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CLASSIC MAYA DEFENSIVE SYSTEMS AND WARFARE IN THE PETEXBATUN REGION

Archaeological evidence and interpretations

Arthur A. Demarest,[a] Matt O'Mansky,[a] Claudia Wolley,[a] Dirk Van Tuerenhout,[b] Takeshi Inomata,[c] Joel Palka,[d] and Héctor Escobedo[a]

[a]Department of Anthropology, Vanderbilt University, Nashville, TN 37235, USA
[b]Department of Anthropology, Tulane University, New Orleans, LA 70118, USA
[c]Department of Anthropology, Yale University, New Haven, CT 60520, USA
[d]Department of Anthropology, University of Illinois–Chicago, Chicago, IL 60607, USA

Abstract

From 1989 to 1996, excavation and surveys were carried out at dozens of sites and intersite areas in the southwestern Peten by the Defensive Systems Subproject of the Vanderbilt Petexbatun Regional Archaeological Project and by subsequent related Vanderbilt investigations. The excavations and analyses explored fortification systems, related settlement, and artifactual evidence. Beginning at about A.D. 760, the major centers of the Classic Maya civilization in the Petexbatun region were fortified by a massive expenditure of labor on defensive walls of masonry, usually surmounted by wooden palisades. As warfare accelerated, major centers and later even small hilltop villages were located in highly defensible positions and were fortified by walls, palisades, moats, and baffled gateways. Despite these efforts, all major centers were virtually abandoned by the early ninth century. By A.D. 830, only the island fortress of Punta de Chimino and a very reduced and scattered population remained in the Petexbatun region.

The nature of warfare in the lowland Maya civilization has been a subject of intense debate for the past several decades. Through the 1940s and 1950s thinking on Classic Maya warfare was guided by J. Eric S. Thompson's vision of Classic Maya civilization as a peaceful theocratic society. Large-scale multidisciplinary archaeological projects, epigraphic decipherments, and iconographic studies in the 1960s and 1970s led to radical revision of most aspects of his theocratic "vacant center" model. Maya warfare began to be viewed differently following studies of military scenes on the Bonampak murals, other iconographic studies, and discoveries of fortification systems at several geographically and chronologically diverse lowland Maya sites (Adams 1973; Chambers 1982; Dahlin 1984; Graham 1967; Puleston and Callender 1967; Rice and Rice 1981; Webster 1976, 1979). Breakthroughs in epigraphy in the late 1970s and the 1980s further confirmed that warfare was a central feature of Maya civilization—as it is in all civilizations.

With the reinstatement of warfare as an expectable aspect of Classic Maya society, a lively debate began about its nature, variability, and role in the rise, maintenance, and fall of Classic Maya civilization (Adams, ed. 1977; Adams and Hammond 1982; Ball 1977; Carneiro 1970; Chase and Chase 1989; Demarest 1978; Freidel 1986; Marcus 1974; Miller 1986; Schele and Miller 1986; Webster 1975, 1976). This more sophisticated discussion has examined the specific political, economic, and ideological causes and effects of Maya wars, the differing cults, types of warfare, and the variability of these phenomena in time and space (Cowgill 1979; Demarest 1978, 1992, 1996a, 1996b; Freidel 1986, 1992; Marcus 1993; Schele 1983; Schele and Freidel 1990; Schele and Miller 1986; Webster 1977, 1979, 1993). Some of these discussions have centered on the end of the Classic and the Terminal Classic periods during which iconographic and epigraphic presentations of warfare were explicit (Cowgill 1979; Freidel 1992; Marcus 1974; Miller 1986, 1993; Stuart 1993). These discussions of warfare and the "collapse" of lowland Classic Maya civilization have often turned to the western Peten, the Pasión, and the Usumacinta River regions. In these zones, the archaeological, iconographic, and epigraphic evidence seemed especially clear regarding the militaristic aspect of Late and Terminal Classic society.

BACKGROUND: WARFARE AND THE COLLAPSE IN THE GREATER PASION REGION

The Pasión region began to become a special focus of discussions of Classic Maya warfare after reconnaissances by Vinson (1960), Grieder (1960), Navarrete and Luján Muñoz (1963), and especially Graham (1961, 1963, 1967). In fact, defensive fortification walls were reported in this region in the nineteenth century (Artes 1893). Ian Graham's early reconnaissances, in particular, stimulated interest in this region through the distribution, and later the publication, of studies of the monuments of the region. Many of these had very militaristic themes, ninth-century dates, and exotic features. Most relevant to our work was Gra-

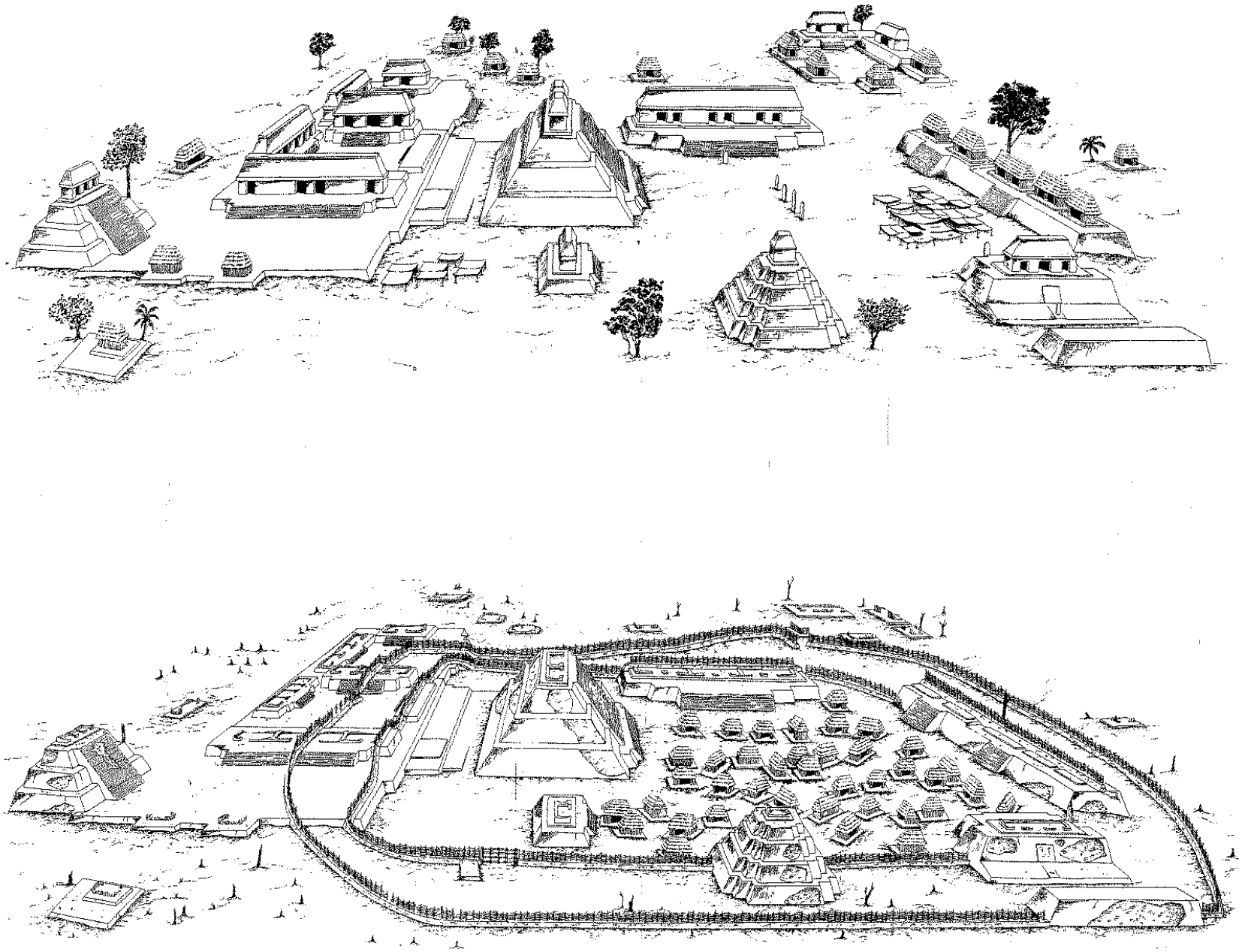

Figure 1. Top, Dos Pilas West Plaza Group before A.D. 760; bottom, Dos Pilas West Plaza Group defensive walls and siege village after A.D. 761 (drawn by L. F. Luin, courtesy Vanderbilt University Press).

egies and, in some cases, even where weaknesses in the defenses were eventually overrun. The dating evidence is poor in some operations where the small number of artifacts only allows us to date walls as "Late Classic." In other excavations we can assert more precisely that defensive systems were constructed between A.D. 760 and A.D. 830 from ceramic markers recovered (diagnostic pastes and forms of the late facet of the Nacimiento phase) (Foias 1996). Virtually all fortifications probably date to this short period. This period also witnessed the gradual cessation of public architecture and dated monuments at site after site, the destruction of some epicenters, the abandonment or radical depopulation of centers, and the general reduction of the region's population (as estimated by a variety of measures) to 5–10% of previous levels (Foias 1996; Palka 1995; Valdés and Demarest 1993).

From settlement, architecture, epigraphy, and artifacts in all contexts, we can now plot the pattern of disintegration of Classic Maya civilization in the Petexbatun region between A.D. 760 and A.D. 830. Site by site, defensive systems were constructed, public architecture and major monumental construction ceased, populations dwindled, central Peten imports declined, and eventually even residential population levels fell rapidly from their Late Classic peak. Debate continues about ultimate causality and the general nature of the collapse of Classic Maya civilization in the southern Maya lowlands. But for the Petexbatun region itself we can assert that political systems rapidly disintegrated in a state of endemic warfare.

THE PETEXBATUN FORTIFICATION SYSTEMS: GENERAL CHARACTERISTICS

The nature of fortifications in the Petexbatun during the A.D. 760–830 period varies somewhat as their systems evolved and improved, probably through a very costly process of trial and error. The fortifications at Dos Pilas were rapidly constructed on a rigid schematic plan with clear weaknesses (Figure 1; see also Palka 1997:Figure 1). Palisade base walls were low (about 1.5 m) and obviously very rapidly constructed in concentric defensive rings, with walls often running right over existing buildings and often poorly placed in relation to the local topography (Demarest, Lopez, et al. 1994; cf. Palka 1995:85–86). Not surprisingly, it appears that the Dos Pilas defensive system rapidly failed. Later at Aguateca, at many hilltop fortresses, and at other sites the same general defensive concepts were utilized, but with much more careful construction, strategic placement of walls, additional features, and, consequently, greater success.

While some variability occurs, the simple principles were the same: low stone masonry walls were built to sustain and act as footings for wooden palisades surrounding site epicenters or encircling higher defensible locations. Original stone base wall heights ranged from 1.5 to 3.5 m. The highest of these walls may not have required wooden palisades. Where soils were thicker, or where palisades could run over previously standing architecture (with its solid fills), stone base walls tended to be very low or nonexistent, because palisade stakes could be footed directly into the thick soils or construction fills. Defensive wall masonry varies from crude heaped stones to finer walls of stacked, often reused, blocks (Figures 2–4). Usually, stone masonry blocks are 40–80 cm in length and are stacked horizontally, although vertical facing slabs with internal fill are found at Aguateca and Quim Chi Hilan, where such vertical masonry is generally more common (see later; also Inomata 1997).

It is impossible to know the precise nature of the wooden superstructures that were part of most of these defensive systems. Gateway placement, wall heights, and other indirect evidence of palisades has been supplemented by fortuitous finds of postholes and burned impressions of palisades themselves to produce the reconstructions shown in the figures here. One remarkable set of findings of burned impressions in wattle and daub was uncovered by Van Tuerenhout at the site of Quim Chi Hilan. This evidence supported our earlier hypothesis: low walls sustained wooden palisades along their entire length, with special features near gateways (Van Tuerenhout 1996:135–139). At Punta de Chimino, Wolley's excavations of more massive walls and moat systems recovered a deep posthole atop an 8 m high wall, indicating that heavy, widely spaced posts might have been reinforced by lighter lateral crossbars to provide protection for the defenders (see Figures 2 and 4). These discoveries of palisade impressions and postholes are nearly miraculous in the loose rubble of collapsed walls disturbed for a millennium by the great roots of Petexbatun's towering cedars, mahoganies, and ceibas. Only through extensive sampling were we able to find such confirmatory evidence, while also plotting the general variability in Petexbatun defensive wall forms and plans.

At all sites, various types of baffled gateways were used to restrict entrance. In some cases baffled gates were a strategic device to guide the enemy into "killing alleys" between walls where the trapped besiegers could have been pummeled with heavy throwing spears (Figure 5). Strategic placement, defense of water sources, and effective use of natural typography were most critical to a site's defenses. Not surprisingly, the moment in which a center or village fell to destruction within the A.D. 760–830 period relates to the efficacy of its defensive system and related strategic factors. As the endemic warfare accelerated, agricultural intensification, settlement density, and population placement all responded to the prime directive of defensive needs.

Fortification systems of exactly the type found in the Petexbatun region were described by the conquistadors, friars, and other chroniclers in the sixteenth and seventeenth century in Yucatan, Tabasco, and even in the Peten itself (e.g., Jones 1989, 1991). The conquest of Yucatan required the Spaniards to confront moated centers with dry stone walls sustaining timber palisades. Defenses encountered also included concentric palisade systems and stone walls surmounted by piled thorny brush (Chamberlain 1948; Thompson 1965). In the Peten central lake kingdoms of the Itza Maya, the Spanish faced palisaded forts along escarpments as well as fortified islands and peninsulas much like Punta de Chimino (Jones 1981, 1991; Rice 1981; Rice and Rice 1981; Rice et al. 1993, 1995). The full range of Petexbatun defenses are nearly identical in form and dimensions to those described in Postclassic and ethnohistorical contexts in the Maya world. It appears that such stone base wall, palisade, and moat systems are found earliest in the Petexbatun, appear later in tenth- and eleventh-century Yucatan, and become more prevalent during the Postclassic and contact periods (Demarest 1996b). Thus, the reconstructions illustrated here are supported not only by the archaeological evidence, but also by analogous later forms of Maya fortifications.

Also note that other types of walls are found in the Petexbatun including terrace walls, check dams, true dams, and field walls in some areas of agricultural intensification (Dunning et al. 1997; Killion et al. 1991; O'Mansky and Wheat 1997). These wall systems are easily distinguished from the defensive walls in form, associated features, and placement in the terrain. Whenever artifacts or stratigraphy allow dating, the defensive wall systems prove to be of Tepeu 2, or more specifically of eighth-century, date.

ham's mapping and publication of wall systems in the Petexbatun region itself (Graham 1967). These discoveries led to debate regarding their probable function as defensive systems and to competing interpretations of the nature, intensity, and causes of warfare in the Petexbatun and Pasión regions (Adams 1973, 1977:153–156, 1983; Adams and Hammond 1982:508–509; Demarest 1978; Weaver 1972:190; Webster 1976, 1993). The reconnaissance work and publication of monuments at Seibal and in the Petexbatun region also revealed that monumental art and texts were dominated by themes of war and conquest (I. Graham 1967; J. Graham 1973). Some theories argued for a greater intensity of ninth-century warfare in the Pasión region because of foreign invasion (Adams 1973; Graham 1973; Sabloff and Willey 1967; Willey 1973), foreign "influences," or at least more-intense interactions on this western periphery of the Maya world (Demarest 1978; Sabloff and Willey 1967). Adams (1983) proposed possible ecological and subsistence factors that might explain the intensity of warfare in the Pasión region and especially its Petexbatun subregion.

As described above (Demarest 1997), the Vanderbilt Petexbatun Regional Archaeological Project began specifically with the intent of exploring these issues of warfare and fortifications in the region and the nature and causes of conflicts there. Building on the debates and evidence from the earlier major projects at Altar and Seibal, we also hoped to explore whether the warfare was related to the complex changes in material culture in the Pasión region in the ninth century and the subsequent collapse of Maya civilization there. As the initial focus of the project was warfare, defensive systems were a major aspect of the research design in every season of the six-year Petexbatun Project and the subsequent Punta de Chimino Project. The Petexbatun Project's general director, Arthur Demarest, also directed the Defensive Systems Subproject. From 1989 to 1993 extensive excavations were carried out in wall systems by many different teams of excavators and supervisors at Dos Pilas, Punta de Chimino, Aguateca, Quim Chi Hilan, and other sites throughout the region. In the final and largest field season of the project, the 1994 season, we concentrated much time and resources on defensive systems at Punta de Chimino, Dos Pilas, and Arroyo de Piedra, as well as survey and excavations at a number of small, but formidable, hilltop fortress sites on or near Transect 4 (Demarest 1997:Figure 2). Excavations of fortifications and related defended agricultural systems continued in 1995 and 1996 with the Vanderbilt Punta de Chimino Archaeological Project directed by Demarest and Escobedo.

Below we provide brief comments on some of the excavations and findings on fortification systems. Detailed descriptions with excavation profiles, artifact lots, and features of all of these hundreds of excavation units can be found in the six preliminary volumes of the Petexbatun Project results and the recent volume on the Punta de Chimino Project (Demarest and Escobedo 1997, eds. 1997; Demarest and Houston 1989, 1990; Demarest et al. 1992; Demarest, Inomata, Palka, and Escobedo 1991; Demarest, Valdés, and Escobedo 1995; Valdés et al. 1993). The final monograph series on the Petexbatun Regional Archaeological Project (in preparation with Vanderbilt University Press) will also detail both excavations and artifact analyses at the fortified major centers and villages of the region. Here our brief commentaries and selected illustrations should convey the general nature of the defenses, their relationship to the culture history of the region, and the endemic and destructive nature of warfare in the last century of Classic Maya civilization in the Petexbatun region.

DATING AND CHRONOLOGY

Initially, we did not know whether the wall systems identified by Graham and others at Aguateca and Dos Pilas were defensive constructions. We were also uncertain whether they would date to the Classic, the Terminal Classic, or the Postclassic. It was even possible that they were constructions of the Lacandon Maya in colonial or later times. Initial excavations in fortifications in 1989 and 1990 (Demarest 1989, 1990; Inomata, Symonds, Beekman, and Houston 1990) demonstrated the defensive nature of the walls at Dos Pilas and dated them to the end of the Classic period, from A.D. 760 to 830, or what Foias and Bishop have designated as the late facet of the Nacimiento phase (Bishop and Foias 1997; Demarest 1997; Foias 1996). This dating of the Dos Pilas walls coincided with epigraphic interpretations by Houston, Matthews, and Stuart (Houston 1987; Houston and Matthews 1985; Houston and Stuart 1990) regarding conflicts in A.D. 761 within the Petexbatun kingdom and the end of the reign of Ruler 4, the last known ruler of Dos Pilas. This dating also aligned the construction of the defensive walls with the end of the public architecture and dated monuments at that site and a radical reduction and concentration of population. While the details of epigraphically reconstructed history are still being debated (Escobedo 1997a) the archaeological evidence, in all of its dimensions, has grown increasingly secure over the six years of the project and subsequent research.

Taken together, the evidences of the first two seasons proved not only a defensive function for the walls, but a possible causal connection to the Maya collapse in the Petexbatun region. Our interpretations of defensive function, dating, and association with an early manifestation of the collapse (Demarest 1990; Demarest et al. 1989; Demarest, Houston, and Johnston 1991) were greeted initially with skepticism by colleagues at meetings. Furthermore, we were surprised that the walls did not date to the ninth-century Terminal Classic period of hypothesized foreign invasions that had been proposed by participants in the Seibal and Altar projects (Adams 1973; Sabloff 1973; Sabloff and Willey 1967). The senior author of this article had himself earlier proposed that such fortifications were present in this area because it may have been a "border" region with western "Mexicanized" Maya groups. He had argued that such zones of contact between groups with differing "ethics" of warfare can result in more-intense conflict involving a higher level of destruction and requiring fortifications (Demarest 1978). So the earlier, pre-Fine Orange, late-eighth-century dating of the first-excavated Petexbatun wall systems challenged our earlier thinking and the emphasis on "foreign" influence by earlier projects.

Given the skepticism and debate within the project and from colleagues, the Defensive Systems Subproject used heavy sampling to resolve these issues. All of the other subproject excavations at all sites and intersite areas were directed to devote considerable time and resources to the mapping, excavation, and dating of any wall systems found. Defensive-systems excavations were especially stressed in 1991 and 1994, the two largest seasons of the Petexbatun Project. The consequence of this heavy sampling is a high degree of certainty about general function, specific details, and dating of the wall systems in this region. The 111 excavations carried out in defensive systems from 1989 to 1994 included units of 2 m^2 to deep vertical trenches 17 m long to wide horizontal exposures of up to 58 m^2. Inevitably, such thorough sampling uncovered general patterns and also stumbled upon some unique and revealing contexts. We are now able to specify dating, architectural associations, and function of the fortifications. We can identify at many sites their specific defensive strat-

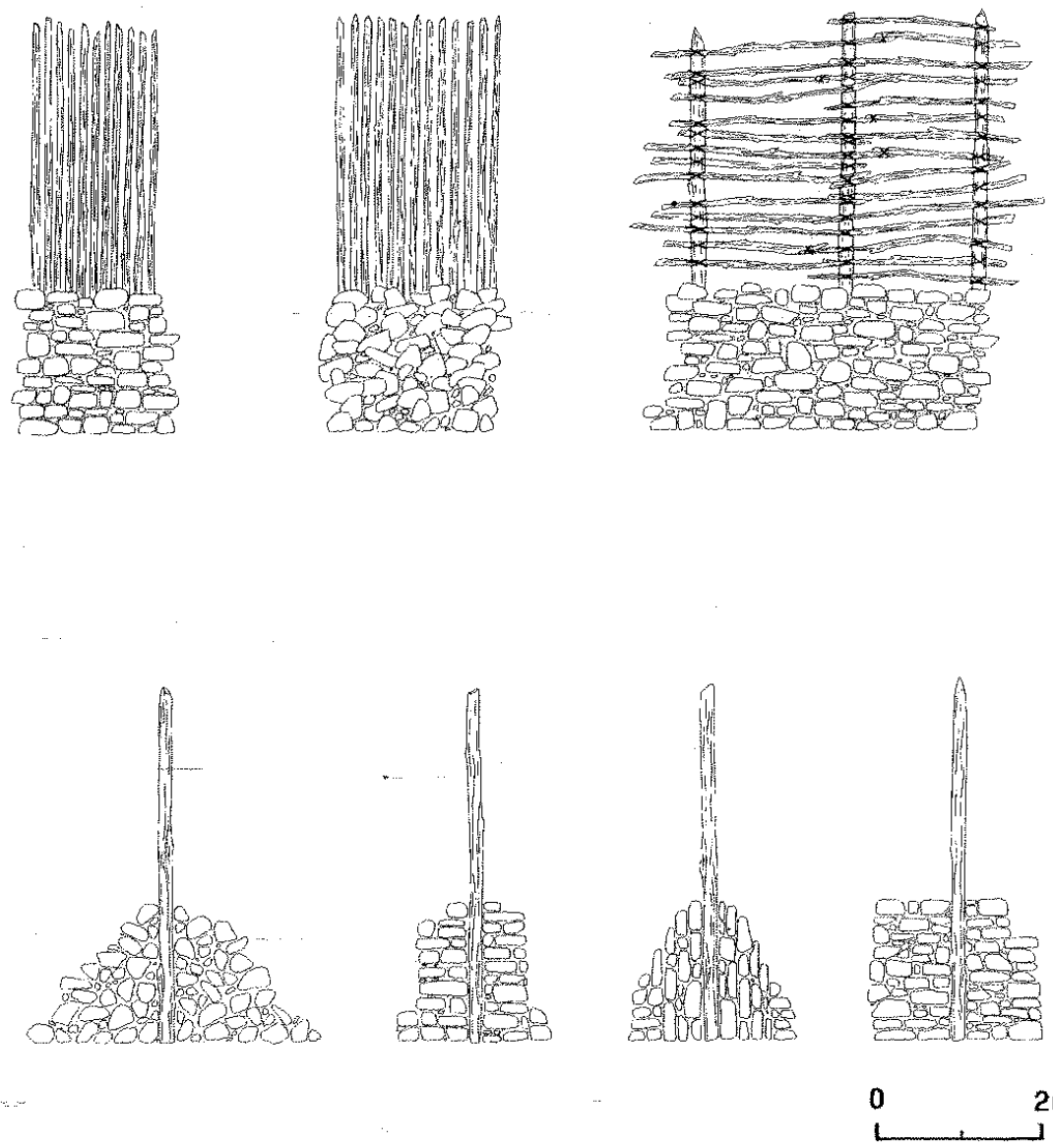

Figure 2. Top, frontal views of defensive base walls and palisade types; bottom, cross sections of defensive walls showing masonry types (drawn by L. F. Luin, courtesy Vanderbilt University Press).

DOS PILAS WEST PLAZA GROUP FORTIFICATIONS

The walls of the Plaza Group at Dos Pilas were the first excavated by the project and the most thoroughly explored. First noted by Vinson (1960) and Graham (1967), the walls were later mapped by Boyd Dixon and Stephen Houston (Houston 1987; Houston and Mathews 1985). Clearly visible on the site surface were two concentric rings of fortifications. The Vanderbilt project in 1989, 1990, and 1994 excavated over 60 units into these walls, including intersecting trenches, horizontal exposures, individual units, and excavation of special features (Brandon 1992:67–70; Demarest 1989, 1990; Demarest, Lopez, Chatham, Emery, Palka, Morgan, and Escobedo 1991:208–241; Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995; Escobedo et al. 1990:227–333; Inomata, Escobedo, and Demarest 1990:205–224; Palka 1991:123–137, 1995; Rodas 1995:251–255; Symonds et al. 1990). The two concentric wall systems form irregular nested rectangles with rounded corners. The outer wall is over 600 m in length, and the inner wall is just over 500 m long. The rectangles were laid out as if according to some rigid scheme running over existing architecture and bisecting a number of range structures and palaces (see Figures 1 and 5; Palka 1997:Figure 1). In some areas the placement of walls seems less than ideal in relation to the natural topography.

These defensive walls at Dos Pilas now stand only 1–1.3 m high and are about 1 m wide, as most have been damaged by treefall and root action in the dense stand of cedar and mahogany rainforest that covers this area. Much of the remaining standing masonry is of finely carved blocks stacked without mortar (see Figure 3). The quality of the neat masonry blocks of many parts of this wall system is due to the dismantling and looting of structure stones and stone facades from the palaces and temples around the west plaza. Several of the structures of the royal palace (structures L5-33, L5-34, L5-35, L5-37) were leveled to provide cut masonry blocks that could be stacked quickly into walls around the base of the palisades. The funerary temple of Dos Pilas Ruler 2 (Structure L5-1), parts of a ballcourt, and other structures were also stripped of large sections of their stone facades. Specific blocks found in the defensive walls could be traced to adjacent structures. For example, blocks from Hieroglyphic Stairway 3 on Structure L5-25 were discovered by suboperation DP28D reused as wall blocks in the defensive base wall nearby (Demarest, Lopez, Chatham, Emery,

Figure 3. Photo of a segment of remaining defensive base wall masonry at Dos Pilas (height 1.3 m).

Palkā, Morgan, and Escobedo 1991:227–232). Restored to their original step on the hieroglyphic stairway, the wall blocks allowed a reading of this important inscription on wars between Dos Pilas and the enigmatic "Ik" site.

Three well-defined gateways were excavated by the project, one in the outer wall and two leading into the inner enclosure. Two of the entrances were simple, angled openings that may have held wooden gates, but no perishable evidence was preserved. A third gate in the inner wall had an attached small, walled platform, which possibly served as some type of gatehouse or control point. One gateway in the outer wall gave entrance into a "killing alley" formed by defensive walls built over the leveled structures of a royal palace (see Figure 5). Here, as throughout the West Group defensive complex, the defensive walls were 20–30 m apart. Thus the alley between them could be subjected to a deadly rain of heavy-headed throwing spears or other projectiles hurled by defenders on or behind the inner wall (Palka 1995:85–86). In various operations in the West Plaza area we discovered caches and scatters of such spear points. In one extensive excavation, DP2G, Rodas (1995) found an area just behind the inner wall with evidence that defenders were casually retouching projectile points. Other confirmatory evidence includes a cache pit excavated just beyond the outer defensive walls that was filled with skulls of adult males who had been decapitated while still fleshed—presumably sacrificed captive warriors (Johnston et al. 1989).

Within the two sets of walls around the West Plaza was an area of about 4 ha densely packed with crude, very low platforms with associated midden lenses. This impoverished village filled the great plaza of the West Group, the former ritual and political center of the site. Excavations were carried out in this anomalous occupation over six seasons of the project (Demarest 1990; Emery et al. 1992; Foias and Brandon 1992; Palka 1991, 1992, 1995; Palka

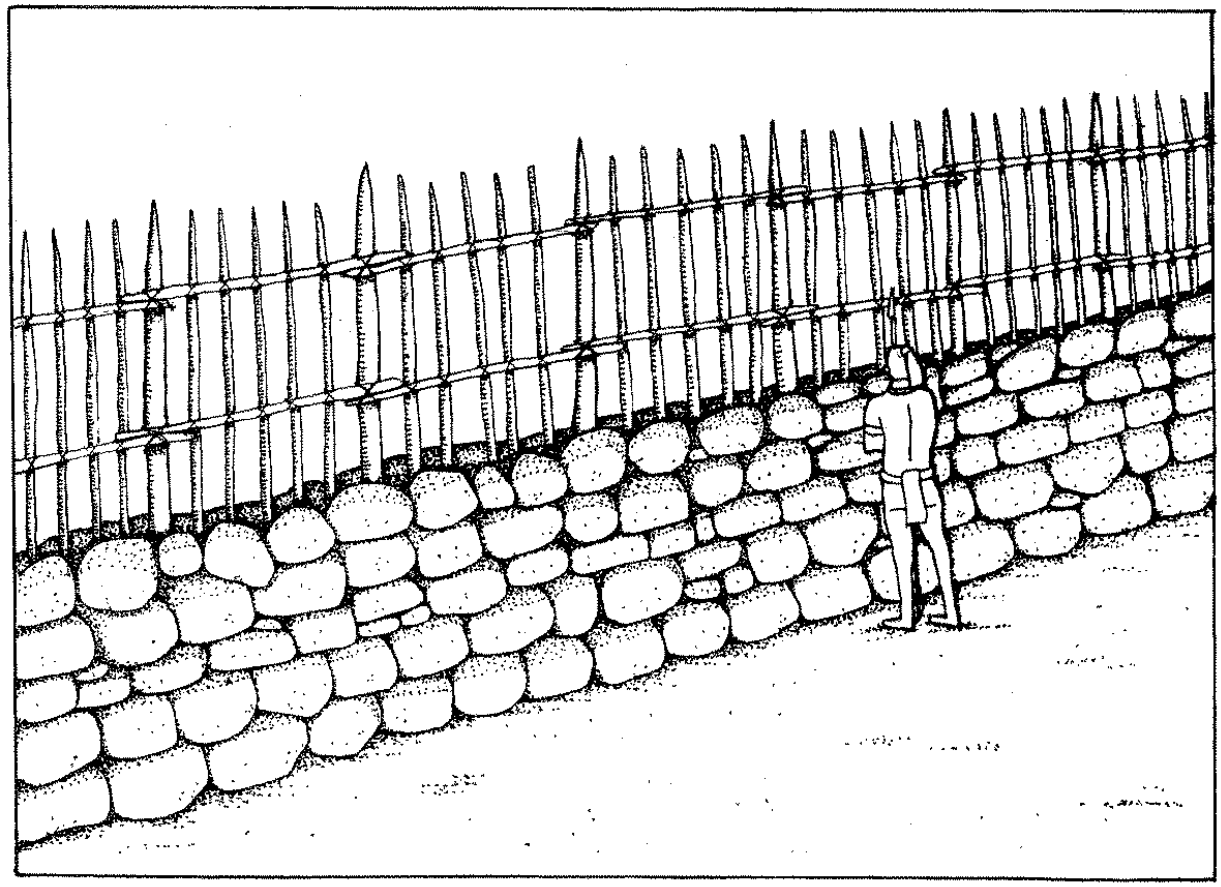

Figure 4. Reconstruction of a typical Petexbatun defensive wall and palisade system (drawn by Jodi Johnson, courtesy Vanderbilt University Press).

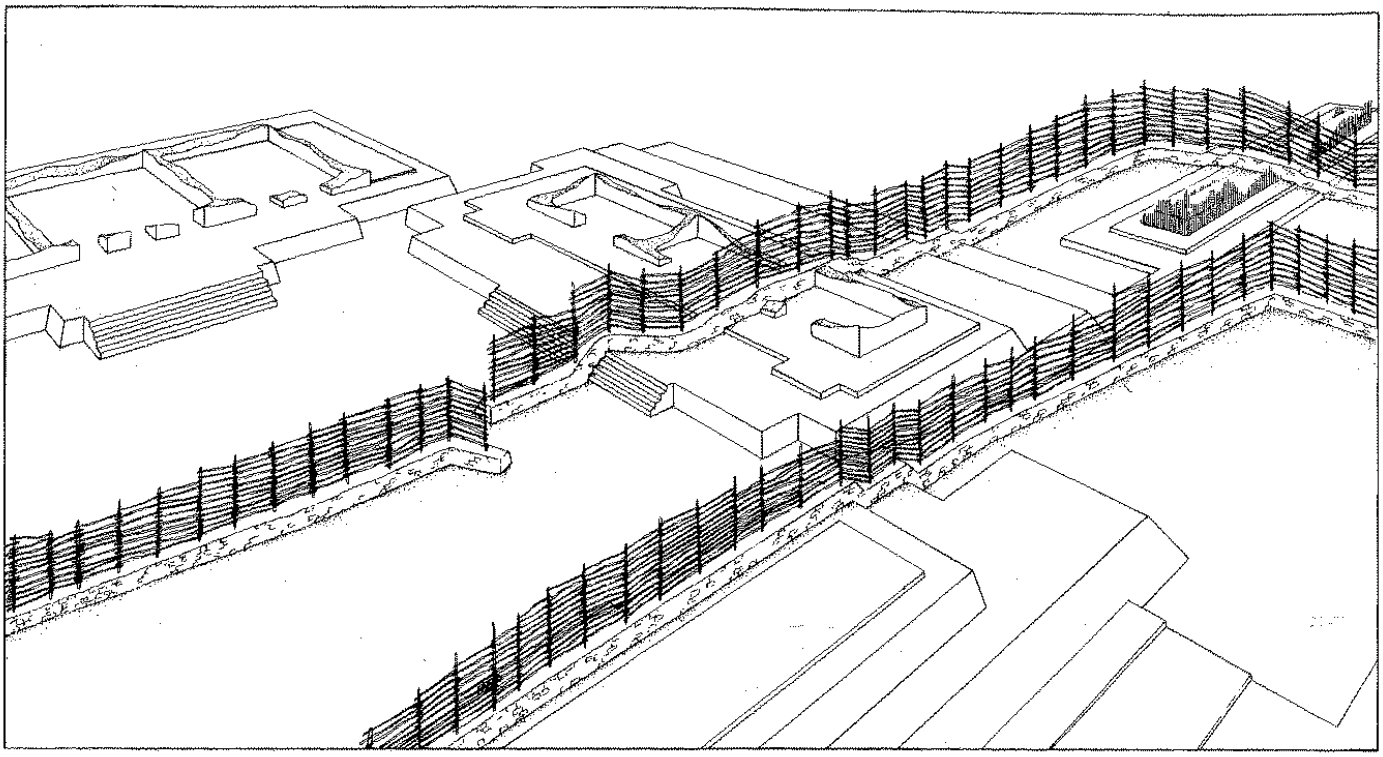

Figure 5. An example of Dos Pilas fortifications with gate and "killing alley" construction running over the former royal palace of Ruler 1 and Hieroglyphic Stairway 4 (drawn by L. F. Luin, courtesy Vanderbilt University Press).

and Foias 1991; Palka et al. 1989; Rodas 1995). Judging from the very shallow refuse lenses and the ceramic evidence, the plaza occupation was brief. Ceramics both within the plaza village and in deposits behind the walls date to the late facet of the Nacimiento phase (A.D. 760–830) including sherds of Chablekel Fine Gray Ware cross-dating to A.D. 750–850 in the Palenque region. Vessel fragments of Dos Pilas Volcanic Brown Ware date to this same period with diagnostic decorative modes and forms. Peten-style polychrome sherds are rare. The ceramic evidence and the superimposition of walls over dated architecture and monuments demonstrate that the wall system and its enclosed village were built in the period just after the end of the construction of public architecture at Dos Pilas at A.D. 761.

One obvious possible interpretation of the evidence is that this crude dense village within the defensive walls was the occupation of a besieged and reduced population of the site. The timing of Dos Pilas wall construction, monument and architecture cessation, the plaza village, and the beginnings of defensive systems elsewhere all correspond to a series of epigraphically described events that include the defeat of Ruler 4 of Dos Pilas and the end of that center's political control of the Petexbatun region (Houston 1987, 1993; Mathews and Willey 1991). While the epigraphic record is subject to varying interpretations (Demarest 1997; Escobedo 1997), archaeological and historical evidence concur that the region was "balkanized" after A.D. 761 into competing political centers engaged in a struggle to replace the lord of Dos Pilas as the dominant power in the Petexbatun.

THE EL DUENDE FORTIFICATIONS

Less than a kilometer from the West Plaza Group of Dos Pilas rises an enormous temple complex known as El Duende (Structure P5-7). Excavations of the temple and associated terraces directed by Escobedo (1992; Escobedo et al. 1990) revealed that the 70-m-high complex was built by modifying the natural terraces and outcrops of a hill. After the political collapse of Dos Pilas as a royal capital in A.D. 761, this naturally defensible and highly sacred area became a second fortified complex with the construction of three concentric palisade systems around the three high terraces of the pyramid compound (Figure 6).

Again, the concentric base walls vary in height from less than half a meter (over areas with architectural fill for footing) to unmortared masonry of up to 1.5 m in height. Original base wall heights were probably about 1.5–2.0 m. As seen in the schematic (see Figure 6), only low palisades would have been needed here, as the steep terraces of the complex itself provided highly defensible ramparts. The outermost wall around a wide, deep terrace south of the temple had a well-defined baffled gateway formed by overlapping walls, leaving a narrow 1-m-wide corridor between them as a highly restricted entrance to the walled terrace (Escobedo 1992; Escobedo et al. 1992). The inner wall to the south also included another entranceway with a rectangular attached structure, possibly another control point.

Within this impressive series of defenses an area of 3.5 ha may have protected perishable structures, but we excavated only a few house platforms on these terraces. The structures contained late facet Nacimiento complex artifacts and the same impoverished material culture as found in the West Plaza Group village (Palka 1995; Palka and Moscoso 1992). Again, it would appear that this second major focus of ceremonial architecture at Dos Pilas also became a fortified refuge after its fall as the political capital in A.D. 761. Architectural activity was limited to the defensive walls, low platforms, and some inept re-erection and movement of earlier monumental blocks (Palka 1995). Such activities and occupations are

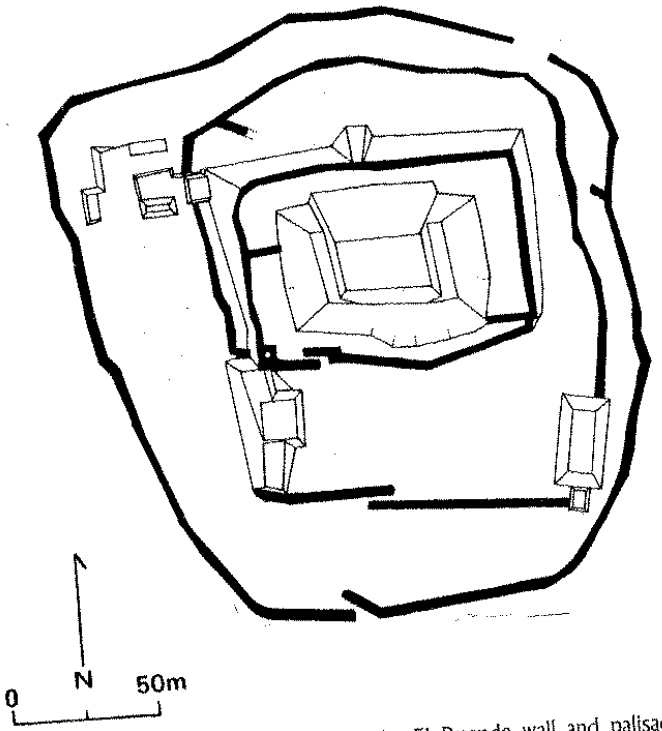

Figure 6. Schematic overhead view of the El Duende wall and palisade systems showing baffled gateways, concentric walls, and defensive use of the 70-m-high temple and terraces.

parallel to Eznab-phase activities and occupations in the last centuries of Tikal's decline (Culbert 1973). Recall, however, that these Petexbatun walled-refuge villages date to over 70 years earlier—long before Fine Orange or other Tepeu 3 diagnostics appear. Here, as elsewhere in the Petexbatun, the processes involved in the collapse phenomenon began much earlier and with clear and violent manifestations.

AGUATECA DEFENSIVE SYSTEM

About 12 km southeast of Dos Pilas rises a steep eroded fragment of the Petexbatun escarpment, bordered to the east by steep cliffs above Lake Aguateca and bisected by a dramatic gorge plunging down as much as 60 m (Demarest 1993). It is a naturally defensible location with fresh springs near its base (Figure 7). While the site was occupied from Preclassic times on, its major occupation, monuments, and public architecture are from the eighth century (Inomata 1997). This fluorescence corresponds to the establishment there in the late seventh or early eighth century of a secondary seat of the royal dynasty of Dos Pilas. The principal seat of power remained at Dos Pilas, as evidenced by the larger scale of public architecture there, its several palaces, and much more numerous and larger monuments. Nonetheless, Rulers 2, 3, and 4 of Dos Pilas and their courts probably resided some of the time at the royal palace at Aguateca with its naturally defensible location and direct access to Lake Petexbatun and the water routes that connected their growing hegemony. As their alliances expanded, such access and security may have become more important, and they may have spent more time at the Aguateca palace, although such details are not accessible from the brief monumental inscriptions.

In any case, after A.D. 761, Ruler 4 was driven from power at Dos Pilas, that site's political dominance and public constructions ended, and population declined. At Aguateca, however, the dynasty continued, claiming to be the true ruling lords of the Petexbatun region. The historical details of this period are confusing, because several centers claim the title of heir to the Dos Pilas dynasty (Houston 1993; Inomata 1997; Mathews and Willey 1991; Schele 1995). The archaeological evidence is very clear, however, that the period after A.D. 761 is one of intensive conflict between these rivals and that Aguateca became a besieged and massively defended royal center. The continuation of its elite occupation from A.D. 761 to at least A.D. 800 may be attributed to its defensive position, which was superior to that of the ill-fated royal seat of Dos Pilas. The natural defensibility of Aguateca's location may have allowed for somewhat more gradual construction of its walls and other defenses.

The Vanderbilt Petexbatun Project excavations at Aguateca from 1990 to 1994 emphasized mapping and test excavations in the defensive works. Details of excavations, maps, and other features have been presented in our preliminary reports (Demarest 1990; Demarest et al. 1989, 1991; Demarest, Suasnavar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995; Inomata et al. 1991, 1993; Inomata, Symonds, Beekman, and Houston 1990) and in Inomata's (1995) Ph.D. dissertation. Later, Inomata's Vanderbilt project excavations and ongoing research shifted to systematic horizontal excavations of elite residences and artifact distributions (Inomata 1997). The Aguateca fortifications system remains the site's most impressive and telling feature. Since Graham's mapping of the Aguateca walls 30 years ago (Graham 1967), they have been a source of debate on Maya warfare and an indication that it was a more central aspect of Maya society than previously believed (Adams 1977:153–156; Adams and Hammond 1982:508–509; Demarest 1978; Smith 1982:222; Weaver 1972:190; Webster 1976). The Vanderbilt Petexbatun Project investigations were able to associate these fortifications specifically with the region's internal political strife and the endemic warfare there in the eighth century.

The Aguateca defenses concentrically encircle the site in three major nested wall systems (see Figure 7; also see Inomata 1997:Figures 2, 3, and 5). These extensive walls and palisades held the high ground from attack from the north, south, and west. The eastern flank of the site was unassailable because of its natural protection by sheer stone cliffs over 30 m high above the waters of Lake Petexbatun. The outermost encircling walls run for several kilometers and enclose a second inner concentric defensive wall system. Then, finally, the innermost defenses utilized the great natural gorge that isolates the epicenter of the site, its royal palace, and its elite residences. The gorge defenses were additionally reinforced with walls and palisades running along the chasm edge. Walls also shield the natural bridge that crosses the gorge and connects the core epicenter with the rest of the site to the west (Figure 8). Rectangular protecting wall enclosures at some narrow points in the gorge (see Figure 7; also Inomata 1997:Figure 3) also suggest that perishable, probably removable, bridges linked the epicenter to the site and that the bridges may have been carefully protected from surprise assault by these walled enclosures.

Other defensive wall systems further shielded the area of the royal palace from the natural bridge entrance to the epicenter. These seem to have provided several final levels of interior defense almost in the manner of the innermost nested defensives in Iron Age or very early medieval Europe. The defensive system even included a range of walls running east to provide access to a natural

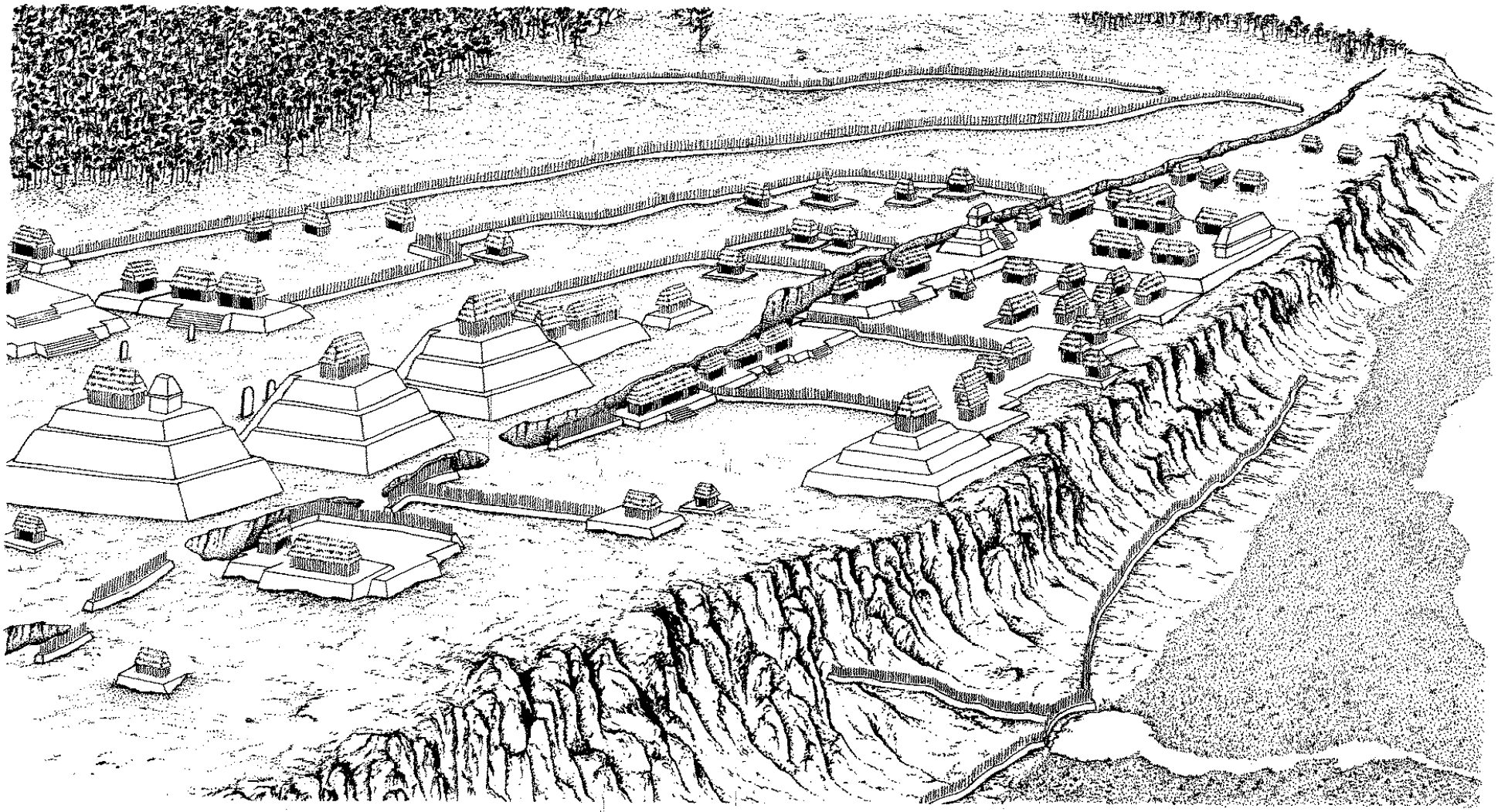

Figure 7. Overview of Aguateca defenses showing natural cliffs, gorge through site, and defensive walls surrounding the center, bordering the gorge, and protecting access to the site's spring (drawn by L. F. Luin, courtesy Vanderbilt University Press).

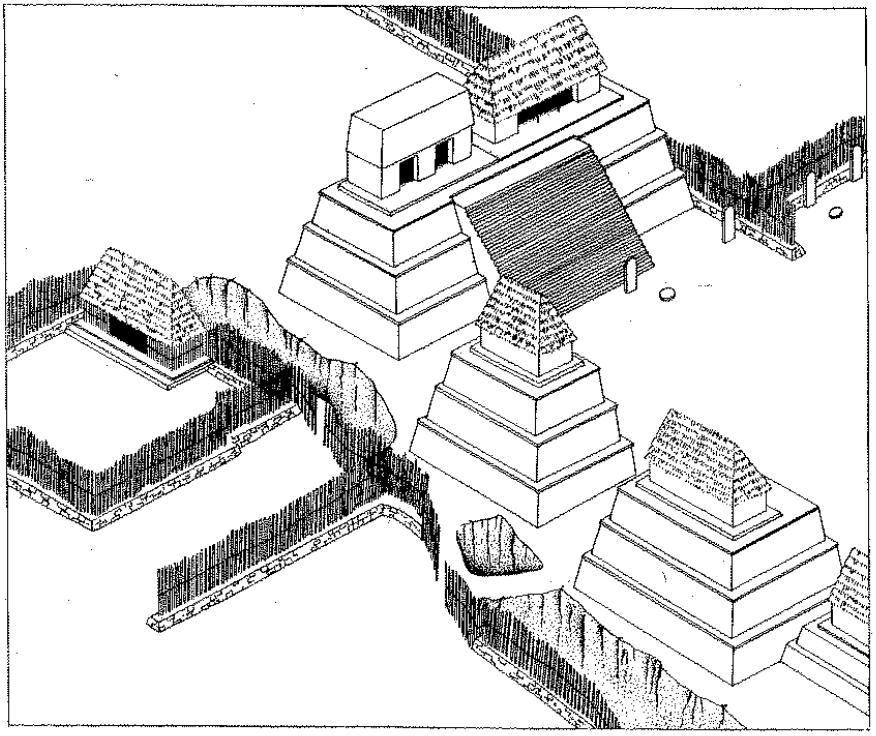

Figure 8. Close-up of a portion of the Aguateca defensive system showing walls, palisades, and gates along the gorge, protecting a natural bridge entrance to the royal palace zone (drawn by L. F. Luin, courtesy Vanderbilt University Press).

spring as a water source for the besieged center (see Figure 7; also Inomata 1997:Figure 3). In all, over 4 km of defensive walls have been mapped and explored, and we believe that palisades without base walls may have extended far beyond this.

Details of defensive wall construction at Aguateca differ from Dos Pilas, again indicating more careful planning and construction. Unlike Dos Pilas, walls were not made from masonry ripped from nearby architecture, but were of rough cut stone blocks of limestone. Nor do walls at Aguateca run over earlier buildings as at Dos Pilas. Masonry was carefully and effectively constructed without mortar or with simple mud mortar that has since dissolved. The absence of mortar made dating difficult, but recovered sherds were of Late Classic types. However, the placement and abutment of walls against architecture in many loci date the entire defensive system to a period after the construction of most residential and ceremonial architecture at the site in the mid-to-late eighth century. Both because of the higher quality of construction and circumstances of preservation, many masonry walls at Aguateca remain standing to somewhat greater heights than at Dos Pilas, and some may originally have stood as high as 2 m and nearly 1.5 m wide. Masonry construction here also included use of vertical slabs with internal fill in defensive walls, as in other aspects of construction (see Figures 2 and 15).

Weaknesses in the fortifications are apparent and may relate to the ultimate demise of the center. The outermost system of walls ends in the northwest corner of the site in flat terrain. This may be due to a judgment that this outermost defensive ring was unnecessary or could indicate that wall construction in this area was prematurely terminated by the fall of the center. A more certain flaw in the defenses is that the great natural gorge—the linchpin of the system—is very narrow at several points (only 5 m wide), and enemies could have crossed it relatively easily by placing logs across it. This weakness may have been a fatal one, since it appears that the center fell suddenly with extensive burning of buildings near these narrow points in the gorge (Inomata 1997). What we had believed to be an imaginative *National Geographic* reconstruction painting of such a scenario (Demarest 1993:107) later was demonstrated to be a realistic possibility by the subsequent discovery by our excavations of the burned epicenter of the site. In this issue, Inomata (1997) describes the evidence from this final moment of Aguateca's fall to its enemies. He believes that the fall was so rapid that in situ artifact distributions in the elite residences of the epicenter provide new insights into Maya household organization.

THE PUNTA DE CHIMINO DEFENSES

The most massive, and the most successful, defensive system in the Petexbatun was discovered in 1989 by Instituto de Antropología e Historia archaeologists near the small site of Punta de Chimino. There, a peninsula projects into Lake Petexbatun in a strategic position to control the center of the region and water routes to the south to Aguateca and beyond and to the north to Seibal and the Pasión River. Instituto archaeologists discovered a great artificial moat at the base of this peninsula. Given the modest size of the site, we were surprised when our own initial surveys demonstrated not just one, but three, moat and wall systems built across the long narrow neck of the Punta de Chimino peninsula (Figure 9).

Beginning in 1989, we shifted considerable resources to explore this complex defensive system, its function, dating, and culture-historical associations. In 1989, the site was mapped by Takeshi Inomata (Inomata et al. 1989). In 1990, 1991, 1994, and 1996, excavations into the defensive earthworks and moats were directed by Arthur Demarest and Claudia Wolley (Demarest 1995; Demarest, Sears, and Rasmussen 1994; Velásquez 1993; Wolley 1991, 1993; Wolley and Wright 1990; Wolley et al. 1991). In 1996, a new project directed by Demarest and Escobedo returned to the site to sample thoroughly all areas; excavate residences, elite ar-

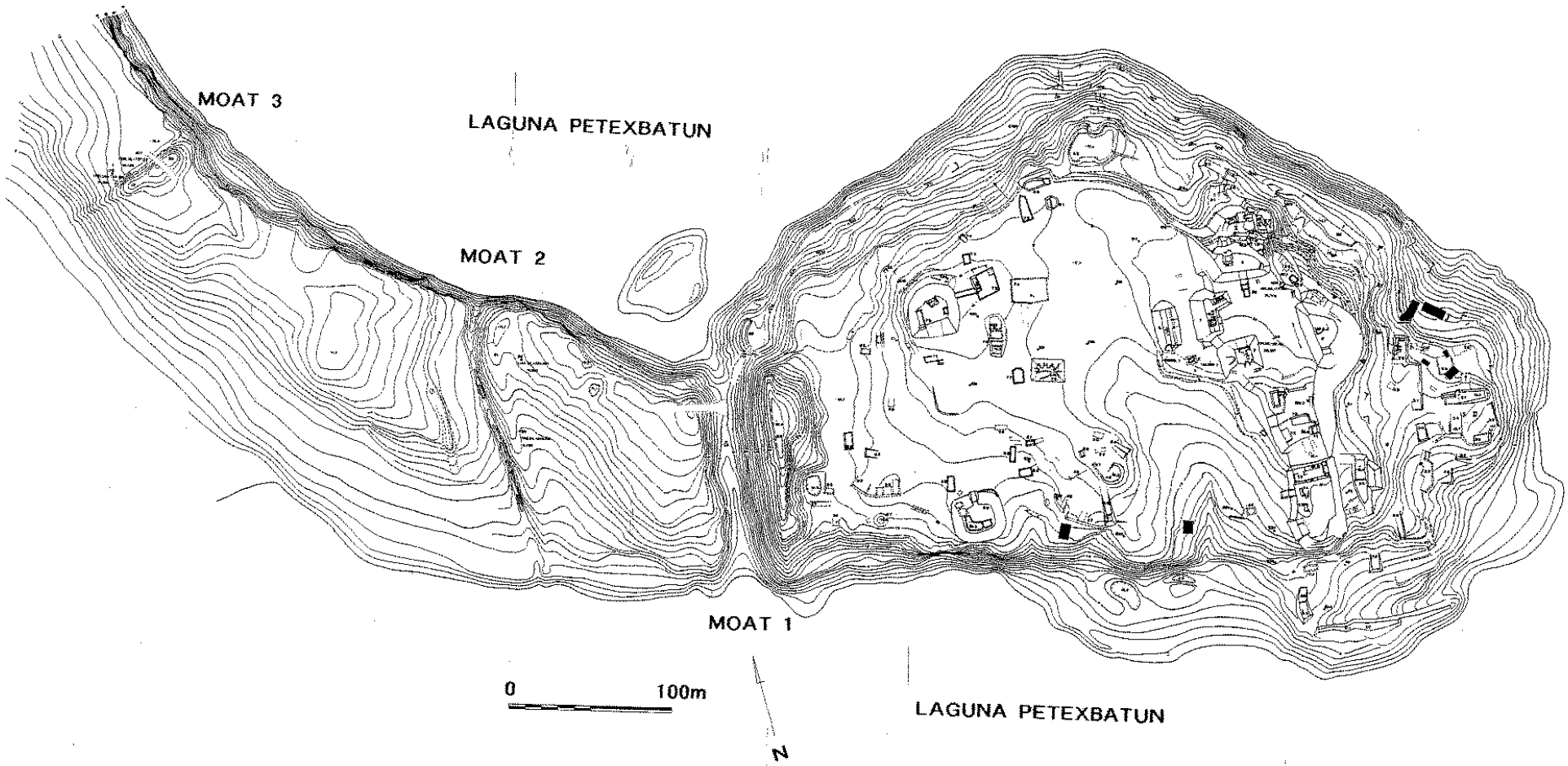

Figure 9. Map of Punta de Chimino showing contours of two of the moat and wall systems and the "island" epicenter (from Inomata et al 1989:Figure 6.2; courtesy Vanderbilt University Press).

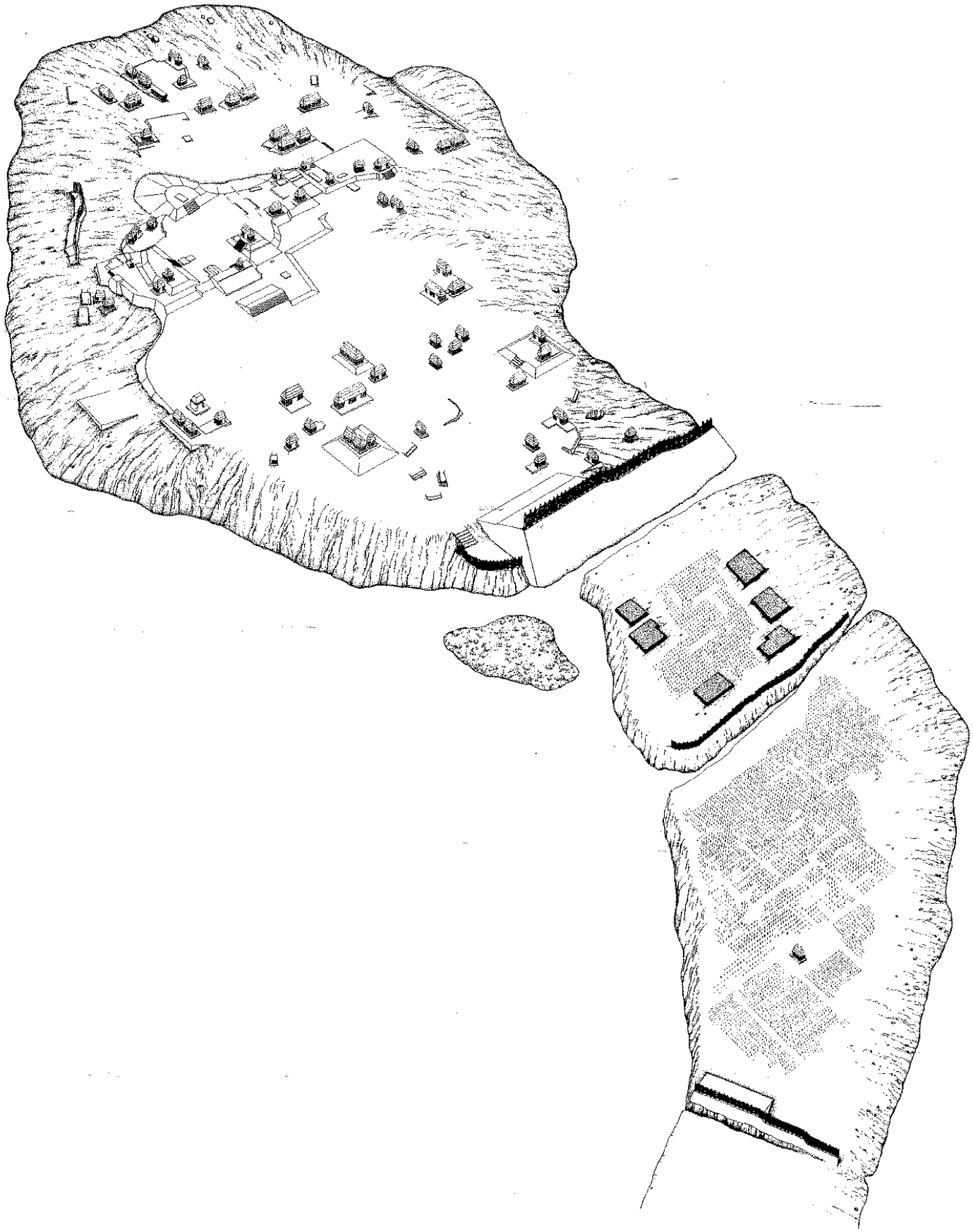

Figure 10. Perspective reconstruction of the Punta de Chimino epicenter showing the three moat and wall systems and protected zones of agricultural production (drawn by L. F. Luin, courtesy Vanderbilt University Press).

chitecture, and field systems; and complete extensive ecological studies (Demarest and Escobedo 1997, ed. 1997; Escobedo 1997; Quezada et al. 1997). The site is now the most completely sampled in the region, and we can understand its long history and its cleverly integrated defensive and ecological adaptations. We can also understand why such a small center may have played a critical role in Petexbatun culture history.

The site epicenter was naturally defensible given the long narrow neck of peninsula ending in a bulbous high remnant of the limestone escarpment. The innermost and largest moat and wall system completely cut off the wide end of the peninsula from the mainland (Figures 9 and 10). The innermost moat is over 9 m deep, and the waters of the lake continue to flow through it. Wall fall has filled in the moat to some extent; it may originally have been over 12 m in depth. This moat was hewn into the soft, weathered limestone bedrock of the peninsula. On the inner (eastern) side of the moat, the excavated limestone was piled and pounded into a compact, 8-m-high wall apparently surmounted by a wooden palisade. Together the moat, wall, and palisade system formed a barrier well over 20 m high and turned the site epicenter into an impregnable island fortress (Figures 10 and 11).

Excavations in the innermost wall by Wolley (Wolley and Wright 1990) exposed a clear, large posthole (Figure 12). This was a rare find in the disturbed soils and loose fills of the area, made possible here by the unusually compact fill of the innermost wall at Punta de Chimino. The massive form of the posthole and apparent spacing indicated that wall form here was like that shown in frontal view in Figures 2 and 4, with heavy, widely spaced posts supporting lighter cross bars. Recovered ceramics date construction of the system to the late facet of the Nacimiento phase (A.D. 760–830) with possible continued use into the Terminal Classic Sepens phase in the ninth century.

Our investigations from 1990 to 1996 cut trenches 20–25 m long through each of the three defensive perimeters cross-sectioning

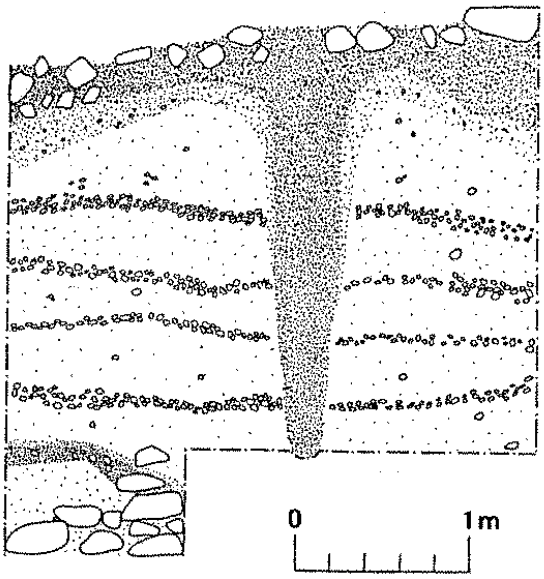

Figure 12. A posthole in Punta de Chimino moat/defensive wall (from Wolley and Wright 1990:Figure 21.6).

the inner walls, the wide moats, and the outer surface of each system (Demarest 1995; Demarest, Sears, and Rasmussen 1995; Wolley 1991; Wolley and Wright 1990). Two trench cross sections of the second wall system and one through the third moat and wall exposed careful construction (Figures 13 and 14) to form effective outer defenses and protection for food-production zones that lay within the site's defensive system (see Figures 10 and 11). The second moat was 3–4 m deep surmounted by a 1.5–2-m-high wall made of large, rough-cut limestone masonry blocks retaining soil, clay, and pebble fill suitable to support wooden palisades (see Figure 13). This second moat and its wall are 180 m long, again completely cutting off the neck of the peninsula.

The area between the first and second moats (Zone b in Figure 11) was excavated in 1996 (Demarest and Escobedo 1997; Quezada et al. 1997) and was found to have many one-to-two course, low terrace walls forming possible box terraces (see Figure 10). Preliminary phosphate fractionation tests on soils here and the presence of these features suggests that this "no man's land" in the defensive perimeter may have been used for intensive gardening to support the epicenter nearby (Demarest and Escobedo 1997; Dunning 1991, 1993; Dunning and Beach 1994, personal communications 1994–1996; Dunning et al. 1991).

Farther inland, the peninsula neck narrows as it joins the mainland. Here a 90-m moat and wall system forms the last barrier yet found. The moat here is surmounted by a well-constructed wall with solid masonry courses still standing to 1.5 m (see Figure 13, top). Original wall height was probably 2 m and, again, it is likely that these supported a palisade (see Figure 13, bottom). The zone between the second and third moats was also nearly devoid of construction, with only one house platform in the center of the area (Zone c on Figure 11). Again, we may speculate that this area served not only as a defensive perimeter, but also for growing crops between and even during the attacks that necessitated the construction of the system.

The Punta de Chimino defensive system was not only the most massive, but was also the most effectively designed in terms of

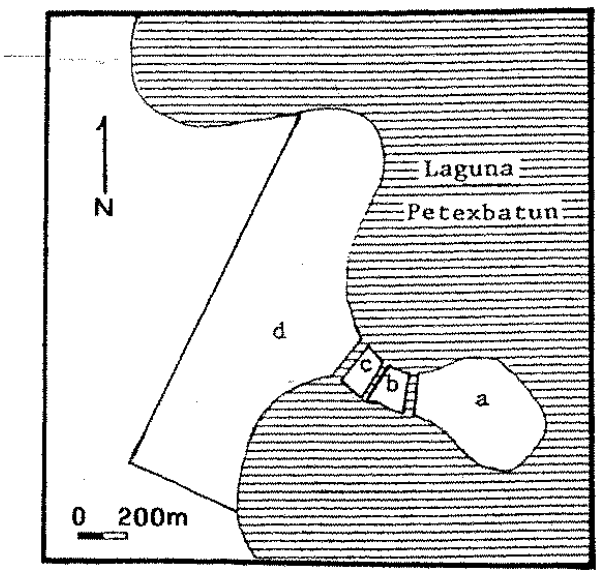

Figure 11. Schematic map of Punta de Chimino peninsula showing moats and Zone a (epicenter), Zones b and c (protected food-production zones), and Zone d (mainland agricultural zone) (after Demarest, Sears, and Rasmussen 1995:Figure 41.1).

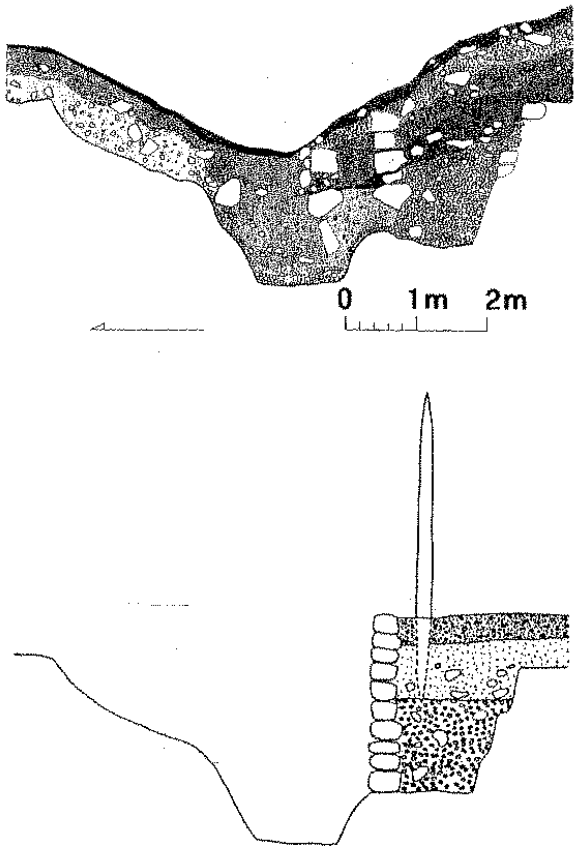

Figure 13. Top, profile of an excavation trench across the Moat 2 defenses (from Wolley 1991:Figure 34.13); bottom, reconstruction of original moat and wall form (drawing by Jodi Johnson).

access to food and water. It faces inland toward Tamarindito, a larger center and the probable major aggressor in the region after its defeat of Dos Pilas in A.D. 761. Initially we were puzzled by the scale of the defenses at Punta de Chimino. Explanation was provided by our excavation there of a walled portage, a large ballcourt, many rich burials, elite residential compounds, and middens bearing the highest proportion of imports in the region including polychromes, fine-paste wares, and most of the Petexbatun region's Pachuca green obsidian (Demarest 1995; Demarest and Escobedo 1997; Escobedo 1997; Morgan 1995a, 1995b; Quezada et al. 1997; Wolley 1991). The position of this peninsula in controlling lake trade explains both its wealth and its strategic value. As described above (Demarest 1997), these same geographical advantages, enhanced by brilliant earthworks and moats, help explain why Punta de Chimino was the only major center to survive the endemic warfare of the A.D. 760–830 period.

THE QUIM CHI HILAN DEFENSIVE SYSTEM

The small village of Quim Chi Hilan sits on the high escarpment perched above the cliffs midway between Aguateca and Punta de Chimino (see Demarest 1997:Figure 2). It is a small site of fewer than 30 house platforms and was probably—for at least part of its history—a satellite community affiliated with Aguateca to the south. Its importance is for methodology and interpretation of features; meticulous excavations here by Van Tuerenhout recovered remarkably well-preserved evidence of details of wall and palisade construction (Van Tuerenhout 1996; Van Tuerenhout and Verhagen 1992; Van Tuerenhout et al. 1993, 1994).

The wall at Quim Chi Hilan still stands to about 1 m, but originally probably rose higher. The wall construction with a 2 m width and original height of 1.5 to 2 m would have been, however, more than sufficient to foot wooden palisade posts securely to form an effective barrier. The wall runs 150 m west from the escarpment cliffs. Then it turns south–southwest for 650 m until it again intersects the escarpment cliffs, enclosing a protected area of nearly 10 ha. Only 6 house platforms lie within the wall, and the other 23 lie beyond. The wall's primary function, however, may not have been to protect its small population of 100–200 people. Rather the presence of agricultural slope terraces inside the walled area suggests that one function may have been to protect intensive food-production areas (Dunning and Beach 1994:57; Van Tuerenhout 1996). Such production zones may have helped to feed the embattled elites at nearby Aguateca. The walls here also may have provided an outer defensive buffer for Aguateca itself. Wall construction at Quim Chi Hilan is in Aguateca style, with use of high vertical slabs for base courses (see Figure 15; cf. Inomata 1997; Van Tuerenhout 1996).

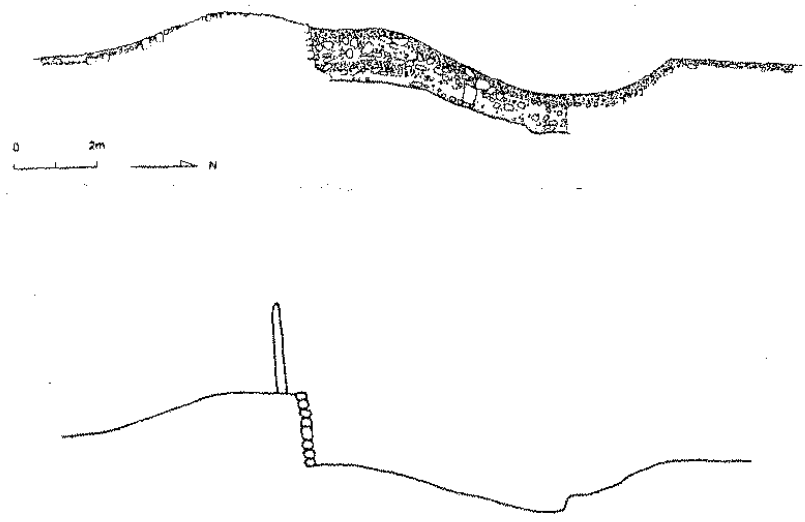

Figure 14. Top, profile of an excavation trench across the Moat 3 defensive system (from Demarest, Sears, and Rasmussen 1995:Figure 41.3; bottom, reconstruction of original form of wall and moat.

The findings that give Quim Chi Hilan further importance include a particularly well-preserved baffled gateway (Figure 15). Burned wattle-and-daub fragments here also preserved impressions of wooden palisades (Van Tuerenhout 1996:130–172). This evidence and five trenches through the walls confirmed their defensive function and the specific details of their palisade and gateway form. Artifacts recovered by the excavations date the walls to the end of the Classic period. They also indicate that this area was abandoned after A.D. 800 presumably when Aguateca, the great center to its south, was overrun and burned (Inomata 1995, 1997; Van Tuerenhout 1996).

HILLTOP VILLAGE FORTS AND RURAL DEFENSIVE SYSTEMS

These most physically unimpressive discoveries of the Petexbatun Project may also have been its most important from a processual, theoretical, or culture-historical perspective. The mapping and excavations of defensive walls at Dos Pilas, Aguateca, and Punta de Chimino made us sensitive to the nature of Petexbatun fortification systems. Subsequently, in 1991–1996, project members at various sites, and especially on the Intersite Survey and Aguateca subprojects, discovered numerous small, well-fortified hilltop occupations. Quim Chi Hilan described above was the first of these to be discovered (Inomata, Symonds, Beerman, and Houston 1990; Killion et al. 1991). Then reconnaissances near Aguateca discovered and mapped a nearby, massively fortified hilltop at Cerro de Cheyo (Inomata 1991). Subsequently project surveys and transects discovered defensive walls around many rural sites and in strategic locations near major resources or infrastructural investments (Demarest and Valdés 1993, 1994, 1995a, 1995b; Demarest, O'Mansky, Hinton, Suasnávar, and Rasmussen 1995; Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995; Inomata and Stiver 1993; O'Mansky and Wheat 1997; O'Manksy et al. 1995; Suasnávar 1995; Valdés and Demarest 1993; Wolley 1995).

Intersite and village defensive systems were variable in form and function. A prime example of a strategically placed village fortification was Quim Chi Hilan, which may have protected terraces and other nearby intensive agricultural systems. In other areas, wall systems across steep gorge bottoms were discovered (Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995; Wolley 1995). These allowed the occupants of nearby hill forts to control movement between steep karst hills and to defend springs. On a larger scale, walls running downhill east from Aguateca protected access to the adjacent springs (Inomata 1995, 1997:Figures 2 and 3). Other wall systems defined true forts with a purely military function such as Cerro de Cheyo, described later. Finally, most of the hilltop defensive systems utilized the naturally defensible karst hills and towers supplemented by wall and palisade systems to protect small villages. These could be used as refuges in times of war and would be safe from surprise attacks in what must have been uneasy intervals of peace.

Cerro de Cheyo

Cerro de Cheyo is a massively fortified steep hill less than a kilometer southwest of Aguateca (Figure 16). A 500-m-long wall encircles the steep hilltop. Eight small structure platforms lie atop the hill, but the site is dominated by Structure 1, a single massive

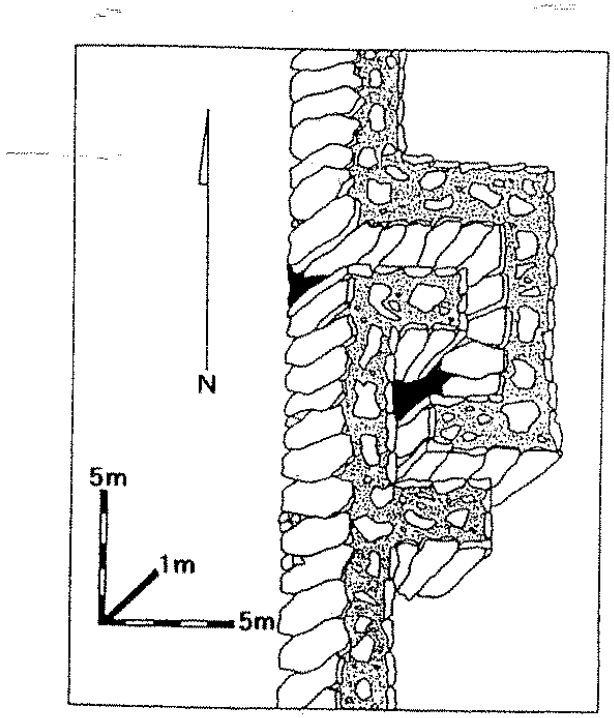

Figure 15. Perspective view of base wall of a baffled gateway in the Quim Chi Hilan defensive system (from Van Tuerenhout 1996:Figure 5.10).

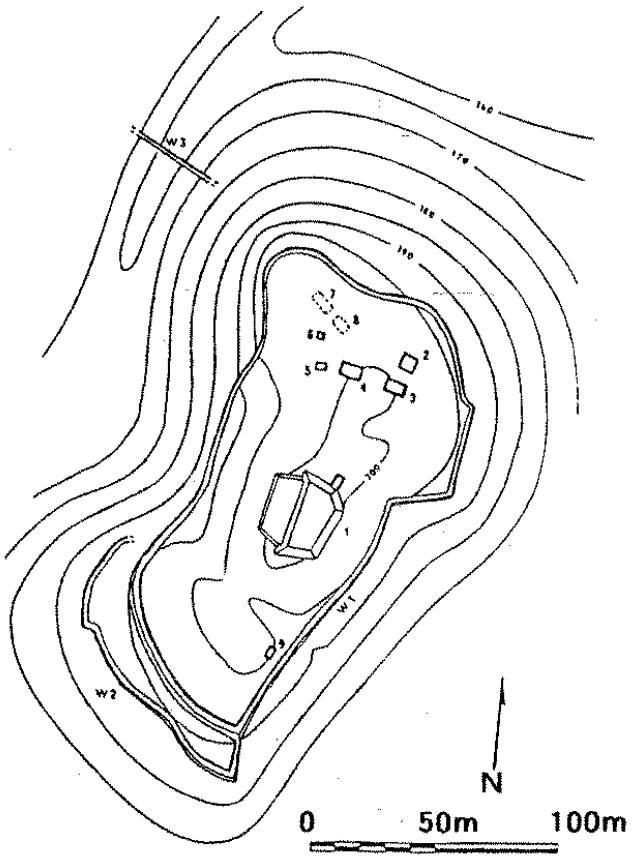

Figure 16. Map of base wall defenses of Cerro de Cheyo hilltop fortress (from Inomata 1995:Figure 4.8).

platform 4 m high and 30 × 35 m in area (Inomata 1991). Excavations there directed by José Suasnávar demonstrated a nonresidential function for this high platform and uncovered atop it a shallow burial of a young adult male buried with bound hands, most likely a sacrificed war captive (Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995). Unlike most of the small walled villages in the region, the fortifications around Cerro de Cheyo were built of massive, well-constructed masonry. On the north side of the site where the slope drops, steeply forming a broken cliff face, the defensive walls were only about 1.5 m high. As the walls curve around to the less steep and more vulnerable south, they rise to over 3 m. A second 130-m-long wall on the south defines a narrow corridor, presumably a well-protected entrance into the site (see Figure 16). An additional 40-m-long wall, 1.5–2 m high, crosses the gorge below the site, and it could have given the defenders at Cheyo further control of this narrow steep pass with its access to springs and to Aguateca farther north.

Suasnávar's excavations (Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995) revealed little local population to justify this massive defensive system. He confirmed earlier speculations (Inomata and Stiver 1993) that it was most likely a purely strategic fort, a garrison post, associated with Aguateca and defending the perimeter and water sources of that site. Of course, the affiliations of such hilltop fortresses probably shifted toward the end of the eighth century, as Aguateca's enemies closed in upon the last remnants of the Petexbatun dynasty there. Recovered artifacts were datable to the eight century.

Cerro de Bananas

Cerro de Bananas, the next steep "karst tower," lies less than a half kilometer northwest of Cheyo. The village atop this steep hill has 36 Late Classic house platforms, 14 of which lie within a 235-m-long wall that rings the hilltop. About 1 m of crude masonry still stands of this wall, and we presume that this supported a palisade of the type found at Quim Chi Hilan. A 20-m-long extension west from this main wall enclosed an additional 4 houses, perhaps accommodating later population growth. This site appears to be a true village occupation at a time in Petexbatun history when peasant populations were forced by the warfare of the time to occupy such defensible locations and to enclose parts of their sites within walls and palisades.

A pair of parallel, rough masonry walls runs between Cerro de Bananas and Cerro de Cheyo and other points south. The walls currently stand to less than a meter, but may have originally stood to twice that height. Excavations there in 1994 (Wolley 1995) discovered a small narrow opening (1 m wide) in the very center of this wall, probably a gateway closed by a wooden gate of the type found at Quim Chi Hilan. This double-walled corridor, a typical Petexbatun late-eighth-century feature, formed a killing alley—a highly effective defensive barrier—across the gorge.

Transect 4

Transect 4, explored in 1994 and 1996, resulted from a redirection of the Intersite Settlement Survey Subproject to explore areas deeper inland in the highly eroded karst zone to the west of the high escarpment and lake border of the Petexbatun (see this issue, Demarest 1997: Figure 2). Extensions westward of earlier 200-m-wide transects (Killion et al. 1991; O'Mansky and Wheat 1997; O'Mansky et al. 1995) and this new inland fourth transect penetrated areas of more leached soils and an eroded landscape of hills, valleys, steep karst towers, and gorges. To our surprise, population in this ecologically poor zone was not low—at least not in late Tepeu 2 (locally Nacimiento complex) times. Instead, the intersite survey team discovered a fairly high level of population, but with almost all of it densely clustered atop defensible hilltops or even steeper, sheer karst towers (Figure 17).

Site placement and surrounding walls consistently show that by the late eighth century defensibility had become the sole determining factor in settlement. This locational logic contrasts sharply with settlement patterns in Late Preclassic through Tepeu 1 times, when access to thick fertile soils, water sources, and transport routes determined the location of major centers like Tamarindito, Arroyo de Piedra, and intersite settlement areas along the edge of Lake Petexbatun (Demarest, Suasnávar, Wolley, O'Mansky, Hinson, Sears, and Rasmussen 1995; Killion et al. 1991; O'Mansky and Wheat 1997; O'Mansky et al. 1995; Van Tuerenhout et al. 1993,

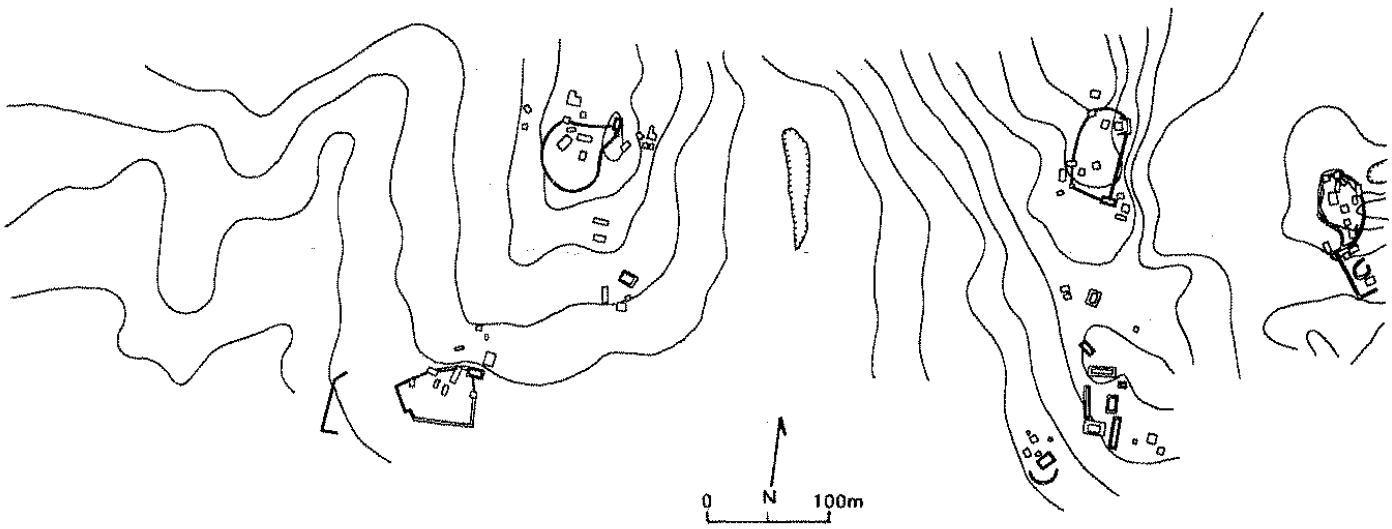

Figure 17. Segment of Transect 4 showing several small hilltop fortified villages (from O'Mansky et al. 1995:Figure 43.4).

1994). As surveys penetrated inland they found other fortified hilltop villages, each encircled by crude masonry base walls still standing to less than a meter in height. These presumably stood higher originally and supported wooden palisades of the type verified elsewhere. A few examples of such villages will show the regional pattern and the late-eighth-century shift to defensibility as the primary locational variable.

Cerro de Mariposas

Cerro de Mariposas (Demarest, O'Mansky, Hinson, Suasnávar, and Rasmussen 1995; Inomata and Stiver 1993) is a Tepeu 2 village of 21 structures that lies at the beginning of Intersite Transect 4 (see Demarest 1997:Figure 2). Ten of these house platforms are ringed by a well-preserved wall that runs for 220 m encircling the site (Figure 18). An opening in its east side with a 5-m-wall barrier shielding it formed a protected gateway (see Figure 18). As shown here in the map and hypothetical reconstruction, 11 small house platforms were outside of the defensive wall. We do not know if houses outside of the walls here and at other walled villages were abandoned during the A.D. 760–830 period of endemic warfare (as shown in Figure 18 and our other reconstructions), or whether such structures continued to be occupied, but relied upon the adjacent palisaded areas as refuges in times of war. These platforms may represent slightly earlier (pre-siege) occupations. It is also possible that they date slightly later and represent an expansion of the hilltop villages at the end of the eighth and in the early ninth centuries. At that time the fall of all major centers and general regional depopulation may have led to a lower levels of conflict in the Petexbatun. Such a speculation is highly probable, but not verifiable, since recovered ceramics and radiocarbon assays now allow us to date the shallow associated middens only to the Nacimiento complex and occasionally more specifically to its late facet (A.D. 760–830) (Demarest, O'Mansky, Hinson, Suasnávar, and Rasmussen 1995).

Cerro de Miguel

Cerro de Miguel (Figure 19) lies atop a hill west of Cerro de Mariposas (O'Mansky et al. 1995). It consists of 14 small Late Classic structures, most of which are clustered within clear defensive walls. Most of the village is located on the northern portion of the hill, where seven structures are densely packed behind a 250-m-long encircling defensive wall. Three platforms were run over by that wall. The wall continues down the upper portion of the southern slope of the hill, enclosing an additional three structures. A single structure is located just west of the defensive walls at Cerro de Miguel and is the lone unfortified structure on the hill. The collapsed remnants of the walls at Miguel measure 1.5–2 m wide and about .5 m high, but presumably stood to a meter and supported a palisade.

Cerro de Yax

Cerro de Yax, also on Intersite Transect 4 (Figure 20), consists of a tightly clustered settlement atop the hill and additional structures on the southern slope (O'Mansky at al. 1995). The northern settlement (Group Y-1) consists of 14 small structures, eight of which are within or run over by a defensive wall that rings the hilltop. Of the six remaining structures, five are part of a pair of patio groups that include those structures passed through by the defensive wall. The southern settlement (Group Y-2) consists of

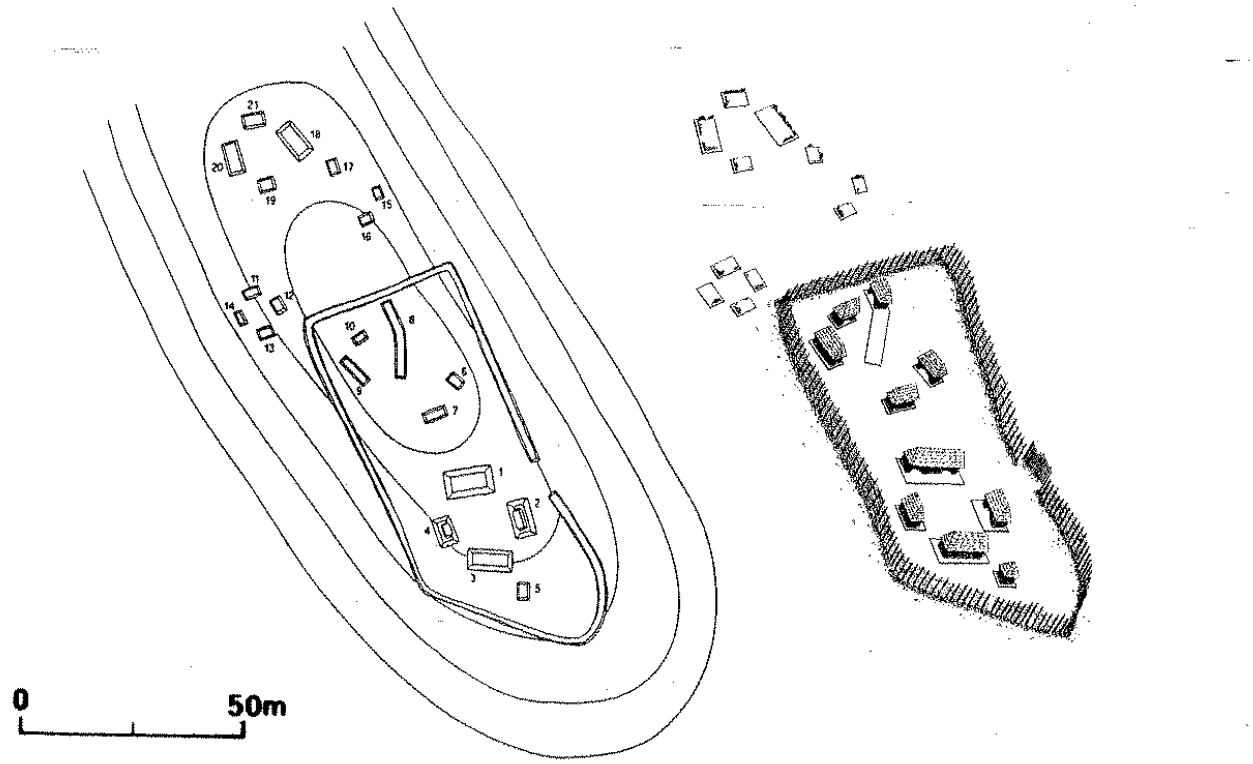

Figure 18. Left, map of Cerro de Mariposa (from Inomata and Stiver 1993:Figure 3.2); right, reconstruction drawing of Cerro de Mariposa walled hilltop village (drawn by L. F. Luin, courtesy Vanderbilt University Press).

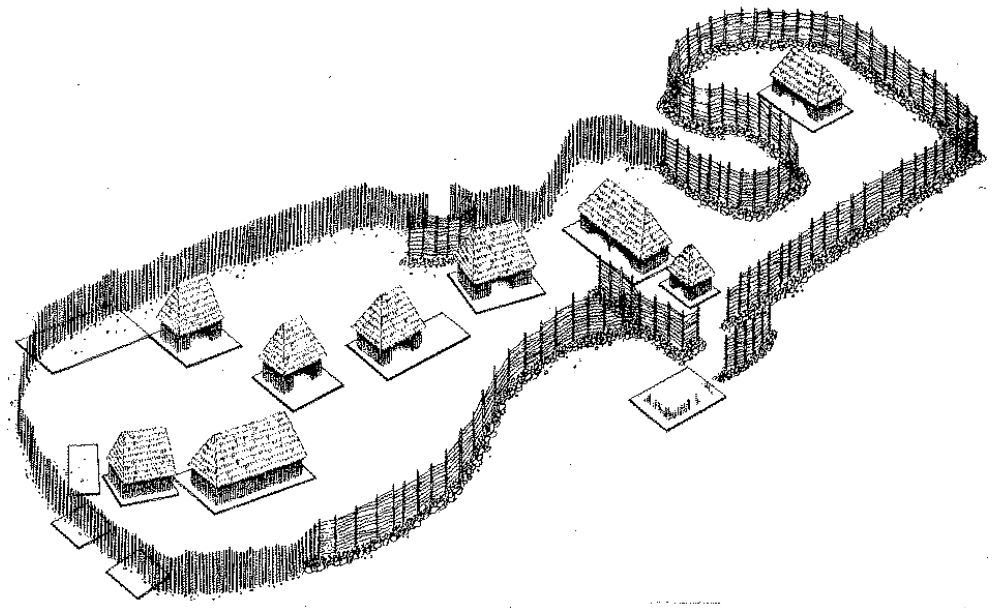

Figure 19. Cerro de Miguel hilltop fortified village (drawn by L. F. Luin, courtesy Vanderbilt University Press).

19 unfortified structures, including the most substantial plaza group on the transect. Our reconstruction drawings here assume that houses outside of the fortifications were not occupied while forts were in use, but this is one of several alternative interpretations. Again, we do not know whether such houses predate or postdate the nearby fortified village or whether only a portion of such settlements were fortified to provide a refuge from attacks. Ceramically, we can only date all structures to the eighth century here. In all cases, it is also equally probable that many of these houses were surrounded by palisades footed into thicker soils or clay that did not need base walls to secure palisades. One wall downhill of all structures appears to be a terrace to hold soils on the steep slope for construction or agriculture (see Figure 17). The collapsed remains of walls at Cerro de Yax, as at Miguel, are now 1.5–2-m-wide heaps standing to only about .5 m. They run for a total of 170 m to encircle the site (see Figure 20).

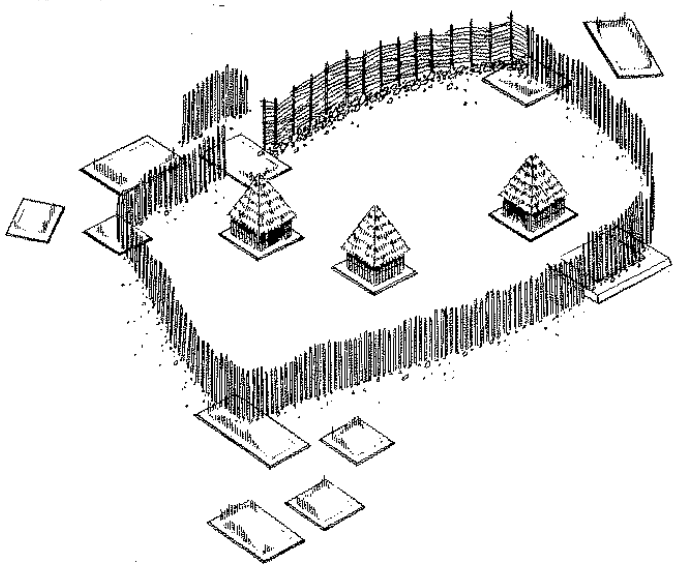

Figure 20. Cerro de Yax fortified hilltop village (drawn by L. F. Luin, courtesy Vanderbilt University Press).

Cerro de Che

Cerro de Che is located 450 m west of Cerro de Yax. Like the other hilltop sites, it consists of walled settlement with additional settlement to the south. The northern settlement includes 21 somewhat dispersed structures and a single defensive wall strategically ringing the top of the hill. Only four structures actually lie within the defensive wall, while three more are connected to it (Figure 21). The remaining 14 structures appear to be unfortified. Again, they also may have been within palisades unsupported by base walls or may have predated or postdated the fortified village within the A.D. 760–830 period. The southern cluster of settlement was designated Group A rather than being considered part of Cerro de Che, because the relationship between the northern and southern settlements is unclear. Group A, consisting of 11 structures and a number of walls, is the only low-lying settlement west of Aguateca. The defensive system surrounding Cerro de Che and the collapsed wall rubble associated with Group A ranged from 1 to 2 m wide and .5 m to 1 m high. The Che walls run for approximately 190 m, and those in Group A total 135 m in length.

By the end of the Petexbatun intersite surveys and excavations in 1996 it was apparent that most naturally defensible hilltops and escarpment positions in the region became loci for small fortified settlements at the end of the eighth century. These tiny hilltop refuges represented the final phase in the political devolution and the disintegration of social and economic order in the Petexbatun. These forts indicate the degree of desperation and the impact on settlement and subsistence caused by the warfare of the last half century of Maya civilization in this region.

DEFENSIBILITY AND DEFENSIVE SYSTEMS AT ARROYO DE PIEDRA, TAMARINDITO, AND SEIBAL

By 1994, the only major sites in the entire Petexbatun region for which we had not discovered fortifications in the late eighth cen-

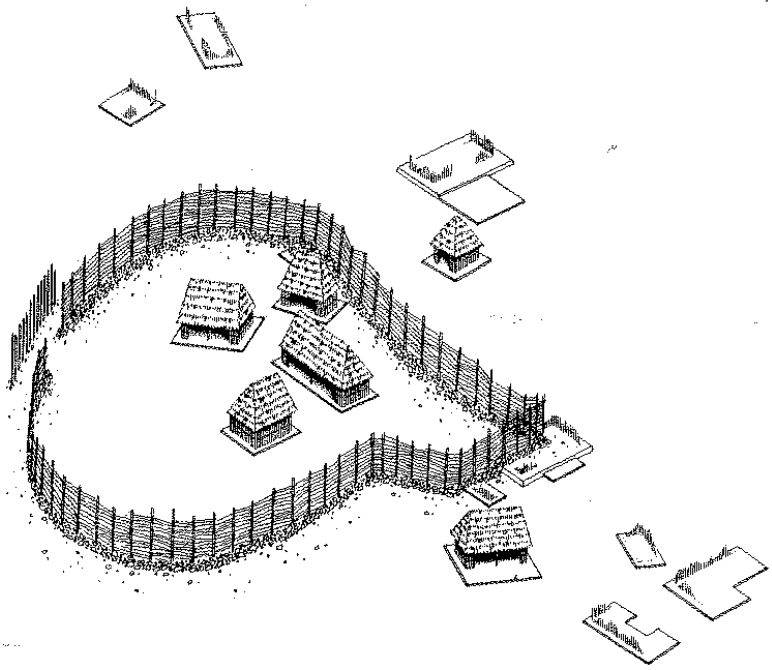

Figure 21. Cerro de Che fortified hilltop village (drawn by L. F. Luin, courtesy Vanderbilt University Press).

tury were Arroyo de Piedra, Seibal, and Tamarindito. Other major centers and many minor centers and villages were fortified and sometimes moated after A.D. 761. The Petexbatun landscape had become similar to that of the very early Middle Ages, with defense being the primary variable for location of villages and major centers. Earlier centers, such as Dos Pilas, which were in indefensible locations were initially fortified, but then were abandoned early in this late-eighth-century violent period. Yet we remained somewhat puzzled about these three major centers that lacked identified fortifications.

In 1994, the Arroyo de Piedra Subproject, directed by Héctor Escobedo, completed extensive studies of all aspects of the archaeology of that center (Escobedo 1997). Settlement surveys in the site perimeter by José Suasnávar (1995) revealed that the site was surrounded with arroyos and swamps, providing natural defensibility from most directions. On its north side he discovered a long, well-preserved defensive wall bordering a natural escarpment to form a defensive barrier (Suasnávar 1995:202–204). It now appears that, as at other sites, the natural positional advantages of the center of Arroyo de Piedra were supplemented by defensive wall systems.

Similarly, Seibal's eighth- and ninth-century major Group A has long been known to have been enclosed by defensive walls (Adams 1963, 1973:93; Artes 1893). Smith (1982:232) also identified these, but expressed some skepticism about their defensive function, because the walls and platforms that enclosed Group A only stood to 1.2 m high. We now know that the original interpretations of Artes (1893) and Adams (1973) were correct, as the system is much like the contemporary defenses at Aguateca and elsewhere. Original walls would have stood higher and could have sustained palisades of the types discovered at Quim Chi Hilan and Punta de Chimino.

The positioning of the entire site of Seibal and the placement of walls takes advantage of a naturally defensible location above steep river bluffs and cliffs. Indeed, its positioning is strikingly similar to that of its contemporary and rival, Aguateca. Seibal project explorers and excavators agreed that the eighth-century epicenter of the site, Group D, was strategically placed above cliffs and ravines that made it another fortress. Smith (1982:232) notes that "Group D, surrounded by steep barrancas, or ravines, is naturally situated for defense, and this potentiality could have been augmented by the various structures that were built along ravine edges in this group. It is most likely that the first defensible section of the site, Group D, was selected for this purpose."

Finally, turning to Tamarindito, we again find a center placed atop extremely steep naturally defensible limestone hills. Valdés (1995, 1997; Valdés et al. 1995) attributed the lack of defensive walls at Tamarindito to its dominant position as the successful aggressor, and the last remaining great center in the A.D. 760–800 period. It should also be noted, however, that the position of the site's two epicenters atop high very steep hills and the placement of its structures formed a daunting defense needing little supplement. The thicker soils of this agriculturally rich center, as well as its architectural platforms, could have sustained supplemental palisades without the need for footing-stone base walls like those at its enemy center of Aguateca, which has virtually no soil above bedrock.

CONCLUSIONS

The evidence from seven years of surveys and excavations in the Petexbatun region has uncovered a remarkable history of warfare in the late eighth and early ninth centuries. In the late eighth-century, political units fragmented sequentially from a regional alliance, to warring centers, to minor sites, to tiny villages. At each stage in this rapid political devolution, fortification and warfare systems proliferated, with a corresponding negative impact on population and on all aspects of political and economic stability. Economic networks and ecological patterns were disrupted by warfare and balkanization (Dunning et al. 1997; Foias and Bishop 1997), and population decreased due to internal disorder, casualties, and emigration (Demarest and Escobedo 1997). The collapse of Maya civilization in most of the Petexbatun region was virtually

complete by the time that centers to the north and east, including Seibal, had just begun their own final century of rapid change and later decline.

Questions of ultimate causality in the general collapse of Classic Maya civilization in the southern lowlands are very complex. They involve pan-Mesoamerican trends, internal structural flaws, elite growth, and elite status rivalry. Specific manifestations of the collapse differ in each region (Demarest 1996b, 1997). Thus, the evidence from the Petexbatun sites will clarify many issues on this longstanding controversy, but the debate will continue. What has been demonstrated, now beyond a doubt, is that Classic Maya civilization in the Petexbatun region collapsed in the late eighth century in a state of endemic siege and fortification warfare—a form of warfare different and more disruptive than the conflicts of earlier periods of Maya civilization. We are only just beginning to explore the implications of this surprising evidence for research on the collapse in other subregions and for the general study of Maya civilization.

RESUMEN

El subproyecto de guerra y sistemas defensivos del Proyecto Arqueológico Petexbatun se llevó a cabo de 1989 a 1996 bajo la dirección de Arthur Demarest. Muchos arqueólogos participaron en el levantamiento topográfico y las excavaciones de las fortificaciones a través de la región Petexbatun. Comenzando en aproximadamente 760 d.C. se construyeron fortificaciones alrededor de todos los centros mayores de Petexbatun. Muros basales de piedra se construyeron a alturas de 1.2 a 2.5 m para cercar y proteger los epicentros de Dos Pilas, El Duende, Aguateca, Punta de Chimino, Arroyo de Piedra y probablemente partes de Seibal. Las evidencias de las excavaciones indican que la mayoría de estos muros también apoyaron palizadas altas. Puertas desviadas, "callejones de matar" y fosos hondos se utilizaron en muchos sitios para reforzar los sistemas defensivos.

A pesar de estas diversas defensas, todos los centros principales de la región fueron abandonados antes de 800 d.C. y algunos tienen evidencias claras de destrucción intencional. Durante este período las poblaciones rurales se albergaron en aldeas empalizadas encima de los cerros. Algunas terrazas de cultivo y fuentes de agua también fueron protegidas por fortificaciones. El impacto destrozador de la guerra y otros factores en el colapso de la civilización clásica de los mayas resultó en el abandono de todos los centros principales y un declive dramático de la población a principios del siglo IX. Cuando aparecieron la cerámica Anaranjado Fino y los otros diagnósticos del complejo Tepeu 3, la región ya estaba abandonada salvo algunas complejos residenciales esparcidos, la fortaleza isleña de Punta de Chimino y, por supuesto, la ocupación enigmática de Seibal del siglo IX al noreste de la región Petexbatun.

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