phase boundaries that float within the Xunantunich chronology. Based on these additional data, it could be suggested that the Late Classic began as late as A.D. 630 in the upper Belize River valley. This chronology compresses the earliest Late Classic ceramic complexes (Tiger Run, Coc, and Samal) into a very short, two-generation time span. The ending boundary for the Terminal Classic period was also reworked by the sampling technique and produced a date of A.D. 915. Obviously, this phase still suffers from a lack of Postclassic samples at Pacbitun, and in general more radiocarbon dates are needed from adjacent periods to understand the Late and Terminal Classic phases fully.

DATED HIEROGLYPHIC MONUMENTS

One invaluable set of chronological data available to the those studying Classic Maya society is the large corpus of hieroglyphic texts, a body of information that is increasingly being integrated with other forms of archaeological data (Fash and Sharer 1991; Houston 1989; Stuart 1992). As mentioned earlier, Smith (1955) demonstrated the utility of correlating a well-defined ceramic sequence with dated monuments by drawing on pottery from stub-stela caches at Uaxactun. This method has proved useful at many sites, and it has been refined both by examining larger assemblages from dated tombs and by considering vessels that can be dated directly by their painted or inscribed texts (Chase and Chase 1994).

The paucity of hieroglyphic texts at Xunantunich limits our ability to correlated the ceramic sequence with dated objects. As mentioned, there are almost no ceramic vessels with text at Xunantunich, although a few rims were decorated with glyph bands (LeCount 1996; Thompson 1942). Five carved monuments occur at Xunantunich with hieroglyphic texts. Of these, three stelae—Stelae 1, 8, and 10—and an altar have been known for decades (Graham 1978; Maler 1908; Morley 1937–1938). These monuments were found along the south side of Structure A-1 in Plaza A-I. Excavations in 1997 along the south side of Structure A-11 recovered a fragment of what was probably a circular wall panel, but it lacked any calendrical information (Yaeger 1997). Although the three stelae have suffered extensive erosion, they can be dated with some confidence (Table 4).

Stela 1 bears a fragmentary calendar round date. Sylvanus Morley (1937–1938:Plate 17b) depicted the *tzolkin* as 5 Ahau; he argued that the stela dated to 10.1.0.0.0. . 5 Ahaw 3 K'ayab (A.D. November 30, 849). The cached eccentric flints that Thomas Gann found in a pocket hollowed out of the bedrock in front of the butt of Stela 1 are similar to Late and Terminal Classic eccentric flints found throughout the region (Morley 1937–1938; see also Iannone 1992). Morley argued that Altar 1 was associated with Stela 1, but the portion of the monument that probably bore the calendar round date was broken off in the early twentieth century. Extensive excavation along the southern face of Structure A-1 by several investigators has not recovered those pieces.

Stela 8 is broken, and most of the monument's hieroglyphic text is on the badly eroded lower half (Figure 10). The text begins with a calendar round date at glyphs. The *tzolkin* coefficient is 8. The day name is eroded, but what is legible is consistent with the glyph for Ahaw. The *haab* is also eroded, but one bar and one dot at the upper margin of the glyph are visible, narrowing the possible coefficients. It is followed by glyphs that are consistent with a "completion of tun" glyph. These pieces of evidence lead us to suggest that this text records 9.19.10.0.0. 8 Ahaw 8 Xul (A.D. May 6, 820), a date that accords well with the late style of the monument. Note the apparent presence of the Naranjo emblem glyph, although without the vegetation scrolls, at position C2 (Houston et al. 1992:507; see also Martin and Grube 2000:83).

Stela 9 bears a full Long Count date. Although the monument has suffered some erosion, the date can be read clearly as 10.0.0.0.0 (A.D. March 15, 830).

In summary, the three stelae from Xunantunich can be dated confidently, although their texts are too eroded to allow much additional reading. They mark half-katun and katun period endings, beginning in 9.19.10.0 and ending nearly 50 years later, in 10.1.0.0.0. The erection of Stela 8, the first stela at Xunantunich, is contemporary with Stela 32 at Naranjo, the last securely dated monument at that site. Unfortunately, the Stela 1 sub-stela cache recovered by Gann included no ceramic artifacts or other temporally diagnostic material, so we cannot directly link the erection of the stelae with any ceramic material. However, the construction history of Structure A-1 and its use history are consistent with a Tsak' phase date for the stelae, as would be indicated by the radiocarbon data.

Table 4. Chronological information on Xunantunich stelae

Monument	Long Count Date	Calendar Round Date	Gregorian Date
Stela 8	9.19.10.0.0	8 Ahaw 8 Xul	May 6, 820
Stela 9	10.0.0.0.0	7 Ahaw 18 Sip	March 15, 830
Stela 1	10.1.0.0.0	5 Ahaw 3 K'ayab	November 20, 849

ARCHITECTURAL STYLES

Architectural styles often change in patterns that are consistent and regular enough to make them accurate temporal markers. These changes can manifest themselves in masonry techniques (see, e.g., Nelson 1920) or in the layouts of buildings (see, e.g., Flannery 1972; Rice 1988). In his work at Xunantunich in 1959 and 1960, MacKie (1985) identified two masonry styles, which he argued were temporally discrete. His "Ashlar Type I" consists of regular courses of large limestone blocks finished on all six sides, generally 35–40 cm tall and 20 cm thick. In contrast, the style he designated "Ashlar Type II" consists of smaller blocks, often finished on only their exterior sides. These blocks, which are 15–20 cm wide, 5–8 cm high, and 15–20 cm deep, are set as slabs in rough courses.

MacKie argued that Ashlar Type I predated Ashlar Type II based on the stratigraphic relationships between sequences of walls and platform facings found on the Castillo. Structure A-6-1st is made of Ashlar Type II slab masonry, and the preceding Structure A-6-2nd consists of Ashlar Type I block walls. Further, modifications to Structure A-6-2nd that apparently occurred in conjunction with the building of Structure A-6-1st consist of Ashlar Type II masonry (MacKie 1985; see also Yaeger 1997). MacKie found a similar ordering of these two masonry styles at Structure A-11 and Structure A-15; a similar stratigraphic relationship pertains to the

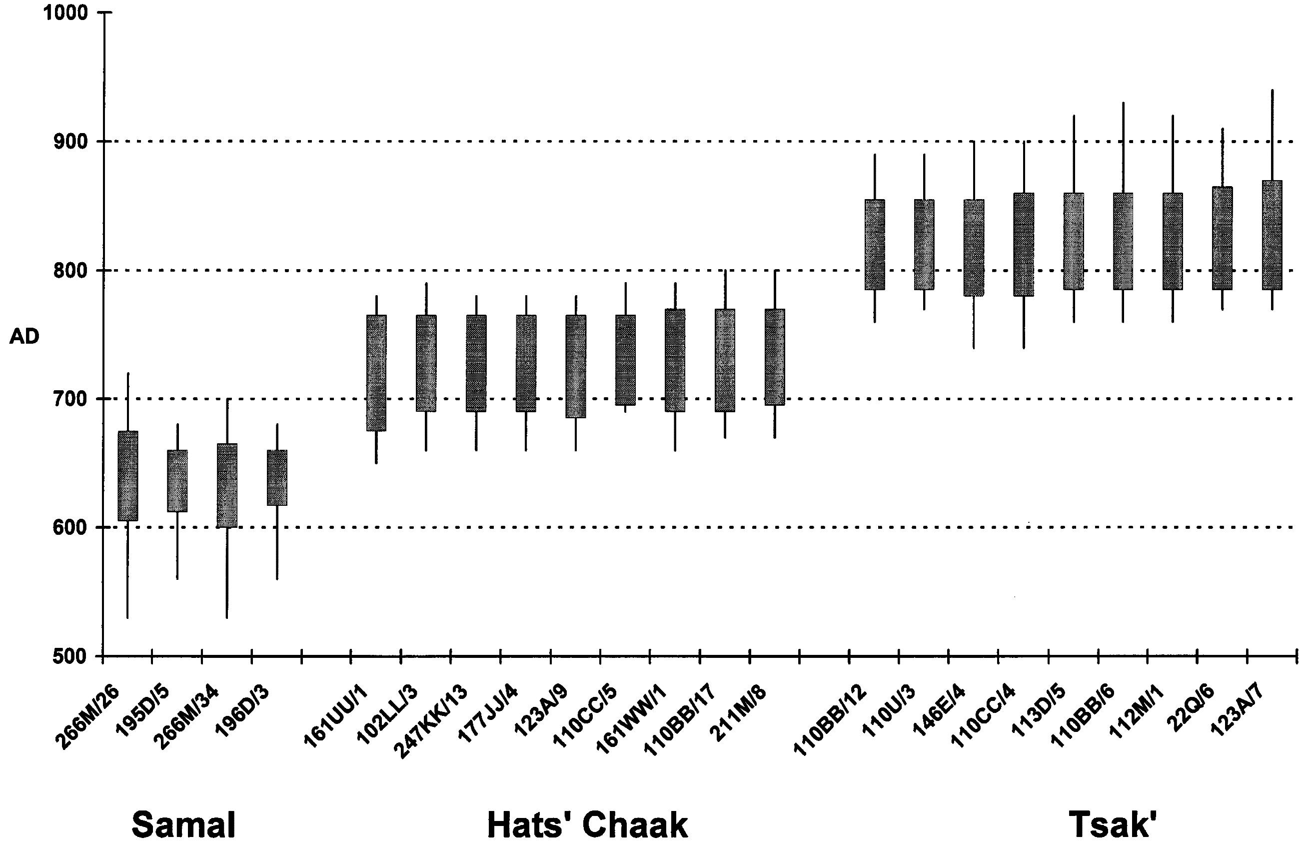

Figure 9. Radiocarbon samples as Gibbs sampler technique posterior distributions. In this chart, box plots indicate the ages for 1-σ ranges and vertical lines, 2-σ ranges. Overall agreement 171.9%, A'c = 60.0% after 29,496 iterations.

construction of Structure A-12. The masonry of Structure A-12-1st and its substructure is the large-block Ashlar Type I, but the Maya built later, secondary walls of Ashlar Type II small limestone blocks to thicken and buttress the building's spine wall (Yaeger 1997:38).

In Structure A-12 Room 1, the basal courses of the room's southern wall consist of large blocks, but small blocks make up the upper courses. A similar juxtaposition of small blocks over large blocks exists on Structure A-6-2nd. The basal molding and the next one to four courses of Structure A-6-2nd's north wall are invariably made of large limestone blocks. In all these walls, however, these courses of large blocks are overlain by smaller, limestone blocks identical to those used for the Structure A-6-1st superstructure and the late modifications in the rooms of Structure A-6-2nd. It is unclear whether these constructions that include both types of masonry are single-component constructions or products of later remodeling and refurbishing.

These examples are all clear cases in which masonry of MacKie's Type II style stratigraphically postdates the Type I style. There are examples, however, that contradict this sequence. On Structure A-1, for example, the final facing on the south side of the substructure consists of large blocks, despite the fact that it is probably contemporaneous with or later than the buildings mentioned earlier made of Type II masonry, such as Structure A-6-2nd. These large blocks were probably used because of the widespread removal and reuse of cut stone from abandoned areas of the site late in Xunantunich's history, including Group C and the Northeast Complex (Church 1996; Keller 1995). These counter-examples suggest that masonry style can be a useful chronological indicator, but functional and economic considerations also influenced masonry choices in ways that caution against using architectural styles as a sole source of chronological control.

The data from a hinterland settlement, San Lorenzo, further demonstrate the complex relationship between masonry choices and economic realities, identity marking, and changing social and political contexts (Yaeger 2000). Hats' Chaak architecture tends to consist either of cobble or limestone masonry facings, the differences related in part to a household's ability to mobilize labor for house construction. Some substructure facings consist of masonry that looks like MacKie's Type I (e.g., SL-22, Structure 2; SL-24, Structure 1). All superstructure masonry walls, however, are slab-like masonry more akin to MacKie's Type II. Some of these cases are the result of later masonry buildings being constructed on older substructures, but there are several examples in which one side of a platform—generally the side facing the patio—is made of large block masonry while the side or rear facings of the platform are made of smaller blocks. In SL-22, Structure 3, a masonry superstructure combines Type I large-block masonry in its bench and Type II slabs in its wall, although the stratigraphic evidence shows them to be contemporaneous. This evidence leads Yaeger to suggest that the masonry typology used by MacKie at Xunantunich does not apply to San Lorenzo and that it has limited utility for regional dating.

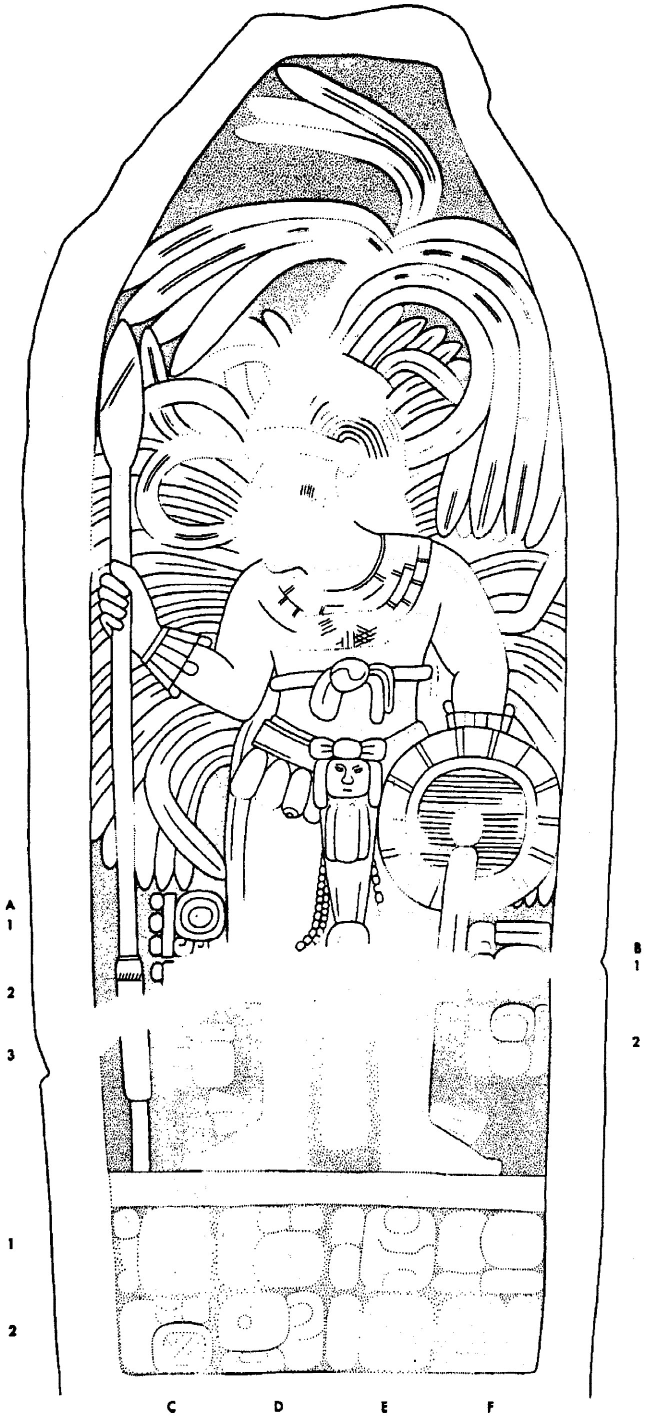

Figure 10. Xunantunich Stela 8 (drawing by Ian Graham, Corpus of Maya Hieroglyphic Inscriptions, Peabody Museum of Archaeology and Ethnology. Copyright 1978 by the President and Fellows of Harvard College).

OBSIDIAN HYDRATION

Research at Xunantunich coincided with refinements and advances in obsidian-hydration–dating techniques. Recent studies have attempted to control a wide range of variables that affect hydration rates and ultimately the generation of chronometric dates (Freter 1993; Gonlin 1993; Hammond 1989; Meighan and Scalise 1988; Sheehy 1991; Tourtellot 1993:225–226; Webster et al. 1993; but cf. Braswell 1992; Ericson 1988; Smith and Doershuk 1991). The hydration rate is affected by external factors (soil humidity, pH, and temperature) and by the internal chemistry of the glass (water content). New techniques have been developed to measure these variables, and XAP and the University of California at Los Angeles (UCLA) Obsidian Laboratory undertook a systematic approach to control some of these factors at Xunantunich.

To determine relative humidity (RH) and effective hydration temperature (EHT), thermal cells were buried at both Xunantunich and San Lorenzo. Nine double sets of Trembour saturated salt cells from UCLA were placed at Xunantunich. UCLA cell sets were buried 25, 50, 100, and 200 cm below the surface in Plaza A-III and on an upper eastern terrace of the Castillo. At San Lorenzo, Yaeger obtained cells from Archaeological Services Consultants, Inc. As at Xunantunich, two locations were selected to assess variation in RH and EHT. Column 1 was placed in a shaded area, and Column 2 was placed 50 m away in an area where grass was the only ground cover. Cell pairs were placed at depths of 10, 25, 50, and 100 cm below ground surface. We also placed a pair of UCLA cells in each column to check the compatibility of the two different cell makers. In addition, we buried UCLA cells in a deep, stratified refuse deposit behind SL-22, Structure 2, and an additional pair of cells was placed in the clay and cobble fill of SL-28 Structure 1.

Inter- and intrasite variations in effective hydration temperatures and relative humidity are present in the data (Table 5). At San Lorenzo, Column 2 had an average temperature 2.275°C higher than Column 1, indicating a real difference in effective hydration temperature between obsidian buried in shady and sunny locales. At Xunantunich, however, the EHT varied between 25.9°C and 26.8°C, with an average of 26.6°C, indicating a good degree of consistency among effective hydration temperatures. The Xunantunich EHT data match most closely those recorded from the San Lorenzo Column 1 cells. Relative humidity varies not only with depth but also with location. At Xunantunich, RH ranges from 97% at 25 cm below surface to between 99% and 98% below 50 cm in the two locations. At San Lorenzo, average RH is 1% higher than at Xunantunich and ranged between 100% and 98% at 50 cm. Some of this variation can be attributed to differences between the ASC and UCLA thermal cells, but regardless of the thermal-cell maker, the RH values below 50 cm at San Lorenzo varied as much as 2%. For hydration-rate calculations, estimations of EHT and RH were based on data derived from UCLA thermal cells at Xunantunich because obsidian samples were selected from relatively shallow subsurface contexts at this site. Because variability in EHT and RH values at Xunantunich is very small and does not display a clear trend with depth, it is likely that this variability is the result of measurement error. Based on these patterns, mean EHT and RH values were used to calculate rates.

Work by Christopher Stevenson and colleagues has established relationships among the rate of hydration, the amount of intrinsic water, and the density of glass (Stevenson et al. 1998). The amount of intrinsic water varies significantly from sample to sample in a single obsidian source; therefore, each artifact potentially will have its own specific hydration rate. Based on a large empirical study of multiple obsidians, Wallace Ambrose and Christopher Stevenson (2002) determined a quantifiable relationship between relative density and intrinsic water. The density measurement utilizes the weight in air versus the weight in liquid of each sample, taking

Table 5. Trembour saturated salt cells data from Xunantunich and San Lorenzo

Pit Location	Cell Set No.	Depth Below Ground (cm)	EHT	RH%
Plaza A-III	UCLA 1-2	25	26.8	.97
	UCLA 3-4	50	26.7	.98
	UCLA 41-42	50	26	.98
	UCLA 5-6	100	26.5	.98
Castillo	UCLA 11-12	25	26.5	.99
	UCLA 13-14	50	26.6	.99
	UCLA 43-44	50	25.9	.99
	UCLA 15-16	100	26.5	.99
	UCLA 17-18	200	26.5	.98
San Lorenzo Column 1	ASC 96-1/2	10	26.1	100
	ASC 96-3/4	25	26.6	100
	ASC 96-5/6	50	26.6	100
	ASC 96-7/8	100	26.4	.98
	UCLA 19/20	50	25.6	.99
San Lorenzo Column 2	ASC 96-9/10	10	28.9	100
	ASC 96-11/12	25	28.6	100
	ASC 96-13/14	50	28.5	100
	ASC 96-15/16	100	28.8	.99
	UCLA 21/22	50	28.4	.98
SL-22, Structure 2	UCLA 27/28	25	27.8	.99
	UCLA 25/26	50	28.4	.99
	UCLA 23/24	100	28.3	.98
SL-28, Structure 1	UCLA 29/30	25	28.9	.98

EHT = effective hydration temperature in degrees Celsius; RH = relative humidity.

advantage of the Archimedean principle. Weights are taken on a scale valid to four decimal places using a heavy liquid to increase surface adhesion and reduce bubbles, thereby reducing errors. The algorithms that determine OH, or the percentage of intrinsic water by weight, are provided by software available from Stevenson. We found that all Xunantunich obsidian samples range in intrinsic water content between .11% and .12% by weight. It is highly probable, therefore, that the sampled obsidian blades were from a single source, probably El Chayal. No x-ray fluorescence or neutron activation analysis studies were performed to verify this inference.

Variations in soil composition and pH, especially those related to very acidic or alkaline soils such as those found in the Maya Lowlands, could have an effect on the hydration process and may alter hydration rates (Hench and Clark 1978; Lanford 1978; Laursen and Lanford 1978). To control for the possible effects of pH, hydration rims were measured from internal fissures rather than from the exterior surface, a technique first developed by Ambrose (1994). Based on experiments in the UCLA Obsidian Hydration Laboratory, it was found that prismatic blade platforms commonly showed internal cracks. Apparently, internal cracks were produced when blades were struck from cores; therefore, for slide preparation, a wedge of obsidian was sliced perpendicular to the platform. Thirty-three blades with proximal ends were selected from single-component middens; unfortunately, only 16 of the prepared slides exhibited internal fissures. Numerous rim measurements were taken from the same internal crack because diffusion fronts are located on both sides of a fissure. Internal rims were measured in two ways at different locations: single-sided (one side of the crack to the diffusion front) and double-sided (diffusion front to diffusion front). We are most confident in the double-sided measurements taken some distance from the exterior surface. Hydration rates are calculated using a $\pm$.10-μ reading to establish a date range (Table 6).

Dates obtained from the Xunantunich samples did not prove as reliable as we originally hoped. Obsidian dates are generally 150

Table 6. Obsidian-hydration-rate variables and dates

Sample No.[a]	Provenience	Site and Structure No.	Ceramic Phase	Rim Thickness (μm)	EHT	RH%	OH	Rate	Date A.D.	Range
15832	102LL/3	Xunantunich Str. A-6	Late Classic	4.4	26.6	.99	.114	11.8	362	287–435
15846	22F/2	Xunantunich Str. D-7	Tsak'	4.3	26.6	.99	.121	13	569	502–635
15822	116E/4	Xunantunich Str. A-23	Hats' Chaak	4.2	26.6	.99	.118	12.5	586	518–653
15851	117L/3	Xunantunich Str. A-25	Hats' Chaak	3.9	26.6	.99	.115	12	734	669–798
15852	117A/3	Xunantunich Str. A-25	Hats' Chaak	3.8	26.6	.99	.119	12.6	852	790–911
15823	116E/4	Xunantunich Str. A-23	Hats' Chaak	3.8	26.6	.99	.120	12.7	862	802–921
15842	117I/8	Xunantunich Str. A-25	Hats' Chaak	3.6	26.6	.99	.118	12.5	959	900–1015
15831	102LL/3	Xunantunich Str. A-6	Hats' Chaak	3.5	26.6	.99	.118	12.4	1,009	951–1064
15825	116E/5	Xunantunich Str. A-23	Hats' Chaak	3.5	26.6	.99	.118	12.5	1,018	961–1073
15816	130H/6	Xunantunich Str. D-5	Samal	3.5	26.6	.99	.120	12.8	1,038	982–1092
15819	102LL/4	Xunantunich Str. A-6	Hats' Chaak	3.2	26.6	.99	.115	11.9	1,138	1083–1191
15854	22F/3-D1	Xunantunich Str. D-7	Tsak'	3.3	26.6	.99	.120	12.7	1,139	1086–1190
15817	116I/3	Xunantunich Str. A-23	Tsak'	3.2	26.6	.99	.117	12.3	1,163	1110–1215
15843	117G/8	Xunantunich Str. A-25	Hats' Chaak	3.2	26.6	.99	.117	12.3	1,167	1114–1218

[a]UCLA Obsidian Hydration Laboratory, UCLA Institute of Archaeology, A210 Fowler, Box 95150, Los Angeles, CA 90095-1510, USA; EHT = effective hydration temperature in degrees Celsius; OH = percentage of intrinsic water by weight; range = μm $\pm$ .1; rate = μm^2/1,000 years; RH = relative humidity; Str. = Structure.

to 200 years too young when compared with contexts dated by radiocarbon. More important, they did not consistently cluster according to their associated ceramic dates. Many archaeological, environmental, or procedural factors could be offered to explain discrepancies between the obsidian-hydration dating and the dates obtained by radiocarbon analysis. Yaeger (2000) attributed most of the temperature difference to vegetation cover. The strong role of shady vegetation and ground cover in determining subsurface temperatures is confirmed by the data from the UCLA cells placed in archaeological contexts at San Lorenzo. SL-22 and SL-28 are located in a cattle pasture nearly devoid of trees and shrubs, and the EHT results are nearly identical to those from the cells in sunny Column 2. Although the conditions of Column 2 and SL-22, Structure 2, are valid for most groups at San Lorenzo today, the site has been under vegetative cover as dense as, or denser than, that around Column 1 for most of its post-abandonment history. To calculate accurate hydration dates, researchers would have to determine as closely as possible the amount of time the site was under different conditions. Further complicating matters, most obsidian samples are from refuse contexts behind or adjacent to substructure platforms, or in the collapse from superstructures. These artifacts presumably began their post-depositional history on the ground surface, then were gradually buried by both natural and cultural deposition. This post-depositional history also appears to affect hydration-rind preservation. Based on microscopic examination of artifact cross-sections, Glenn Russell of the UCLA Obsidian Hydration Laboratory noted that both surface rinds and internal crack rinds near the surface have undergone erosion, possibly due to elevated soil pH levels. Eroded rinds may yield smaller hydration-rim thickness, which would result in more recent dates. It must be suggested that, as currently performed, obsidian hydration does not constitute a reliable and fine-grained dating methodology for conditions at Xunantunich and San Lorenzo (see also Braswell 1992).

IMPLICATIONS AND DISCUSSION

Our new dates have specific implications for the reconstruction of Xunantunich's political history and events occurring across the central Maya Lowlands. We suggest a rapid florescence of Xunantunich under the auspices of the nearby kingdom of Naranjo from A.D. 600 to 780. Political autonomy and collapse of the polity occurred between A.D. 780 and 890, in the Terminal Classic period. The timing of these events leads us to suggest that Xunantunich was directly involved in greater Peten politics.

According to Robert Sharer (1994:346), the earliest signs of trouble in the Maya Lowlands began with the onset of a new katun cycle in A.D. 790. It is at this time that large Maya centers throughout the central and southern lowlands either slow down or cease activities associated with elite intellectual and cultural activities. The collapse of power and authority at state capitals allowed provincial centers, such as Xunantunich, to break away and usurp control over peripheral regions early in the Terminal Classic. Simon Martin and Nikolai Grube (2000:226–227) suggest that more sites erected stelae in A.D. 790 than at any point in time, and this wave of balkanization continued until A.D. 830. Combined, these data created the illusion that the collapse was a rapid and possibly more choreographed event than many current models suggest. Although the timing of the collapse at lowland sites might appear highly correlated, the particular conditions that instigated problems and the individual responses to them might be highly variable. For example, Demarest et al. (1997:219) have suggested that in the Petenbatun region, the collapse began in A.D. 760, suggesting that some regions may have begun the process sooner than others.

A second important implication of our chronology involves the nature of the Terminal Classic Collapse. At Xunantunich, the "collapse" must be viewed both as an archaeological phase that was relatively short and a sociopolitical era of transition that was marked both by political autonomy and abandonment. As a regional center, Xunantunich survived for more than 100 years after the onset of collapse at other sites through a combination of political strategies. Some of these strategies are reflected in the material markers of elite culture; others are signaled through more mundane patterns. Civic building was not the focus of elite prerogatives, possibly because labor and skill were in short supply. Rulers apparently concentrated their effort on the erection of stelae and replacing the plaster frieze on the Castillo. Both these actions publicly announced autonomous authority and symbolically terminated foreign rulership. Ceramics, by contrast, continued to reflect Peten Maya affiliation, presumably because most pottery styles (with the exception of glyph-banded vessels) more strongly reflect the group's cultural affinity than individual political authority.

RESUMEN

El equipo científico del Proyecto Arqueológico Xunantunich ha realizado ocho temporadas de trabajo, las cuales incluyen excavaciones y recorrido de superficie cubriendo el área rural que gobernaban los reyes de Xunantunich desde su capital antigua y en Xunantunich, un centro rector de la cuenca del río Mopán en Belíce occidental. Previas investigaciones han demostrado que la mayoría de los edificios en Xunantunich fueron construidos durante el clásico tardío y que el sitio continuó su función como centro político de alta importancia hasta después de la caida de grandes ciudades de la civilización maya en el Petén (Ashmore y Leventhal 1993; Graham y Pendergast 1980; MacKie 1985; Schmidt 1974). Las tres estelas de Xunantunich, las cuales datan entre 820 y 849 d.C., subrayan la continución de la función política del sitio durante el clásico terminal.

Este ensayo se aproxima nuevamente y con más detalle a la historia política de Xunantunich y su reino. El sitio se fundó a principios del clásico tardío, durante la fase Samal (600–670 d.C.), careciendo de ocupaciones de importancia durante las fases más tempranas. A pesar de haberse establecido mucho más tarde que los demás centros de la región (por ejemplo, Actuncan, Baking Pot, Buenavista, Cahal Pech, El Pilar, y Pacbitun), Xunantunich floreció durante la fase Hats' Chaak (670–780 d.C.) del clásico tardío, estableciendo el dominio político sobre la región, posiblemente bajo el mando y poder de los reyes de Naranjo.

Entre 780 d.C. y 890 (la fase Tsak', correspondiente al clásico terminal) la región dentro de la cual se localiza Xunantunich sufrió una disminución de población. Esta disminución de población se acompaña por el abandono de la residencia real a fines de la fase Hats' Chaak y la coetánea erección de tres estelas y un altar, todos grabados. Estos acontecimientos, señalan fuertes cambios políticos, los cuales denotan la liberación de los líderes de Xunantunich del dominio del reino de Naranjo. Luego de haber sido liberada, la ciudad de Xunantunich fue completamente abandonada durante la fase Tsak', lo cual indica que no logró funcionar como centro independiente.

Los detalles históricos que aquí se presentan se posibilitaron por medio de nuevos datos cronológicos tanto relativos como absolutos los cuales fueron obtenidos a base de las excavaciones del Proyecto Arqueológico

Xunantunich. En el presente, se exponen los resultados de cinco técnicas cronométricas utilizadas en Xunantunich y se pretende evaluar su utilidad.

La cronología que se propone se basa en la secuencia cerámica recientemente elaborada por LeCount (1996). En su secuencia cerámica, LeCount (1996) refinó la secuencia de tipos y variedades establecida por Gifford (1976) para Barton Ramie y áreas contiguas usando datos de los depósitos estratigráficos de Xunantunich y asentamientos rurales como San Lorenzo. La secuencia de LeCount tiene la ventaja de proporcionar una resolución temporal más fina que la de secuencias anteriores por haber distinguido entre estilos formales y decorativos que antes se clasificaban juntos dentro de las variedades anteriormente reconocidas por investigadores.

La forma de mayor utilidad es el cuenco de tipo—variedad Mount Maloney Negro—Mount Maloney porque el ángulo del labio cambia desde un angulo casi vertical, a un angulo de ca. 45 grados, hasta llegar a un ángulo horizontal. Al distinguir esta evolución del labio de los cuencos del tipo Mount Maloney Negro y al añadir otros cambios de modos decorativos en otras variedades contemporáneas, se pudo dividir el complejo Spanish Lookout de Gifford (1976) en tres complejos, nombrados Samal, Hats' Chaak y Tsak', el último con una faceta (o sub-fase) temprana y una faceta tardía.

Se puede asociar fechas absolutas con la secuencia cerámica que se ha construido para Xunantunich por medio de ciertos tipos cerámicos que tienen en común con las secuencias de Barton Ramie (Gifford 1976) y Pacbitun (Healy 1990) en el valle del río Belice, y las de Uaxactun (Smith 1955) y Tikal (Culbert 1993) en el Petén, Guatemala, las cuales se ha fechado con textos hieroglíficos y radiocarbono. Hasta cierto nivel, las secuencias cerámicas son únicas para cada sitio, y por ésto, es necesario examinar las fechas derivadas en un marco comparativo. Con este fin se escogieron 22 muestras de carbón, todas ellas procedentes de depósitos estratificados de basura doméstica, de depósitos de ocupación in situ o de relleno de construcción sellado. Todas estaban asociadas con muestras cerámicas de las varias fases que se habían distinguido en Xunantunich.

Para datar las fases, los resultados de los análisis de radiocarbono se calibraron con OxCal 3.0.3 (Stuiver y Reimer 1993) y luego se determinó un marco de asociación entre las fases cerámicas y las fechas de radiocarbono por medio del método iterativo estadístico "Gibbs sampler" (Buck et al. 1992). Los resultados indican que la fase Samal data entre ca. 600 y 670 d.C., la Hats' Chaak de 670 a 780 d.C. y la Tsak' de 780 a ca. 890 d.C. Cabe señalar que resulta difícil delimitar la fecha inicial de la fase Samal tanto como la fecha terminal de la fase Tsak' por falta de muestras de carbón para datar las fases anteriores y posteriores.

Las fechas de las inscripciones de Xunantunich complementan las fechas de carbono-14. De los cinco monumentos con textos hieroglíficos que se conocen en Xunantunich, en tres se preservan restos de fechas. La Estela 8 lleva una fecha de la rueda calendárica que corresponde con la fecha de cuenta larga 9.19.10.0.0 (6 de mayo, 820 d.C.), mientras la Estela 9 lleva una fecha de cuenta larga de 10.0.0.0.0 (15 de marzo, 830 d.C.). La Estela 1 se encuentra en muy mal estado de preservación pero se puede distinguir una fecha que correseponde con 10.1.0.0.0 (20 de noviembre, 849 d.C.). Las tres estelas grabadas se erigieron, entonces, en la fase Tsak', probablemente en la faceta tardía de aquella fase. Aunque no se encontaron ofrendas de vasijas asociadas con las estelas, su ubicación al pie de la estructura A-1, la cual se construyó a fines de la fase Hats' Chaak y se modificó de manera sustancial en la fase Tsak', cuando era uno de los edificios ceremoniales más importantes del sitio, apoya la hipótesis que las estelas datan a la fase Tsak'.

Dos análisis adicionales resultaron no muy efectivos en cuanto a la cronología. Se analizaron 60 fragmentos de obsidiana de contexto primario con en el objeto de medir la corteza de hidratación en las rajaduras interiores, las cuales no padecen de disolución química como la corteza exterior (Ambrose 1994). Los análisis produjeron 16 fechas. Al comparar estas fechas con las fechas de radiocarbono, las fechas de las estelas y la secuencia cerámica generalmente aceptada en las tierras bajas mayas, la mayoría resultan entre uno y dos siglos demasiado tarde. Además, no se agrupan por fase cerámica como se esperaba. Estos dos hechos nos llevan a concluir que el método de hidración de obsidiana no se ha refinado suficientemente para servir como un efectivo método cronométrico.

Adicionalmente, se ha propuesto que en Xunantunich existian dos distintas técnicas constructivas (MacKie 1985). En una se usan bloques grandes, cuadrados y bien labrados (Tipo I) y en la otra se usan lajas más pequeñas y generalmente labradas solamente en una cara (Tipo II). MacKie (1985) tambien planteó que el Tipo II se utlizó después del Tipo I. En muchos edificios, resulta ser cierto que el Tipo II sigue al Tipo I en la secuencia de construcción, sin embargo, el hallazgo de casos contrarios y la costumbre de los arquitectos de Xunantunich de reusar bloques grandes obtenidos de áreas del sitio ya abandonadas nos da a conocer que factores económicos y prerequisitos de uso también influyeron las decisiones constructivas en Xunantunich, lo cual limita la utilidad de usar técnicas de mampostería como marcadores cronológicos.

La nueva cronología de Xunantunich nos brinda un nuevo entendimiento de la historia de aquel centro rector y del clásico terminal así como de la caida de la civilización maya en la cuenca del río Belice. El rápido desarrollo de Xunantunich en la fase Samal y su florecimiento en la fase Hats' Chaak parecen haber ocurrido bajo el control del reino de Naranjo, sugiriendo que Xunantunich, tanto como la región, jugaron un papel importante en las estrategias políticas y económicas de los reyes de las grandes ciudades adyacentes, como Naranjo, Caracol y Tikal.

Entre 790 y 830 d.C., mientras que Xunantunich aparentemente se independizaba, estos reinos vieron una declinación abrupta de poder y la decentralización política de la region. Los líderes de Xunantunich en la fase Tsak' erigieron tres estelas labradas e inscritas y elaboraron los edificios ceremoniales que formaban el centro del sitio, celebrando su nueva autonomía, aunque su poder nunca alcanzó los niveles de los líderes en la fase Hats' Chaak. Al final, y antes del postclásico, Xunantunich fue abandonado como la gran mayoría de sus poblaciones rurales.

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