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Regional Investigations at the Cupul Province Trading Center of Xuenkal: Proyecto Arqueológico Xuenkal

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Culture: Maya
Chronology: Late Preclassic to Terminal Classic
Location: Cupul Region, Yucatán, México
Site: Xuenkal

Table of Contents

Abstract

The urban core of Chichén Itzá has been investigated for more than a century however very few studies have focused on the secondary centers that surround Chichén. One of the principle objectives of the Proyecto Arqueológico Xuenkal is systematic investigation of the political and economic influence of Chichén Itzá from the perspective of Xuenkal, the largest center in the Cupul region. After two field seasons of investigation at Xuenkal, the preliminary settlement patterns suggest the center of the site was more closely affiliated with regional patterns of architecture and settlement than with the reproduction of typical gallery-patio and internal sacbes considered characteristic of Chichén. We present the results of mapping and excavation conducted to date by the Proyecto Arqueológico Xuenkal and our evaluation of the significance of this data for understanding the relationship of Xuenkal to other major centers of the region such as Ek Balam, Izamal, and Chichén Itzá.

Resumen

El centro de Chichén Itzá ha sido investigado por más de un siglo, sin embargo muy pocos estudios se han enfocado en los centros secundarios circundantes. Uno de los principales objetivos del Proyecto Arqueológico Xuenkal es investigar sistemáticamente el grado de influencia política y económica de Chichén Itzá desde la perspectiva de Xuenkal, el mayor asentamiento en la región de Cupul. Después de dos temporadas de investigación en Xuenkal, los patrones preliminares de asentamiento sugieren que el centro se asocia más de cerca con los patrones regionales de formas arquitectónicas y asentamientos, que con la reproducción típica de los grupos de patios, galerías, y los sistemas de sacbe distintivos de Chichén. Presentamos los resultados de mapeo y

excavación llevados a cabo hasta la fecha por el Proyecto Arqueológico Xuenkal y nuestra evaluación del significado de esta información para comprender la relación de Xuenkal con otros centros principales de la región tales como Ek Balam, Izamal, y Chichén Itzá.

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Introduction

Chapter 1: by T. Kam Manahan

The second field season of the Proyecto Arqueológico Xuenkal (PAX) was conducted between June 1 and July 15, 2005. PAX is investigating the ancient Maya center of Xuenkal, located in the center of the state of Yucatán, México. The site is located approximately 40 km northeast of Chichén Itzá and 25 km west of Ek Balam, in the heart of the Cupul region (Figure 1, shown below). During the Terminal Classic, the Cupul region served as an intermediary zone between Chichén Itzá and its principal trading port Isla Cerritos. Xuenkal, situated midway between Chichén Itzá and Isla Cerritos provides an ideal setting to evaluate the impact and extent of Chichén Itzá's control over surrounding regions and to develop a clearer understanding of the nature and degree of Chichén's interregional economic and political integration.

Previous Research

The Atlas survey first recorded the presence of Xuenkal in the late 1970s, when it was recognized to be the largest site in the region north of Chichén Itzá (Garza T. de Gonzalez and Kurjack 1980). Members of the Cupul Survey project in 1988 briefly visited the site, made a sketch map of the core area and collected ceramic material from the ground surface (Andrews *et al.* 1989). Xuenkal was included within an INAH salvage project directed by Rafael Burgos (Burgos *et al.* 2004) undertaken as part of the paving and widening of the highway bisecting the southern edge of the site. The initiation of PAX in 2004 (Ardren and Manahan 2004) represented the first intensive investigation of the site. The site core as well as a sizable amount of the surrounding settlement was systematically surveyed and mapped, and controlled surface collections were made from several of the newly mapped structures.

Photograph 1. The historic arch and ancient settlement of Xuenkal.

PAX05

Building upon the work of the 2004 season, the 2005 season was formulated with three goals in mind:

1) Continue and expand upon survey and mapping of the site to delimit its boundaries and determine the density of rural settlement.

2) Begin to assess the chronological placement of Xuenkal and reconstruct its settlement history through off-mound test excavations.

3) Continue and expand upon the documentation and evaluation of the ecological and environmental significance of the numerous natural depressions (*rejolladas*) in the area by conducting an ethnobotanical survey of modern rejollada use and a botanical survey of both the rejolladas and the general area around the ruins.

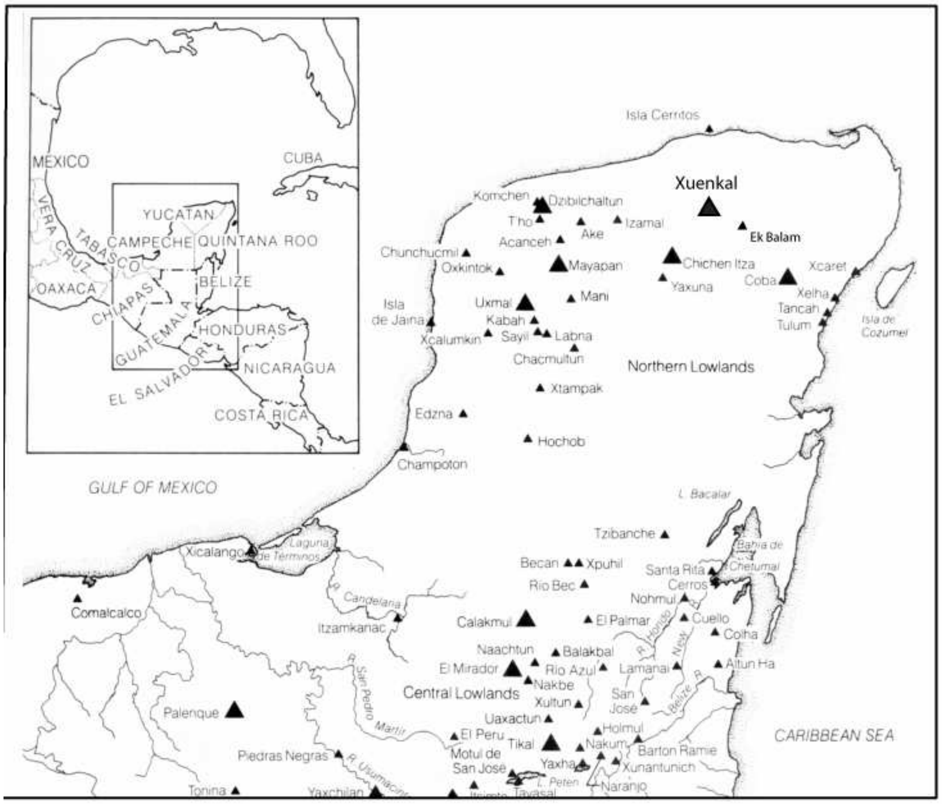

Figure 1. Location of Xuenkal in the Yucatán Peninsula.

In terms of survey and mapping (Chapter 2), the 2005 season focused upon determining site limits, particularly in regard to the eastern and western boundaries. A total of 108 new structures were located, recorded, and mapped in these areas. A second goal was expanding the topographic coverage of the map to reflect the many rejolladas found around the site. In addition to the three rejolladas mapped in 2004, five new rejolladas in the immediate site area were documented and mapped.

The test excavation operations were active for six weeks of the 2005 season. Off-mound test units were excavated using arbitrary 20 cm levels unless natural stratigraphy was encountered, all the way to bedrock, before being backfilled once excavations were finished and the units had been profiled, photographed, and documented. A total of 60 2-x-2 meter units near 47 discrete structures were excavated. This yielded an overall sample of slightly more than 10% of the known structures. The results showed a very strong Sotuta presence at the site, with Sotuta material forming over half of the total ceramic material recovered (Chapter 4). This temporal placement is also supported by both the obsidian data (Chapter 5) and the analysis of chert artifacts (Chapter 6).

Chichén Itzá clearly expressed a substantial influence over the material culture of the site, and judging by the diverse obsidian sources found at Xuenkal (Chapter 5), the site was active in the long-distance trade network that funneled exotic prestige goods into Chichén Itzá. However from what may be determined from the surface, Xuenkal appears to have lacked any of the specialized architecture that continues to be unique to the nearby center such as gallery-patio groups, colonnaded halls, and networks of internal sacbes. While our data are too preliminary to begin to tackle the significance of this important observation, we hope to directly address the issue in the future.

The test excavations also revealed the presence of a robust settlement before the appearance of Sotuta ceramics. Several buildings were associated exclusively with Cehpech ceramics (strongly linked to the Eastern Sphere; see Chapter 4), while many of the monumental buildings (particularly temples) trace their founding to the Early Classic if not back into the Late Preclassic. This finding is echoed not only by the ceramic data, but by the obsidian analysis as well (Chapter 5).

Another goal of the season was to continue documentation of the locally dense concentrations of ground depressions (*rejolladas*). The rejolladas offer abundantly fertile deep, humid soils that were likely exploited in ancient times, perhaps to cultivate cacao. In this regard, an ethnobotanical survey was conducted of the contemporary vegetation found in rejolladas, and contemporary use of the natural features was also documented. Although no wild cacao species were identified, the ethnobotanical research cataloged the biodiversity of the region and documented the extensive contemporary arboriculture practiced within these habitats.

In sum, the 2005 season addressed all research goals through diverse methods. The following chapters detail the methodology and results of this research. While our understanding of Xuenkal's role in the Cupul region and the nature of its interaction with Chichén Itzá is in its infancy, already the two seasons of PAX research have begun to make significant contributions to the study of an often overlooked region of Yucatán.

Survey and Mapping Investigations

Chapter 2: by Justin Lowry

The 2005 season of survey and mapping concentrated on three particular goals. First, the periphery of the site needed to be more fully surveyed and mapped and the boundaries needed better definition. Second, the topographic coverage of the map needed to be expanded to better represent rejolladas and other natural features of the landscape occurring within the site settlement. Lastly, several small pockets near the center that were left unmapped in 2004 needed to be surveyed and mapped. In all, the 2005 season recorded 108 new structures and 5 new rejolladas, adding significantly to the site map (Figure 2, shown below).

Objectives

Three main objectives defined the PAX mapping project in 2005. They all consisted of places where the project felt that more data was needed, and addressed specific questions that had arisen in light of the data from the 2004 field season. The first objective was to verify and ensure that all structures were mapped within the site center as defined on the 2004 map.

An important question that evolved from the 2004 research was the distribution of rejolladas. The potential importance of these topographic features is fully discussed in Chapter 7 of this report. Based on the density of rejolladas around the site, more thorough mapping of these topographic features became another objective for the 2005 season. Location and survey of as many of the rejolladas as possible within the boundaries of the 2005 map and more complete mapping of the ones identified in the 2004 season proceeded throughout the 2005 field season.

Finally, peripheral site settlement also needed to be more completely mapped in order to define the boundaries of the archaeological site. This objective, to map and survey the areas at the edge of settlement, would allow for a more accurate depiction of overall settlement patterns and total site area.

Mapping results in the 2005 season

Each of the three main objectives was systematically approached. We began within the interior of the site map from 2004. Utilizing point data from the previous season we began mapping anything that was missed or incompletely mapped within the bounds of the 2004 map. This internal mapping project refined our understanding of several structures as well as added several new structures. A part of the site to the south was incompletely mapped the year before due to dense brush, but was cleared for milpa in 2005, which allowed for perfect visibility of the surface remains. In this area we added several new structures to the map, and completed documentation of a platform which was only partially mapped in the 2004 season. With the internal mapping complete we moved on to the next two objectives, mapping the rejolladas and expanding the current map to extend well past the original 500 meter by 500 meter grid.

The second and third objectives were approached at the same time, so that we could map off the same circuits, ensuring accuracy and co-registration. Mapping was divided into two areas, the east and the west, for logistical reasons. The mapping of the periphery and rejolladas began on the western side of the site. Using the cement datum from 2004, we extended the grid 250 meters to the west. Transects were conducted every 20 meters off our grid and were surveyed for complete coverage. This additional transect mapping uncovered 82 new structures, mostly small and low lying, including the structures which were mapped to the south in the newly cleared milpa. Very few platforms were found on either the western or eastern mapping sections. On the western side of the site we found and mapped three new rejolladas. They were relatively small, but many of the new structures we found were around the edges of these rejolladas.

For the eastern side we began at another datum and extended the grid 250 meters to the east, where we surveyed in a similar fashion. The mapping on the eastern side only afforded us a look at one new rejollada, which was large. On this side of the site we improved the coordinates for the rejollada directly east of the palace, as well as other topography in that area. Architecture was mapped in a similar way and showed similar patterns to the western side of the site; lower, small structures spaced farther apart, with some clustering near the rejolladas. On the eastern side of the site, we mapped a total of 26 new structures.

Discussion

Our first objective, to find and map any missing elements of the 2004 coverage area, was very successful. We located and mapped missing topography as well as corrected the few mistakes and added much to the central part of the map. The more complete data on rejolladas collected this season allows for a clearer picture of the landscape directly associated with Xuenkal. These four new rejolladas cover more area than was previously thought, which lends credence to the interpretation of rejolladas as places for intensive agricultural production. Their association within the site with small groups of low lying structures may suggest that these rejolladas had caretakers, or that the edges of these features were preferred places for settlement.

The final map from the 2005 season shows a marked decline in settlement density in all areas mapped near the periphery. This suggests the edge of settlement, or more specifically, the edge of stone architecture for the site. Although we acknowledge the possibility of "invisible" settlement or outlying perishable structures, and will address these possibilities in the planned 2006 field season, at this point in time the results from surveying suggest that the settlement is concentrated within an area approximately 1000 m wide from east to west and 500 meters long from north to south, making the settlement limits approximately 100 percent greater than shown on the 2004 map. Actual mapped areas with architecture extend beyond the boundaries of the grid almost 100 meters to the east, west and north and 300 meters to the south. This gives the visible archaeological site of Xuenkal a total area of roughly 1 km^2.

Further mapping will focus on small areas that need to be improved roughly 250 m north and south of our present map. They will likely show the same drop off in settlement found in the eastern and western areas during the 2005 field season, but they still should be further mapped.

Using regional survey techniques such as GPS mapping would allow data to be collected to connect our map of Xuenkal to the ancient site of Espita on a broader regional perspective. In addition, there are other smaller but well preserved sites in the vicinity of Xuenkal that are important to add into a semi-regional scale map using GPS mapping techniques.

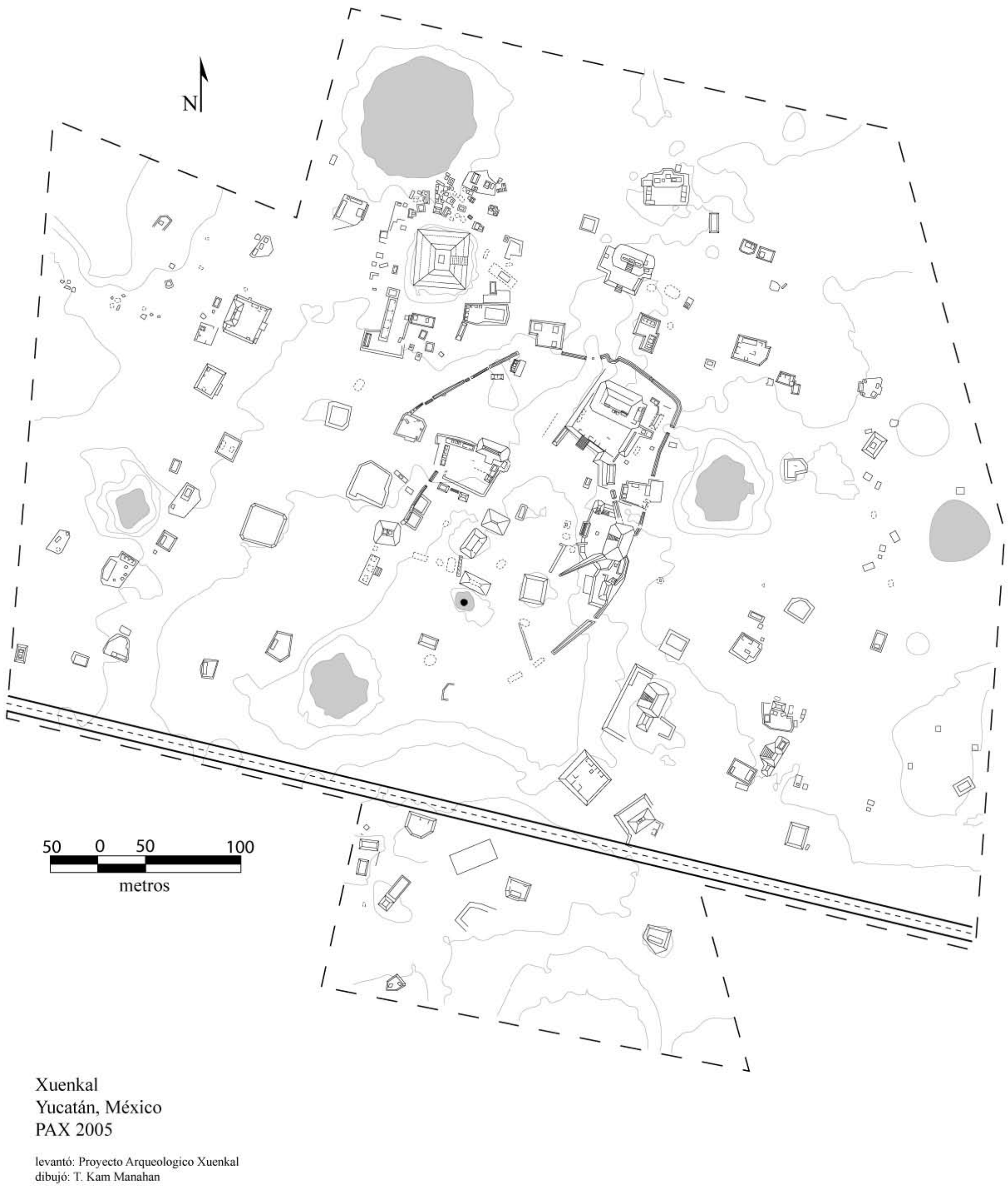

Figure 2. Ancient Settlement of Xuenkal. Grey areas denote *rejolladas* and black area marks cenote. 2m contour intervals.

Test Unit Excavations

Chapter 3: by T. Kam Manahan

In order to gather a diachronic sample of the history of occupation at Xuenkal, a program of off-mound test excavations was devised. Detailed summaries of each test excavation are available in the 2005 field report (Manahan and Ardren 2006). In this chapter data from the excavations has been synthesized with much of the ceramic data to present both the archaeological data as well as the available chronological information recovered via excavation.

Test Pit Methodology

Structures to be tested were chosen according to several criteria. The goal for test pitting was to gain a sufficient sample size from each tested structure to develop a preliminary chronology of the history of human habitation at Xuenkal. Thus a purposive sample, rather than a strictly random sample, was chosen to ensure that as broad a range of structure sizes and locations were investigated as possible. Furthermore, all units were excavated to bedrock (unless otherwise noted) to ensure that no earlier periods of occupation were overlooked. In total, 47 structures were chosen from the 413 structures that are currently mapped, yielding an overall sample size of 11%. A total of 60 off-mound test pits were excavated between June 8 and July 16 (Figure 3, shown below). Additional test pits were placed on structures where feasible in order to increase the sample size of artifacts encountered from each structure.

The hierarchical categorization scheme employed deserves a bit of explanation in order to clarify how it works and how the test pits are organized. The methodology employed correlated the level of operation with groups, so that each group of settlement that was tested has its own operation number (Figure 4, shown below). The suboperation number within each operation corresponds to individual structures within the group. If multiple test units (TP) were excavated near the same structure, they shared a suboperation number. Thus each structure investigated was labeled with a unique suboperation number within the operation.

Excavation of the test pits followed a standardized methodology to allow for easy comparisons between units and structures. All excavation units measured 2-x-2 meters (except for TP 55 which measured 1.5 x 1.5 m) and were excavated in arbitrary 20 cm levels unless a natural change in stratigraphy was encountered before reaching the end of the level. Units were placed off the structures but close enough to the buildings to catch any artifact-rich midden or collapse debris deposits. The particular spot on each building chosen took into account features visible on the surface as well as the vegetation. The units were oriented to each structure's orientation and then grid north was measured with a compass. Each level of each unit received a unique lot number and all artifacts were bagged separately. Details about each lot's location, association, physical context, depositional and cultural context, and a summary of artifacts recovered were recorded on a standardized form. Furthermore, each level was photographed in digital and black-and-white film, usually from two different angles, and each unit was photographed before the excavation commenced. Where collapse debris or other features were encountered, they were photographed and drawn in plan before being removed. Each test pit was excavated by two workmen using hand tools and all dirt was screened through 1 cm mesh. All excavation units were overseen by PAX staff at all times. Artifacts were divided in the field by material type and processed separately in the lab. When a unit reached bedrock, the profile was drawn and photographed and then the unit was promptly backfilled. All units were backfilled before Hurricane Emily passed over the area July 19th.

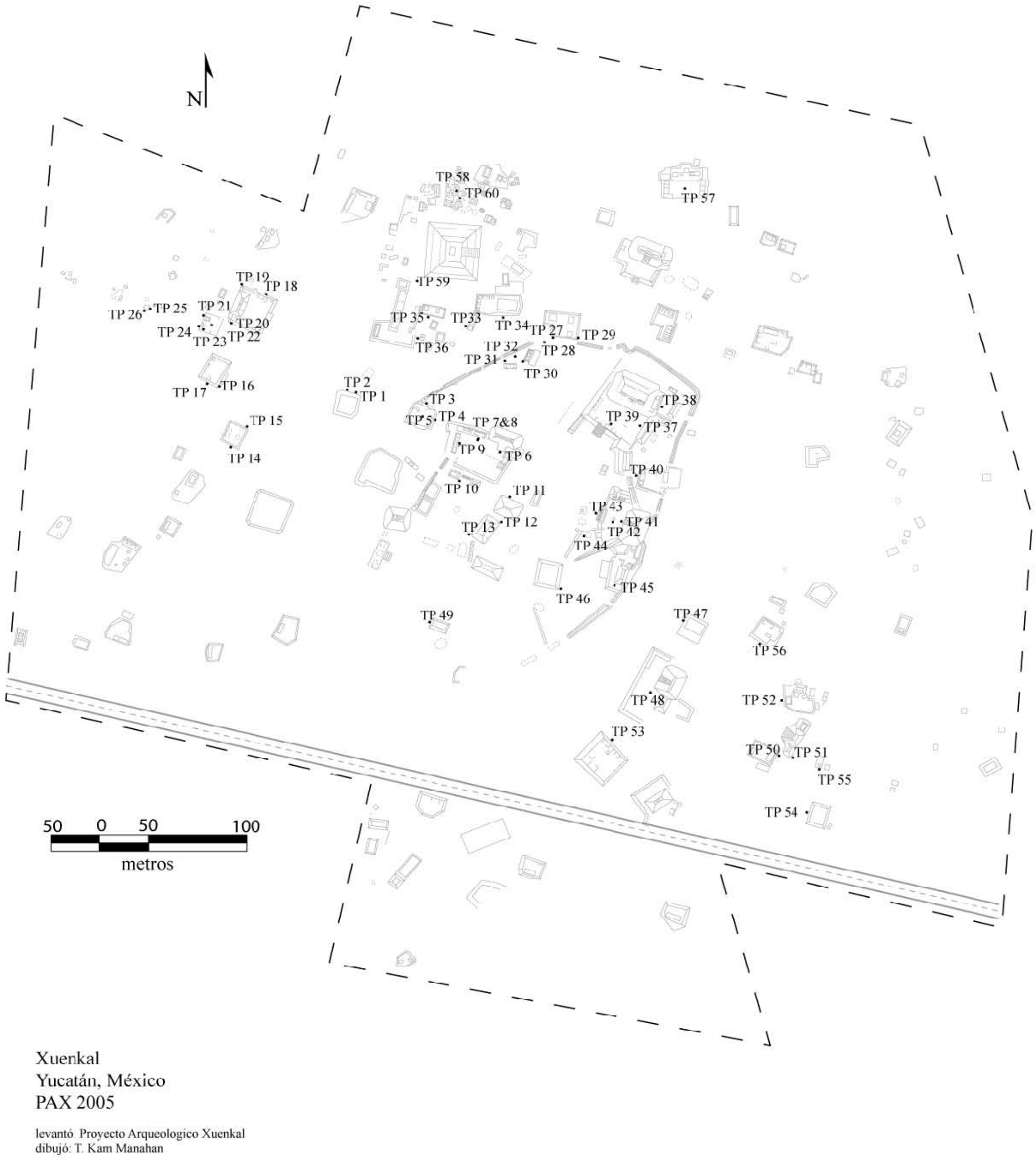

Figure 3. Locations of test pits excavated in 2005.

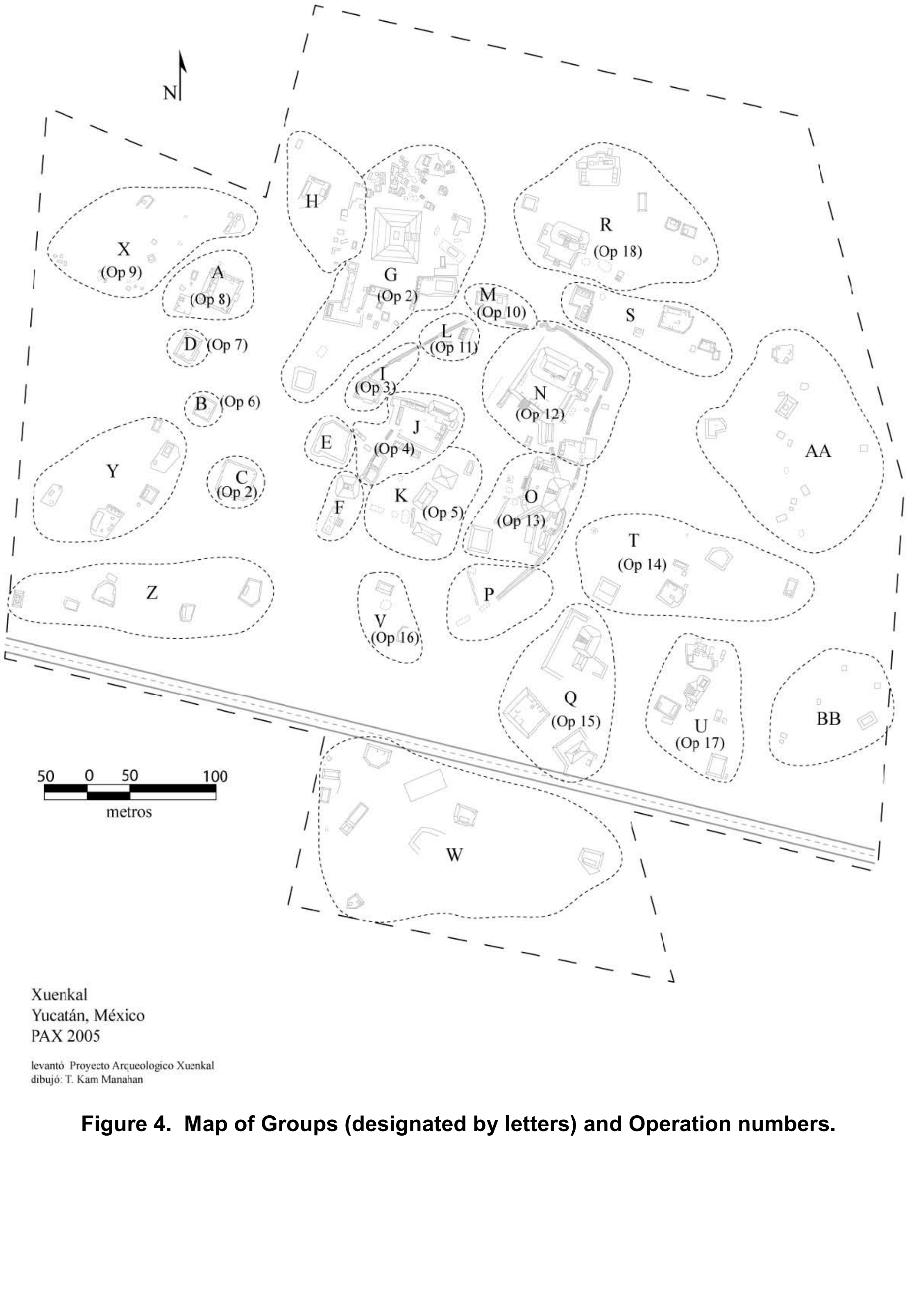

Figure 4. Map of Groups (designated by letters) and Operation numbers.

Photograph 2. Excavation to bedrock in Operation 10/1/7.

Discussion

The site of Xuenkal appears to have been founded by the Late Preclassic, judging from the few early deposits containing Chicanel markers recovered. At least one of the temples (FN-140; Op 15/1) was founded at this time, and some of the rural residential settlement may date from this period (Op 9). This earliest evidence, however, is extremely rare beyond these two contexts. It seems probable that other settlement from this period is preserved in the archaeological record; however this season's test pitting program did not encounter any other structures.

In contrast, evidence for a robust Early Classic occupation at Xuenkal was encountered through the test excavations. The greatest concentrations of Early Classic deposits were found in the site center, in both monumental and residential contexts. All of the largest monumental constructions (or at least predecessors built in the same locale) that date to this period include the temples FN-40, FN-111, FN-123, and FN-140, as well as the Palace Group. The large residential compound Group J (Op 4) was founded at this time, as were many of the smaller residential structures in the center. A concentration of settlement was also found along the western edge of the site. Interestingly, the settlement beyond Structure FN-140 in the southeastern area of the site appears to not have been constructed until much later. In terms of settlement, visible architecture from the surface, and ceramics (particularly the presence of Huachinango Dichrome Incised), Xuenkal appears to have been closely interacting with Ek Balam and other sites in the northeastern plains.

During the Late Classic, Cehpech-associated construction episodes are found on top of many (although not all; the courtyard of Group J apparently was left unmodified, for example) of the Early Classic constructions. Expansions included the eastern courtyard of the Palace Group (Op 12/2) and the courtyard in front of the temple FN-111. New buildings were constructed. Typically the architecture of these new constructions is of freestanding (i.e. non-platform) pyramidal structures built either alone or in triadic groups. These new constructions include Structures FN-183 (Op 16/1), FN-64 and FN-66 (Op 5/1), and FN-211 (Op 18/1). Test excavations from near these buildings contained deposits of pure or relatively pure Cehpech lots, with little to no Sotuta materials. The combination of new constructions mixed with expansions of previously existing architecture suggests a continuous occupation that continued to grow through the Classic period. The ceramics, architecture, and settlement continued to show strong ties to centers in the eastern half of the peninsula, such as Xuenkal's neighbor Ek Balam, and in regards to the ceramic data, particularly Cobá. Chronologically, this construction episode likely correlates to Cobá's expansion of influence into northeastern Yucatán, and coincides with the construction of the 100 km sacbe linking Yaxuna to Cobá.

While Sotuta ceramics are ubiquitous throughout Xuenkal, in many parts of the site the deposits are superficial. That is to say, many of the buildings that appeared to have been in continuous occupation throughout the Classic Period may have ceased to have been expanded upon during the Sotuta phase. This is not to say that Sotuta materials are common throughout the site; indeed they are. However, if the case of Group J may be used as an example, the courtyard of FN-50 was extensively reused and surface middens containing abundant Sotuta materials were allowed to accumulate, but actual constructions directly with the material may be lacking.

Instead there occurred a flurry of new constructions associated almost exclusively with Sotuta materials in areas that apparently did not contain substantial previous occupations. These constructions that have been identified consist almost exclusively of elite residential platform groups. While some platform groups, particularly Groups A, B, C, and D, contained some earlier materials, it seems more probable that these platforms may have incorporated recycled building fill than they contained earlier facets, due to the low frequencies of Cehpech and Cochuah materials. According to this season's results, the large platform groups seen on the map (Figure 1) such as FN-288 in Group G, Group I, FN-127 in Group O, Group M, and FN-129 in Group Q were all new constructions not founded until Sotuta materials became the almost exclusive types of ceramics at Xuenkal.

Although the data are limited to begin to discuss the nature of Cehpech-Sotuta overlap, we feel that we should address the issue. The impression (and indeed it is little more than that at this point in time) is that solely in terms of architecture, the transition from Cochuah to Cehpech ceramics shared more continuity than what is seen between Cehpech and Sotuta. This is not to say that there is no overlap; many, if not most lots contained a mix of Cehpech and Sotuta material. But there exist enough examples of structures associated only with Cehpech ceramics (e.g. Structure FN-183) that are distinct enough from other structures that are associated only with Sotuta ceramics (e.g. Structure FN-129) that with future research we may be able to address this question. A final observation, one that may bear directly on this whole issue of overlap, is that even the structures that yielded only Sotuta ceramics lack the specialized architectural components so ubiquitous (and almost exclusive to) at Chichén Itzá. Even Sotuta-era Xuenkal lacked ballcourts, sacbes, colonnaded halls, and altar-patio-shrine groups. On this basis, we may speculate that Chichén's influence over Xuenkal was one in which the local infrastructure of ruling elite was incorporated into the greater Chichén regional polity rather than removed and replaced. Whatever the case may be, the fact that the fortified site of Xuenkal contained over 50% Sotuta material while its walled neighbor Ek Balam some 25 km away contained less than 1% Sotuta material speaks volumes to the tightly bounded frontier that emerged between the two sites.

As a final note, surprisingly little Postclassic evidence of occupation was found. Only approximately 4% of the ceramic material dated to the Hocaba phase, and no construction episodes could be directly associated with this poorly understood phase. We continue to suspect that the cluster of dense small settlement to the north of FN-40 may represent a Postclassic reoccupation of the site; however test excavations were unable to encounter a sufficient sample to pass judgment one way or the other. Whatever the case may have been, the site of Xuenkal did not witness any other extensive occupation following the collapse of Chichén Itzá until a hacienda was founded among its ruins sometime in the 18th century.

Ceramic Analysis

Chapter 4: by T. Kam Manahan

The ceramic material recovered from the test excavations was taken to the lab, where the sherds were washed, numbered with their provenience, and catalogued. A total of 107 lots were documented, originating from 60 test pits. The present report is based upon the preliminary sorting of 16,284 sherds recovered this season. Using the type-variety system, most sherds were able to be sorted down to the level of ceramic type. The first analysis of the material examined a random sample of 10% of the lots to establish the chronological range present at Xuenkal as well as the amount of regional variation to expect in terms of ceramic spheres. Once the chronology was established, a second analysis of the material was undertaken. This assessment sorted all of the material down to the ceramic sphere and noted the presence and frequencies of diagnostic materials. This level of analysis allowed for assigning chronological placement to every lot. Most of these data were incorporated into the summary of the test pit operations (Chapter 3), but Table 1, shown below, presents the ceramic data together. A detailed modal analysis of variations in form, surface treatment, and paste is ongoing. Although the ceramic complexes at Xuenkal remain to be properly defined once more secure contexts are sampled, the following represents a summary of what is currently known about the chronology and regional variation present in the Xuenkal ceramic assemblage.

Late Preclassic-Early Classic

While a few sherds of Middle Preclassic Joventud Red were found, the earliest material found significant frequencies in the test pits dated to the Late Preclassic Chicanel complex. Typified by the presence of Sierra Red, Chicanel material was found in limited quantities in the bottommost levels near several large monumental constructions. The most dense deposit of Late Preclassic sherds came from TP 48, in front of Structure FN-140 (Op 15/1). The presence of this early material in the plaza of FN-140 suggests that the monumental core of Xuenkal was begun quite early in the site's history. The only trace of Late Preclassic material from domestic contents was found in Group X (Op 9).

Early Classic material was much more common, forming 14% of the total assemblage. The Early Classic material at Xuenkal falls within the Cochuah complex. These materials include Tituc v. Tituc, Tituc v. Bandas, Timucuy, Xanaba Red, Chuburna Brown, Huachinango Dichrome Incised, and Cetelac Vegetable Tempered. The Cochuah complex at Xuenkal shows many similarities with the contemporary material from Ek Balam, together sharing an eastern orientation as early as the Early Classic. The Cochuah contexts were typically in the lower levels, however Early Classic materials were found on the surface in low frequencies in many units. Several of the largest monumental constructions of the site, among them Structure FN-40, FN-140, the Palace (FN-40), FN-50, and FN-111 likely were founded during the Early Classic (or perhaps before).

Cehpech Sphere

In all, Cehpech materials compose 27% of the assemblage from the test excavations. Although Cehpech material was present in 85 of the 109 lots, pure or even primarily Cehpech lots were much scarcer; only 22 lots contained over 50% Cehpech materials and only 9 lots consisted of 90% or more Cehpech. The best Cehpech lots contain approximately equal frequencies of Muna Slate and Yokat Striated. Also present are Arena Red, Batres Red, Ticul Thin Slate, and Chablekal Fine Grey. Judging from the forms and types of Cehpech materials present at Xuenkal, the site was very closely affiliated and actively interacting with centers producing eastern variants of Cehpech, with sites such as its neighbor Ek Balam and particularly the distant polity of Cobá. Diagnostic forms of the eastern sphere of Cehpech found in the Muna Slate of Xuenkal include jars with stepped rims in the form of an inverted "Z" and solid tablet footed bowls. Pure Cehpech lots originated from several areas, among them the eastern courtyard of the Palace compound (TP 38), the triadic group in Group R (Op 18), and especially Structure FN-183 (Op 16). The buildings that produced pure Cehpech ceramics tended to not be associated with platform groups, in contrast to the Sotuta pattern.

Photograph 3. Plumbate sherds from excavations at Xuenkal.

Sotuta Sphere

Sotuta ceramics form the backbone of the Xuenkal assemblage. Fully 55% of the ceramics from the 2005 season are from the Sotuta sphere, a figure only slightly higher than that the 48% found through surface collections. The Sotuta material is typified by the presence of Dzitas Slate. Other types closely associated with Chichén Itzá that are common at Xuenkal include Dzibiac Group, which contain the Chichén Red Wares. Surface treatments of the Dzitas Group often show trickling (Balantun Black on Slate), and incisions (Chacmay Incised). Diagnostic molcajete forms are also very common. In addition to molcajetes, other diagnostic Sotuta forms include periform jars, hourglass censers, and ladle censers. Terminal Classic/Early Postclassic markers such as Tohil Plumbate and Silho Fine Orange were recovered in small but significant quantities. Sotuta materials were recovered from almost every unit in the upper levels. Sotuta materials were recovered most consistently from platform groups. According to the results from the test pits, the clearest Sotuta evidence originates from platforms such as Structure FN-18, Structure FN-127, and Structure FN-129. It seems clear that the Chichén Itzá's rise to power directly affected Xuenkal's destiny. While some of the platform groups contained direct evidence for an earlier phase of construction, many of the platforms appear to have been founded late in the site's history.

Hocaba Complex

Forming less than 4% of the overall assemblage, the Hocaba complex at Xuenkal is perhaps the most enigmatic. Hocaba material appears to be scattered across the surface of the site. Architecturally the settlement to the north of FN-40 looks to be

Postclassic in nature, but testing of these structures failed to prove or disprove this hypothesis. No constructions were identified as being primarily from the Postclassic. Instead the Hocaba material seems to originate from across the site, particularly from within the urban core. It appears that the site center continued to be an important feature of the landscape after the collapse of centralized authority. Late Postclassic evidence is even more fleeting than that from the Early Postclassic. Beyond a handful of sherds from a Chen Mul modeled censer, no Late Postclassic evidence was found.

Obsidian Artifacts

Chapter 5: by Geoffrey E. Braswell

A total of 45 obsidian artifacts were recovered from test excavations during the 2005 season. All of the artifacts were washed, cataloged, and analyzed. Each piece was measured, weighed, and visually sourced. The sample consisted almost exclusively of prismatic blades. Where the proximal end of a blade was present, the platform was analyzed for platform preparation techniques including scratching and grinding. The following represents a summary of what may be discerned from the obsidian assemblage, with the caveat that all conclusions should be tempered by the fact that the sample size is extremely small. Table 1, shown below, presents the complete results of the analysis.

In terms of production activities, a few things may be noted. Only two pieces of debitage were present in the sample, a biface flake and a percussion flake. The biface flake suggests that either bifaces were made or perhaps resharpened on site. The percussion flake, made of obsidian from the Ucareo (UCA) source, is a platform rejuvenation flake from a small polyhedral core. This suggests that prismatic blades were probably made on site, but again these two pieces are the only debitage in the collection.

Photograph 4. Visually distinct obsidian from excavations at Xuenkal.

In terms of production technologies, 55.6% of the pieces come from the El Chayal (CHY) source. Of these 24 El Chayal prismatic blades, 11 are proximal fragments, and at least eight of these have scratched (rather than ground) platforms. As this platform preparation technique is associated with Early to Late Classic contexts, I conclude, therefore, that most of the El Chayal obsidian predates c. A.D. 800/850, or pre-Sotuta. In fact, about 40% of the ceramic material comes from pre-Sotuta (Cehpech, Cochuah, or earlier) contexts.

While the material predominantly came from the El Chayal source, about 40% of the material comes from a variety of central and west Mexican sources, including Pachuca (PAC) Ucareo (UCA), Paredon (PAR), and Zaragoza (ZAR). The presence of obsidian from these sources in Yucatán almost certainly dates to post-A.D. 800/850 and is closely associated with Chichén Itzá and the distribution of Sotuta ceramics. The presence of these sources at Xuenkal indicates active participation in exchange with Chichén during this time. The very limited number of pieces of Ixtepeque obsidian suggests there is not a substantial Tases complex occupation, as compared to the obsidian found at Mayapán and late contexts at Chichén Itzá (Braswell 1999).

Thus in terms of chronology, the obsidian data, while limited, suggest that Xuenkal was occupied throughout the Classic Period (although Early Classic cannot be distinguished from Late Classic on the basis of obsidian). During the Terminal Classic (Sotuta) times, the site saw an intense, but shorter, occupation. Sometime during the early 11th century, the site was likely abandoned. In sum, the limited obsidian data is in accordance with the results from the ceramic analysis.

Table 1. PAX05 Obsidian Analysis (45 Total Pieces)

OP	TYPE	MODFR	LENGTH	WIDTH	THICK	CEDGE	MASS	SOURCE
02.1.1	12	22.3	21.5	11.1	2.4	38.9	0.5	PAC
02.1.1	12	22.3	18.9	13.1	3.6	31.9	1.0	PAR
02.1.1	12	22.3	18.2	11.0	2.2	28.8	0.6	ZAR
03.1.2	12	32.3	20.1	8.3	3.3	40.5	0.5	PAC
03.1.2	12	22.3	20.4	8.3	2.6	35.0	0.5	UCA
03.1.5	12	22.3	22.4	12.2	2.8	38.4	0.8	CHY
03.1.6	12	12.3	22.0	8.2	3.2	42.6	0.6	CHY
04.1.4	5	50.0	21.7	16.8	2.7		0.7	CHY
04.1.4	12	22.3	29.5	14.0	2.8	55.0	1.5	CHY
04.1.4	12	22.3	9.8	12.1	2.3	17.8	0.4	PAC
04.1.4	12	22.3	21.1	11.1	2.2	39.7	0.6	UCA
04.1.6	12	22.3	22.6	11.0	2.1	41.4	0.7	PAC
06.1.1	12	12.3	35.5	13.5	3.3	64.7	1.8	CHY
06.1.4	12	12.3	31.8	9.6	2.8	62.1	0.8	PAR
06.1.6	12	22.3	16.9	10.9	2.1	26.4	0.5	PAC
07.1.1	12	21.3	24.6	9.6	3.3	46.4	0.9	CHY
08.1.2	12	12.3	14.3	15.1	3.4	26.8	0.7	CHY
08.1.2	12	22.3	29.2	13.0	3.5	51.8	1.7	IXT
08.1.5	12	21.3	14.8	4.7	1.8	27.5	0.1	CHY
08.1.5	12	21.3	28.6	10.4	2.7	51.7	0.7	CHY
08.1.5	12	22.3	13.3	7.9	2.6	23.8	0.4	UCA
08.1.8	12	22.3	23.6	10.2	3.3	39.7	0.7	ZAR
10.1.2	12	22.3	25.4	10.3	2.1	47.4	0.5	CHY
10.1.5	12	32.3	27.3	10.1	3.0	53.0	0.7	PAC
10.1.5	5	60.0	13.4	20.3	5.0		1.2	UCA
10.1.6	12	21.3	20.1	10.5	2.1	24.4	0.5	CHY
10.1.6	12	23.3	26.0	10.1	2.8	47.7	1.0	CHY
11.3.1	12	11.3	21.1	9.0	2.8	40.4	0.4	CHY
11.3.2	12	11.3	13.8	6.5	2.2	13.8	0.7	CHY
11.3.2	12	22.3	25.3	10.6	2.7	50.4	0.2	CHY
11.3.3	12	22.3	22.9	10.8	3.4	39.4	1.0	CHY
12.1.1	12	12.3	25.4	9.2	2.5	47.7	0.6	CHY
12.1.1	12	22.3	12.5	13.0	2.2	24.8	0.5	CHY
12.1.7	12	22.3	34.5	9.6	3.1	62.7	1.3	PAC
12.2.5	12	12.3	18.0	13.2	2.9	34.7	0.7	CHY
12.2.9	12	12.3	31.2	13.7	3.1	59.0	1.5	CHY
12.4.1	12	12.3	31.8	10.7	3.1	62.6	1.2	UCA
12.4.1	12	22.3	30.5	12.9	2.7	57.1	1.2	UCA
13.5.3	12	12.3	24.7	13.2	3.2	49.1	1.2	CHY
13.5.3	12	12.3	31.9	12.2	3.3	60.7	1.5	CHY
14.1.2	12	21.3	10.6	7.4	2.0	19.7	0.2	CHY
14.2.3	12	12.3	30.5	12.6	3.3	60.2	1.3	PAR
15.1.2	12	12.3	13.1	13.0	2.7	25.6	0.5	CHY
15.1.2	12	32.3	19.9	11.4	2.3	37.0	0.4	CHY
17.5.1	12	12.3	16.0	8.3	3.0	30.5	0.3	PAC

Key:
Type: 5 = flake; 12 = prismatic blade
Modfr: 50.0 = complete biface thinning or resharpening flake; 60.0 = complete percussion flake; 12.3 = proximal p. blade frag, two dorsal ridges, final series; 21.3 = medial p. blade frag, one dorsal ridge, final series; 22.3 = medial p. blade frag, two dorsal ridges, final series;

23.3 = medial p. blade frag, three dorsal ridges, final series; 32.3 = distal p. blade frag, two dorsal ridges, final series
Length, Width, Thickness, Total Cutting Edge (CEDGE): in mm, blades only
Mass: in grams

Chert Artifacts

Chapter 6: by Nancy Peniche May

A total of 74 chert artifacts were recovered during the 2004-2005 explorations of ancient Xuenkal. The chert artifacts varied in color including tan, pink, grey and white. Each piece was assigned to a typology based on non-metric attributes used for classification of the stone tool reduction process: bifacial retouching, causal percussion, bipolar percussion, and percussion blades. Non-diagnostic attributes were also recorded. Artifacts were recorded as complete, almost complete, proximal fragment, medial fragment, distal fragment, and lateral fragment. Measurements of length, width, thickness and weight, along with the percentage of the dorsal face covered in cortex were also recorded. Measurements were taken in millimeters, weight was recorded in grams, and the percentage of cortex was recorded in arbitrary ranges of: 1-25%, 26-50%, 51-75%, 76-99% and 100% (Braswell 1999).

The chert artifacts from Xuenkal fall within the following technological categories (Table 2, shown below): bifacial (N=7); spherical (N=1); flake (N=34); thinning flake (N=14); percussion blades (N=4), fragments (N=13), and a hammerstone fabricated from a casual percussion core (N=1).

Table 2. Chert Artifacts from Xuenkal

Tipo	Subtipo	Cantidad
Bifacial	Punta	2
	Punta con muescas laterales	1
	Punta pedunculada	1
		3
Esfera		1
Lasca		34
Lasca de adelgazar		14
Total		**74**

Classification of artifacts recovered from Jaina has permitted the identification of three industries of chert working in ancient Yucatán: bifacial retouching, percussion blade and casual flaking, and artifacts (such as flakes and fragments) that cannot be assigned to a particular technology.

The bifacial retouching industry is divided into bifacial blades and thinning flakes. The presence of thinning flakes combined with the lack of evidence for preforms, broken bifacial blades, cores, and other manufacturing debris indicates that at Xuenkal we only have evidence for activities related to the final retouching or resharpening of bifacial blades.

On the other hand the evidence for percussion blades includes four pieces, one of which is a point with evidence of lateral notching. This artifact and a second point with lateral notches from the bifacial industry both date stylistically to the Terminal Classic period (Braswell 2000). To date at Xuenkal there is no evidence of the massive percussion blade production known elsewhere in Yucatán such as at Siho (Peniche 2004).

The casual percussion industry is limited to one artifact: a flake core that was reutilized as a hammerstone. The reutilization of artifacts, along with the resharpening of bifacial tools indicates the value of chert to the ancient inhabitants of this site. This reutilization and maintenance of material may be due to the lack of outcrops of chert within the site and the nearby region. Following Potter (1987), recycling is an indicator of the disposability of the original material-tools are recycled when material is scarce.

This raises the question of the possible sources of material used by the ancient inhabitants of Xuenkal for provisioning chert. Within the geographic region there are two natural chert sources; the Puuc region and the Río Bec zone. In the Puuc region, chert is known to be tan, beige, pink, dark brown, and white (Potter 1987, 1993), while in the Río Bec zone chert is yellow, white, blue, blue-grey, red, reddish brown, and tan (Rovner and Lewenstein 1997). Based upon a color analysis, the materials from Xuenkal originate in the Puuc region.

Table 3. Analysis of chert artifacts from Xuenkal

Op	Sub	Lot	Tipo	Condición	L	W	T	Wt (g)	Corteza	Color
6	1	3	Bifacial	Fragmento distal	21.6	13.5	5.4	1		Café
12	1	1	Bifacial	Fragmento distal	24.5	24.3	6.4	3		Café
8	1	8	Bifacial	Completo	57.5	23.1	6	8		Gris claro
12	1	7	Bifacial	Fragmento proximal	26.6	33.5	8.9	11		Café
7	1	3	Bifacial	Fragmento (borde)	42.6	9.9	4.5	1		Rosa
10	1	2	Bifacial	Fragmento	44.9	8.7	5.8	2		Café
				lateral						
2	1	1	Lasca	Completo	23.8	15.5	1.7			Café rojizo
3	1	5	Lasca	Fragmento distal	13	22.7	3.8		1-25	Café claro
3	1	5	Lasca	Completo	14.3	14.5	3.3			Rojo
3	1	5	Lasca	Completo	35.7	28.5	4.1	4		Blanco
3	1	2	Lasca	Fragmento distal	18.1	26.5	10.3	6		Gris

4	1	4	Lasca	Fragmento distal	29	37.5	13.7	11	1-25	Gris
6	1	2	Lasca	Fragmento distal	22.2	14.1	6.1	2		Beige translúcido
6	1	9	Lasca	Fragmento distal	22.3	16.1	4.9	1		Café claro
6	1	4	Lasca	Fragmento distal	29.8	13.5	6.4	2		Rosa
7	1	2	Lasca	Completo	49	59	12.3	33	26-50	Café/rosa
7	1	3	Lasca	Fragmento	21.3	15.1	9	3	1-25	Gris
7	1	3	Lasca	Fragmento medial	28.3	17.4	5.5			Café
8	1	5	Lasca	Fragmento distal	16.9	18.5	6.2	2		Gris claro
8	1	8	Lasca	Completo	23	13.3	4	1		Café
8	1	3	Lasca	Fragmento medial, lateral	25.5	13	3	1		Café claro
10	1	6	Lasca	Fragmento distal	16.5	15.6	4	1		Café translúcido
10	1	6	Lasca	Completo	23.9	13.1	5.8	2	1-25	Blanco
10	1	6	Lasca	Completo	15.9	12.9	3.2		1-25	Café/rojizo
12	1	5	Lasca	Sin parte distal	31.8	28.7	3.8	4		Café
12	3	1	Lasca	Fragmento medial	22.3	28.9	5.4	5		Café
12	2	4	Lasca	Fragmento proximal	33.4	19.2	5	3		Café claro
12	1	4	Lasca	Fragmento medial	18.9	14	7.1	2		Café
12	1	4	Lasca	Fragmento	26.2	24.1	6	4		Gris
12	1	4	Lasca	Fragmento medial, lateral	12.4	17.1	4.2	1		Café
12	1	4	Lasca	Sin parte proximal	15.7	20.5	1.7			Café
12	1	4	Lasca	Frgamento medial	10.3	14.1	1.5			Café
13	1	1	Lasca	Fragmento medial	19.2	14.9	1.9			Café
14	1	1	Lasca	Fragmento medial	10.1	12.6	5.8			Café claro
6	1	2	Lasca de adelgazar	Sin parte distal	22.9	26.4	4.3	3		Gris claro
6	1	2	Lasca de adelgazar	Sin parte distal	28.3	22.9	3.5	3		Rosa
6	1	4	Lasca de adelgazar	Completo	15.1	14.5	2.4			Café translúcido
8	1	2	Lasca de adelgazar	Fragmento proximal	20.9	18.5	2.4			Café
8	1	3	Lasca de adelgazar	Completo	18.4	13.9	2.3			Café claro
10	1	2	Lasca de adelgazar	Completo	13.5	12.1	1.9			Café
10	1	5	Lasca de adelgazar	Completo	19.1	16.2	2.5			Café
10	1	5	Lasca de adelgazar	Completo	13.9	16.2	3.5			Café
12	1	3	Lasca de adelgazar	Completo	15.9	15.4	1.5			Café translúcido
12	1	4	Lasca de adelgazar	Completo	14.9	11.5	1.2			Café
12	1	4	Lasca de adelgazar	Completo	16.7	18.1	3.8	1		Gris

15	1	2	Lasca de adelgazar	Fragmento proximal	10.5	17.8	2.8			Rosa
14	1	1	Navaja de percusión	Completo	21.9	13	3.1	1		Café translúcido
6	1	2	Navaja de percusión	Fragmento distal	28.3	16.2	4.7	2		Café
8	1	2	Navaja de percusión	Fragmento distal	35.5	13.1	11.2	5		Café claro
12	1	4	Navaja de percusión	Completo	33.8	13.1	3.5	1		Café amarillento
3	1	5	Pedazo		16.6	13.9	2.2			Blanco
6	1	3	Pedazo		14	13.7	7.1	1		Rosa
6	1	3	Pedazo		13.6	12.8	1.9			Rosa
7	1	3	Pedazo		19	14.6	3.2	1		Café rojizo
7	1	3	Pedazo		30.5	22.2	7.2	5	1-25	Rosa
8	1	1	Pedazo		16.3	26.2	2.9	1		Rosa
10	1	6	Pedazo		11.4	13.5	5			Café amarillento
11	1	3	Pedazo		21.8	21.4	17.6	4		Gris
12	1	4	Pedazo		16.6	15.7	7.7	2		Gris
13	6	2	Pedazo		43.3	49.2	37.6	71		
13	2	1	Pedazo		39	40.7	15.6	23		
17	1	1	Pedazo		19.8	14.1	2.4	1		Café
17	1	2	Pedazo		18.8	14.1	3.5			Café rojizo
11	3	2	Percutor	Completo	66.9	60.1	40.2	216		Café claro
							Total	**472**		

Ethnobotanical Investigations

Chapter 7: by Kirsten Tripplett, Celso Gutierrez, and Traci Ardren

As part of the Proyecto Arqueológico Xuenkal 2005 field investigations, in June, 2005, Dr. Kirsten Tripplett, Bot. Celso Gutiérrez, and assistants conducted an inventory of modern plant species occurring in twenty one rejolladas and three cenotes in an 8 km area surrounding the archaeological site of Xuenkal. The main stimuli for the study was the identification of *Theobroma cacao* in three cenote study sites near Valladolid (see Gomez-Pompa *et al.* 1990); as well as evidence of archaeological remains found adjacent to rejolladas throughout northern Yucatán, especially concentrated in the area around Xuenkal (Perez Romero 1988, Kepecs and Boucher 1996). Previous fieldwork by PAX staff members confirmed the location of key rejolladas in the zone surrounding the ancient settlement of Xuenkal, and the 2005 fieldwork utilized this information in order to better explore and document the available evidence on local contemporary human-plant interactions (Ardren and Manahan 2005).

Gomez-Pompa *et al.* (1990) suggest that the taxonomic structure of the Cacao plant communities they observed in cenotes represents anthropocentric influences and that the microclimates of cenotes formerly supported cacao cultivation and production, perhaps for consumption by local or regional elite. In effect, the presence of cacao may act as a marker species for a specific vegetation association that indicates specialized agricultural techniques of cultivation and production within the microclimates of cenotes. The floristic study techniques used by Gomez-Pompa *et al.* can be applied to rejolladas, which, though often shallower and sometimes wider than typical cenotes, are equally important water-drainage sites within the geological landscape.

The 2005 research goals were twofold: document the plant taxa growing within rejolladas, and determine whether cacao is present in either cultivated or feral populations. In addition, the cenote site of Yaxcabá, one of three studied by Gomez-Pompa *et al.* (1990), was revisited, to verify whether cacao populations still occurred there.

A number of investigative questions directed the present study:

- What is the local distribution of plants, especially native or endemic species, in rejolladas?
- What vegetative associations are present and how can they be interpreted?
- What types of land use histories are found within individual rejolladas as represented by resident plant taxa and community structure?

Methods

As part of the inventory, basic data was recorded for each rejolladas, including GPS coordinates, approximate depth and width, height of vegetation, degree of canopy coverage, floristic composition, and presence of architectural structures. A list of the flora within each was recorded and the site characterized in approximate terms. Each rejollada was assigned a preliminary field name (often based upon a particular characteristic of the area for mnemonic purposes; these names are found in the plant lists for each rejollada), but in the final inventory are assigned numbers. Additional notes are included in the table for each taxon. The study was conducted by the authors, with the assistance of Janine Pliska, B.S. Soil studies and characterization were not made.

Under the auspices of the Universidad Autónoma de Campeche Herbarium, Centro de Investigaciones Historícas y Sociales, numerous plant samples were collected. A number of species were observed but not collected. Collection numbers are included in the total inventory list for particular species. A *Negativa de certificación fitosanitaria* (02-731-004) was issued by the Secretaría de Agricultura, Ganadería, Desarollo Rural, Pesca y Alimentación (SAGARPA).

Results

There is a high density of rejolladas near the archaeological site of Xuenkal: Twenty one were located within 8 km of the site center. Rejolladas range in diameter from 25-70m. There is some distinction in plant taxa between rejolladas: Some contained only domesticated species, while others contained both domesticated and "wild" species. A couple of rejolladas featured numerous elements of advanced tropical deciduous forest, and possessed high canopies and rich layering of vegetation. A total of 179 plant species, distributed among some 140 genera and 61 plant families, was encountered in the study. As a point of comparison, Durán *et al.* (2000) report 182 botanical families, 992 genera, and 2477 species for the entire Yucatán Peninsula. Rejolladas around Xuenkal and Espita clearly serve as important repositories of species diversity and offer abundant material for study. Favorable soil conditions and the protected nature of rejolladas provide opportunities for retention of high species diversity and specialized cultivation.

The list of tree and shrub species encountered in the survey was tabulated for the INAH informe (Manahan and Ardren 2006). Local names (Spanish or Maya) are provided when they were supplied by informants. (For additional names see Durán *et al.* (2000)). In terms of frequency (the number of times a taxon occurred across all rejolladas), several species stand out: *Chrysophyllum cainito* (*caimito*; Sapotaceae), *Guazuma ulmifolia* (Sterculiaceae), *Musa paradisiaca* (Musaceae), *Cecropia peltatum* (Moraceae), *Bursera simaruba* (*chakaj*; Burseraceae), *Sabal mexicana* (*Guano, xiat, yapa*; Arecaceae), and *Mangifera indica* (mango; Anacardiaceae). Each of these taxa occurs in at least eight rejolladas. Only *Mangifera indica* and *Musa paradisiaca* are non-native, originating in IndoMalaysia and Asia, respectively (Mabberley 1997). All of the above native species possess some economic utility, except perhaps, *Guazuma ulmifolia*. That taxon is sometimes cited as a food consumed only in times of famine, or only casually, by children.

Chrysophyllum cainito and *Bursera simaruba* are typical of advanced secondary deciduous vegetation. *B. simaruba* is often found in more advanced forest vegetation. Both species may represent conserved taxa (retained when other taxa might be removed for milpa or other land use preparation). Many of the species identified in Table 1 correspond to taxa that Lundell and Lundell (1983:116-119) identify as principal species of advanced deciduous forest, including *Ficus cotinifolia*, *Acacia gaumeri*, and *Brosimum alicastrum*, and *Metopium browneii*. Many additional taxa encountered in the present study correspond to Lundell and Lundell's list of indicator species for that vegetation association.

Table 4 demonstrates that at least seven taxa identified in the study are endemic to the Yucatán (Durán *et al.* 2000; Lundell and Lundell 1983:121, who estimated that possibly as much as 15% of the flora of the Peninsula is endemic), but occur infrequently in the study area. The high degree of endemism in the rejolladas is further evidence of the specialized nature of the habitat. Although diversity within rejolladas was variable, in general, many harbored species that were not encountered outside of the study sites.

Table 4. Endemic plant taxa encountered in rejollada study
(data in second column represents the number of times a taxon was encountered, followed by the rejollada in which they occurred, e.g. 1:15 signifies one occurrence, in rejollada 15)

Jatropha gaumeri Greenm. (Euphorbiaceae)	1:15
Acacia gaumeri S. F. Blake (Fabaceae)	1:15
Lonchocarpus xuul Lundell (Fabaceae)	1:16
Platymiscium yucatanum Standley (Fabaceae)	1:8
Hampea trilobata Standl. (Malvaceae)	3:8,15,19
Passiflora yucatenensis Killip (Passifloraceae)	1:2
Jacquinia albiflora Lundell (Theophrastaceae)	1:17

Rejollada 15, located 1.43 km southeast of the center of ancient settlement at Xuenkal, contained the highest frequency (3) of endemic taxa encountered in the study. This particular site was shallow and, at least initially, not easily discerned from the surrounding topography. Approximately 29 species, most of which are economically important, were identified within the site of what is clearly a well-tended milpa.

Cacao (*Theobroma cacao*) was not located in rejolladas surveyed for this study. The cenote Yaxcabá was visited to check on the status of a small population of *Theobroma cacao* L. subspecies cacao forma *lacondonica* Cuatrecasas observed by the senior author in March, 2003, and studied by Gomez-Pompa *et al.* (1990). The entire population was gone. A local farmer informed the authors that a hurricane which swept through the Yucatán in the fall of 2003, flooded the cenote, destroying the cacao trees, and many other small tree species.

Photograph 5. Rejollada under cultivation today.

Discussion

The findings of this inventory are considered significant: distinct differences are apparent in the floras of the rejolladas and the surrounding secondary vegetation typical of lands around Espita. Species diversity within the rejolladas is rich and most frequently, the resident plant communities are composed of valuable economic species, especially long-lived fruiting trees. There is an abundance of introduced tree species from Europe and Asia (citrus spp., bananas or plantains, mangos and coconut, but many rejolladas also possess native plant species elements, especially in the forms of herbs and large trees traditionally used for shade or because they are culturally significant (*ceiba*, or kapok, *caimito* trees). There is tremendous diversity between the rejolladas as well. In essence, the Yucatán peninsula is a vegetation mosaic, composed of primary and secondary forest plant elements.

Cultivation of milpa crops and fruit tree crops in rejolladas can certainly extend a typical growing season because of rainfall runoff and soil-building activities. Maize was found growing in a few rejolladas, but for the most part, large trees and herbaceous plants were predominant, especially those rejolladas possessing deeper dimensions. There were some indications of fire in some instances, but it was not determined if the fires originated from slash-and-burn techniques or "natural" events like lightening and milpa clearing. Soils tend to be deeper in rejolladas as well. Presumably silt, other soil types, and vegetation debris are washed into the depressions, contributing to soil generation and depth. Although issues of soil depth and possible cultural conservation techniques are not addressed in the present study, they should be a feature of future studies of rejolladas in the Maya cultural areas. Rejolladas are subject to natural resource management techniques by modern inhabitants and cultivators living in Espita. They are frequently connected by trails and are protected from the depredations of cattle and horses.

It was expected that some rejolladas would possess non-modified habitats, with a heavy presence of only native species, and perhaps, feral populations of cacao (*Theobroma cacao*). Instead, many rejolladas encountered in this study were virtual orchards, planted with such important fruit crops as avocado (*Perseas Americana*), mango, nance (*Byrsonima crassifolia*), caimito (*Chrysophyllum caimito*), and occasionally, sapodilla (*Manilkara zapota*), and showing clear evidence of long-standing cultivation. In some rejolladas, especially several located close to the archaeological site of Xuenkal there were as few as three species of trees or shrubs. In contrast, plant species ranged in number from 12 to 35 taxa in other rejolladas. Informants stated that up until about twenty-five years ago (after a catastrophic hurricane), cacao was grown in many local rejolladas. In several rejolladas (especially around the site of Xuenkal) recently abandoned bee hives were observed (informants stated that the influence of aggressive, africanized bees had forced such abandonment of long-established honey collecting activities).

The absence of cacao in rejolladas in the study area was disappointing and somewhat surprising. Local informants maintained that cacao trees had been planted in former times, but were destroyed by hurricanes some twenty to twenty-five years ago. In some rejolladas, many native taxa representative of advanced forest vegetation were present, and edaphic conditions required for cacao were met. It was expected that cacao would be a conserved species in rejolladas, given the preponderance of fruit tree crops, but this was not the case.

Lundell and Lundell (1983) conducted their floristic study of the vegetation in and around the archaeological sites of Chichén Itzá and Cobá, and in and around Valladolid. They characterized the vegetation as secondary growth, the result of repeated clearings and brush fires (Lundell and Lundell 1983:111), with elements of both "tropical humid forests" and "xerophytic woodlands". The authors identified the predominance of sapodilla (*Manilkara zapota*) in some localities as reforestation following "abandonment" of former milpas.

In many respects, rejolladas are specialized and enhanced habitats; they are "footprints" of long histories of land use represented by recognizable forest types or vegetation associations (Lundell and Lundell 1983), and roughly indicative of time since deliberate planting or regrowth after natural, catastrophic events, like flooding and wind storms. Rejolladas also constitute a distinct agricultural system from that of traditional milpa by virtue of various stages of use and reuse. Local Maya have a tremendously long history of land use, specialized knowledge of forest ecology and plant uses, and retain traditional relations to spiritual protectors of land.

Xuenkal and Chichén Itzá-A Regional Perspective

Chapter 8: by T. Kam Manahan and Traci Ardren

The nature and degree of social, political and economic integration of Classic Maya states remains an ongoing point of contention (Fox 1987; Fox and Cook 1996; Fox *et al.* 1996; Chase and Chase 1996; Demarest 1992, 1996; Marcus 1993; Sanders and Webster 1988). While scholars debate the degree of economic embeddedness (Polanyi 1957) of Classic Maya polities, few attempts have been undertaken to quantify or explain the degree of integration. In the Maya world, the Chichén Itzá polity has been characterized as the most economically-oriented center, as well as the most expansionistic and active in interregional interactions (Andrews 1983, 1990; Andrews *et al.* 2003; Andrews and Robles 1985; Brainerd 1958; Freidel 1986; Morley 1940; Schele and Freidel 1990; Schele and Mathews 1998; Tozzer 1930, 1957; Wren and Schmidt 1991). While Chichén Itzá was traditionally viewed as a distinct Early Postclassic phenomenon (Brainerd 1958; Smith 1971; Tozzer 1957), a growing consensus is emerging that its rise and rapid expansion was squarely within the Terminal Classic (A.D. 850-1100) period, thus making it contemporary with many Classic Maya polities, especially the Puuc centers of the northern Maya lowlands (Andrews *et al.* 2003; Ball 1979; Bey *et al.* 1997, 1998; Lincoln 1986, 1990; Ringle 2004; Ringle *et al.* 1998; Suhler *et al.* 1998). Yet the mechanisms that allowed the rapid rise of this polity and the resultant transformation of both political and subsistence economies during the Terminal Classic are virtually unknown. Did Chichén and later polities in fact manifest a dramatic transformation of political and economic integration in comparison to Late Classic Maya polities? How integrated were ancient Maya states before the end of the Classic period? Did these forms of social and political integration change substantively during the Terminal Classic, to what degree, and in what ways? While these questions are not easily answered, they guide our research at the site of Xuenkal.

Current data demonstrate that Xuenkal maintained close ties with Chichén during the latter's zenith. Xuenkal's importance to Chichén can be expressed in two reasons: economics, in terms both of its agricultural potential and its location midway along the trade corridor to the north coast port of Isla Cerritos; and politics, due to its strategic location between Chichén and Ek Balam. Some boundary likely separated Ek Balam and Cobá from Chichén, and we suspect that Xuenkal may have functioned as a regional outpost for the greater Chichén polity against its rival polity to the east. Thus control of Xuenkal would ensure that Chichén was able to procure adequate staples and maintain access to coastal trade routes while shoring up its eastern flank.

Growing epigraphic and ethnohistorical evidence suggests that the leaders of Chichén attempted to establish a conquest empire through expansionist policies such as war and economic domination, thus securing political supremacy at the close of the Classic period (Edmonson 1982; Schele and Freidel 1990; Jones 1998; Schele and Mathews 1998; Boot n.d.). Current epigraphic research at Ek Balam shows that like Cobá, this northern rival of Chichén maintained close ideological ties with southern lowland polities. Inscriptions from Ek Balam and Chichén differ tremendously in the way elite power is described and may even be written in different epigraphic languages (Grube *et* *al.* 2002). A geopolitical boundary must have separated Ek Balam and Cobá from Chichén-the intervening area was a frontier zone where these major polities jockeyed for power and control. Excavations at Yaxuna, only 20 km south of Chichén, revealed that eastern polities built a 100 km sacbe from Cobá, only to have key Yaxuna structures subsequently destroyed by people using Sotuta ceramics within a century (Ambrosino *et al.* 2001). We hypothesize that Xuenkal also may have formed part of such a boundary.

Xuenkal's location midway along the Chichén Itzá–Isla Cerritos trade corridor offered other advantages. Excavations have shown Isla Cerritos was the primary port for Chichén (Andrews *et al.* 1988; Andrews *et al.* 1989; Gallareta N. 1998), and likely received prestige-enhancing goods the mercantile elite of Chichén required for ceremonial and political obligations. Control of the northern salt beds formed the lynchpin in a trading monopoly that ensured Chichén's economic dominance in the north (Andrews 1978, 1983; Andrews and Gallareta 1986; Andrews *et al.* 1988; Kepecs 1998; Kepecs *et al.* 1994). Furthermore, Chichén likely viewed Xuenkal as a buffer from its rival to the east, Ek Balam. Our investigations at Xuenkal clarify Late-Terminal Classic cultural developments in the northern lowlands and help elucidate the relationship between Chichén Itzá and its largest secondary center.

Yet for all the connections between Chichén and Xuenkal seen among the artifacts and portable objects, there nonetheless exist fundamental differences between the sites. Specific architectural groupings such as gallery patios that are ubiquitous at Chichén do not appear in the architectural repertoire of Xuenkal. The ceramic complex at Xuenkal demonstrates strong affinities to that of Ek Balam and other Classic centers of the northern plains. Residential patterns at Xuenkal differ from those at Chichén. While our data are still preliminary, we hope that investigation of Xuenkal will begin to elucidate the dynamic relationship between Chichén Itzá and its surrounding secondary centers.

The Proyecto Arqueológico Xuenkal is a program of mapping, excavation, and analysis which integrates environmental, artifactual, architectural, and iconographic data in order to address the nature of a regional polity surrounding Chichén Itzá. With permission from the Mexican Instituto Nacional de Antropología e Historia (INAH), we have completed two field seasons of research. Our field seasons have focused upon two complementary research agendas. The first is ecological in nature, including an ethnobotanical investigation of contemporary arboriculture as well as study of the relationship between ancient settlement densities and natural variations in soil quality. The second research focus is archaeological, documenting the urban core of Xuenkal through survey, topographic mapping, and off-mound test excavations.

Ecological Investigation

The Cupul region around Xuenkal and the nearby colonial city of Espita has always been the breadbasket of Yucatán, supplying corn, beans, cotton since the 16th century, and later cattle (Andrews 1990; Patch 1993). The region is characterized by a locally dense concentration of sinkholes, or rejolladas, filled with deep, humic soils. Rejolladas represent a significant increase in agricultural potential due to the rich soils and higher moisture within the depressions. Arboriculture, primarily citrus, is practiced in these moist and fertile microclimates today although cacao trees, including rare remnant sub-species from Pre-Columbian cultivation have been documented growing in eastern Yucatán (Gómez-Pompa *et al.* 1990; Kepecs and Boucher 1996). Current models of northern lowland prehistoric subsistence systems rely upon partial exploitation of these natural features during the entire Classic period. Iconography from Chichén Itzá depicts cacao growing in sinkhole features as well as elites dancing with monkeys through cacao groves, and underscores the importance of cacao trade and consumption in the regional economy of Chichén Itzá.

Unfortunately, there are few modern studies of the ecological conditions, or the present distribution, of deliberately planted or "wild" orchards of cacao in Mesoamerica (de la Cruz *et al.* 1995; Folan *et al.* 1979; Lambert and Arnason 1982; Lundell 1938, 1940), although there is a widespread assumption in the literature that ancient Mesoamericans planted and tended cacao in small clumps or in rainforest gardens. Modern studies of Maya forest gardens have been conducted only recently (Atran 1993; Fedick 1996; Gómez-Pompa 1987; Gómez-Pompa *et al.* 1990; Killion 1992; Peters 2000). Gómez-Pompa and colleagues (1990) found definitive evidence of Postclassic forest micromanagement and cultivation of cacao within a Yucatán cenote southwest of Chichén Itzá, where it was a component of a larger forest management strategy which permitted the cultivation of cacao in an ecological environment with a six-month dry season.

During the 2004 season an opportunistic survey was conducted of the region surrounding Xuenkal, in order to verify the location of nearby archaeological sites and document the regional density of sinkholes and rejolladas. Due to the very preliminary nature of this survey we decided to include as large an area as possible, but limit ourselves to features visible from the road. In this way we documented the density of rejolladas in a band 35 km east-west and 30 km north-south, with the plan to enhance the sample with future reconnaissance of the un-surveyed interior sections. The Project home base of Espita, Yucatán was the central intersection for four transects. Using the four roads leading north, east, south, and west from Espita, we marked the location of each rejollada we encountered in a road survey approximately 15 kilometers from Espita in each direction. Rejollada location was recorded with GPS coordinates at the nearest point along the road, and an estimated distance from the road to the center of the rejollada was noted. The diameter of each rejollada was estimated and the direction noted with a compass. All estimations were done visually.

This database provides a way to measure the agricultural productivity and environmental sustainability of the region (in the form of density of sinkholes, availability of fresh water, distance to marine resources, etc) in relationship to the density of ancient settlement (represented in the number and location of archaeological sites). This relationship is key to understanding why the urban capital of Chichén grew to economic dominance-preliminary evidence from the 2004 field season indicates the relative sustainability of the region surrounding Xuenkal is greater than most of the rest of the

Yucatán peninsula, and thus the environmental resources of this polity were key factors in the success of Chichén Itzá during the Terminal Classic.

During the 2005 field season, botanists Kirsten Tripplett and Celso Guiterrez made systematic collections within the rejolladas adjacent to Xuenkal and the greater Cupul region. While the researchers were unable to identify any extant cacao trees, they succeeded in documenting the extensive biodiversity found within these natural features. Such biodiversity was an economic asset to the ancient settlement of Xuenkal, and may have played a key role in the ability of this region to support the dense urban city of Chichén at its height. In the future, we hope to conduct an archaeoethnobotanical sub-project in order to make systematic type collections of modern cacao and to document the intensity and extent of its Pre-Columbian cultivation. Specimens of cacao growing without human attention (wild or feral cacao) have been identified in Yucatán near the current study area as well as in areas of Belize (Gómez-Pompa *et al.* 1990). It is unclear in the majority of cases whether the cacao cultivars in any of these areas are closely related to pre-hispanic types, or whether they are the product of South American cultivars more recently introduced. It is clear, however, that any populations of cacao cultivars native to Central America are unlikely to persist long into the future, as shifts in land use and agricultural policy have wrought radical changes in farming practices throughout much of Mesoamerica. Habitat destruction and the likely loss of native Maya cacao germplasm in the face of South American cacao cropping in Mesoamerica make this work more urgent. Fortunately, northern Yucatán is one of the locations most likely to still contain specimens of feral cacao today.

Archaeological Investigation

Xuenkal was first recorded in the late 1970s as a Rank II category site in the classification system determined by the Atlas Arqueológico del Estado de Yucatán and is considered of urban proportions (Garza T. and Kurjack 1980). The site was briefly revisited in 1988 when the Cupul Survey sketched a more comprehensive map of the site center and collected surface artifacts (Andrews, Gallareta N. and Cobos P. 1989). Although the site was reasonably accessible by gravel road, no other archaeological research was conducted in the region prior to the summer of 2003. At this time an INAH salvage project directed by Rafael Burgos was conducted to mitigate damage to the archaeological ruins from road widening and paving. This fieldwork alerted the archaeological community to the importance of the site and yielded a limited sample of contextual data on some of the smaller residential settlement associated with Xuenkal and its neighbors. Burgos and his colleagues excavated within four residential groups along the southern periphery of the site. Although the ceramics were predominantly from the Sotuta sphere, Cehpech and Early Classic Cochuah sphere materials were also present (Burgos *et al.* 2004). Significantly, the second most common ceramic phase represented were materials from the Early Classic, including groups such as Saban, Maxcanu, and Huachinango.

During the 2004 and 2005 field seasons, the Proyecto Arqueológico Xuenkal surveyed, recorded and mapped the urban core and the surrounding settlement, a total area of approximately 0.8 km^2 (Ardren and Manahan 2004). This area included the remains of 413 ancient constructions, plus the ruins of an 18th century corn and cattle hacienda in the southwestern corner of the site, and remnants of modern settlement as well. In total, over 10,000 points have been recorded with a TopCon Total Station. During the 2005 season, a total of 60 2x2 m off-mound test pits were excavated near 40 structures, yielding an overall sample of almost 10% of the settlement. Test pits were excavated down to bedrock and varied in depth from 20 to 140 cm. Although analysis of the recovered materials is still ongoing, some preliminary impressions of the ceramic assemblage will be discussed later.

While the entire urban core has been recorded, we know on the basis of archaeological reconnaissance that relatively dense residential settlement continues beyond the mapped area to the west and southwest. Although less dense rural settlement continues to the north, it appears that along much of the eastern flank of the site, settlement densities dropped off precipitously leaving the site center. Overall, the settlement appears to be denser yet less extensive than we had originally estimated. The site area may be as small as 1.5 km^2, and we estimate that the total area does not exceed 2 km^2. We plan to continue settlement pattern research within the outlying settlement zone to further delineate the site boundaries and document rural settlement patterns.

Mapping revealed several interesting aspects about Xuenkal's settlement that merit comment. The site is dominated by a single large pyramid. The square base of the structure, FN-40, measures about 65 meters on a side and stands 29 m tall. Detailed mapping of visible surface features revealed that the roughly square pyramid is oriented on the cardinal axes and faced due east, where a single staircase provided access to the summit. The vault of the temple's superstructure, seen clearly in wire frame map, is apparently still standing, as the top of the pyramid is level. The sheer size of the building, its orientation, and visible architectural features such as rounded terrace corners together suggest that the building may originally date to the Early Classic period, and was perhaps associated with cultural developments at Izamal, located some 65 km to the west. While ceramic samples gathered from surface collections correspond to this time period, we believe FN-40 underwent multiple construction episodes and the dating should remain tentative until materials from sealed contexts can be collected and analyzed.

Although we hypothesized that the settlement would cluster around this pyramid, the largest construction at the site, we found that instead FN-40 is on the northwestern edge of the urban core of the site. In reality, the monumental architecture clusters to the southeast of FN-40, and seems to be oriented around the Late-Terminal Classic palace, Structure FN-84. The orientation of FN-84, approximately 15° east of Magnetic North, is shared by most of the settlement, with the significant exception of FN-40. The palace is a two-story masonry structure ringed by vaulted rooms on three sides. On the basis of detailed examination from the surface, it appears that a passageway, now collapsed, existed that led from the exterior rooms of the lower story into interior chambers whose vaults may still be standing. The second story appears to have consisted of two separate freestanding rooms located on either end of the building's front face, each standing on its own terrace. While segments of the terrace and rear wall of the east room are still standing, the west room appears to have collapsed and slid off the front of the building, judging from the talus below.

The palace rests on the north side of the largest platform (FN-94) and is flanked by a large range structure to the east. Structure FN-84 appears to have been the main focal point of the urban core, at least during the Late-Terminal Classic, as surrounding structures either face FN-84 or are oriented along the eastern and western edges of a loosely defined open plaza area running southwestward from the palace. The Palace Group was situated on the summit of a natural rise in the bedrock that accentuated its prominence and visibility. The natural ground surface slopes down from the palace in all directions, but the area immediately to the east of the group drops off precipitously into a rejollada, literally in the shadow of the palace. The hillock also contributed to the group's defensibility, judging by the surrounding walls.

The site center was heavily fortified by a system of defensive constructions. These included a wall that ringed most if not all of the site center, encompassing roughly 7.5 ha, plus a network of shorter defensive walls linking buildings within its confines. The southwestern portion of the outer wall was almost completely dismantled by historic constructions in the 18th century. The outer ring encompassed on the north the two-story palace (FN-84) and its associated structures, the primary temples flanking to the east and west, and the site's cenote, apparently the sole source of potable water. Analysis of surface ceramics suggests that the defensive features were associated with Sotuta sphere artifacts. It should be noted that the defensive network excludes FN-40, the main pyramid, lending support for the dating of both the temple and the defensive network.

In terms of architectural styles, veneer façades, characteristic of Late-Terminal Classic Puuc architecture, are visible on the surface of much of the larger public and residential buildings. Furthermore, at least one temple, FN-111, originally displayed an elaborate stone mosaic façade, judging from the single carved stone element documented from its surface. The palace group, and most elite residential compounds and temples contain vestiges of veneer façades, and at least some likely contain carved stone mosaics as well. Other carved stones include a pair of Chichén-style drum altars. One was found presumably still in situ in front of the palace, while a more complete altar had been hauled to the hacienda's chapel in Historic times and fashioned into a baptismal font.

Veneer façades from two structures (FN-84 and FN-125) were exposed as a result of damage sustained in 1988 during Hurricane Gilbert and subsequent opportunistic looting. While the exposed architecture suffered further damage in 2005 from Hurricanes Emily and Wilma, fortunately damage to the rest of the site appears to be limited to the vegetation. Additionally, Structures FN-50, FN-111, and FN-140 exhibit significant looting on their summits. In the future we plan to consolidate and stabilize exposed architecture before it further deteriorates.

The primary residential settlement pattern is one in which a series of range structures are oriented around three sides of a large platform mound. These platform groups (28 in all) range from platforms that show no evidence of non-perishable structures on their summit to elite groups that feature a 7-10 m tall principal structure flanked by several multi-room range structures, with more modest elite examples in between. While clusters of smaller non-platform structures exist, particularly in the area of dense settlement to the west and north of FN-40, architectural forms and construction techniques suggest a Late Postclassic date, although no ceramic remains were recovered to either confirm or dispute this possibility.

One final point about the settlement concerns its similarity, or lack thereof, to Chichén Itzá. As important as what settlement patterns are present at Xuenkal is the fact that other patterns are absent. Specifically, Xuenkal lacks the specialized architectural groups so common at Chichén such as colonnaded halls and gallery-patio-altar complexes, and sacbes linking groups together. Even though the ceramic data show clear material ties to Chichén, these specific architectural groups appear to be absent. While it is too soon to speculate on the potential significance of this finding, the distinction between architecture and ceramics may hold implications for understanding both Xuenkal and Chichén Itzá itself, particularly in terms of how we interpret the Sotuta sphere.

Preliminary Type-Variety analysis of the ceramic materials recovered from the test pitting program this season is still ongoing, but some tentative conclusions may be drawn. While some Late Preclassic material has been documented, evidence for the earliest substantial occupation is not until the Early Classic Cochuah sphere. These materials include Tituc Bandas, Timucuy, Xanaba, Chuburna Brown, Huachinango Dichrome Incised, and Cetelac. The Cochuah sherds were mixed with later materials, but this fact is likely explained by their unsealed contexts from off-mound test pits.

The picture becomes less clear but very interesting in terms of later spheres, particularly in regard to the relationship between Cehpech and Sotuta at Xuenkal. We again emphasize that these results are preliminary and the analysis is ongoing. Sotuta in its most typical sense is well represented at the site. Dzibiac Group, containing the Chichén Red Wares, is prevalent, as is the Dzitas Group, the Chichén Slate Wares. Surface treatments on the slate often show trickling (Balantun), and incisions (Chacmay Incised). Diagnostic molcajete forms are also very common. In addition to molcajetes, other diagnostic Sotuta forms include periform vessels, hourglass censers, and ladle censers. Terminal Classic/Early Postclassic markers Tohil Plumbate and Silho Fine Orange were recovered in small but significant quantities, comparable in frequency to blades of green obsidian from central México in the same lots.

As one would imagine, these materials were found on the surface and within the uppermost levels of the test units. We suggest there may be an earlier facet to Sotuta at Xuenkal that may become more apparent with further excavation. In the lowermost levels of several units, including one within the construction fill of the plaza in front of the Palace, the material appears quite different. Utilitarian Sotuta types are present, including Piste Striated and Sisal Unslipped, as are some Dzitas Slate sherds.

However, molcajete forms are absent, as are the decorative techniques of trickling and incisions. Also, no Plumbate or Fine Orange is present. Those same lots include some Cehpech types such Muna Slate, particularly with forms associated with Cobá such as Jars and with stepped rims in the form of an inverted Z. Also diagnostic within Muna Slate are solid slab feet. Other Cehpech types include Ticul Thin Slate, some Teabo, and also Tekit inciso, Zumpulche, and Arena Red, as well as some Cochuah sphere material.

The fact that these types also appear in the Late-Terminal Classic period at Ek Balam, located only 25 km away from Xuenkal, but do not appear in the latest contexts at Xuenkal suggests that at some period in Xuenkal's history the boundaries between these polities were much more fluid than the rigid division suggested by traditional models of Sotuta and Cehpech. While we do not have any radiocarbon dates from Xuenkal, recent refinements in the chronology of Chichén make it unlikely that a complete temporal division can be drawn between Sotuta and Cehpech. Rather, we suggest that dynamic models need to be developed that explore this variation in terms of shifting social, political, and economic interactions between contemporaries.

Analysis of ceramics and other artifacts from Xuenkal establishes the contemporaneity of Xuenkal with its nearest neighbor, Chichén Itzá, as well as the existence of a substantial settlement at Xuenkal well before the rise of Chichén. There is a predominance of Sotuta ceramic types in the 2004-2005 collections from Xuenkal. Sotuta ceramics are closely (and perhaps exclusively) associated with Chichén Itzá, and their presence at other sites is associated with the influence of this polity. At Chichén, Sotuta ceramics constitute over 90% of the total ceramic assemblages from the site, yet form only a small percentage within the assemblages from contemporary sites in the region (Cobos 2003). Their presence in even extremely limited quantities is significant and has been used to trace coastal trade routes (Andrews 1978, 1983, 1986; Andrews and Robles 1986; Freidel and Sabloff 1984; Robles 1987, 1988; Robles and Andrews 1985; Sanders 1960). Thus the presence of Sotuta material in 55% of the excavated collections from Xuenkal suggests that Chichén Itzá played a direct role in the site's history. However, four lots, including the palace sample, are mixed Cehpech and Sotuta ceramics, suggesting that the two complexes completely overlap at Xuenkal. Also significant is the presence of diagnostic Early Classic markers (particularly from FN-40) and some Late Preclassic types, implying that Xuenkal's founding predated that of Chichén.

Conclusions

In conclusion, while recent work at Chichén Itzá and other sites is beginning to revolutionize our understanding of this most significant polity, particularly in terms of chronology, fundamental questions about Chichén's origins, its political, economic, and social organization, and its relationship with surrounding sites remain inadequately addressed. Our understanding of Chichén Itzá's origins and significance has been dominated by site-centric approaches to the detriment of surrounding constituent secondary centers and outlying settlements. To date, the supporting population around Chichén Itzá, as well as its secondary centers, has only begun to be investigated (e.g. Anderson 1998; Cobos 1998, 2003). Proyecto Arqueológico Xuenkal seeks to address this imbalance through an in-depth investigation of the most significant site within the Cupul province.

Control of Xuenkal would have offered two principal advantages, one economic and the other strategic. Preliminary settlement pattern, ceramic, and architectural data concur that Chichén Itzá was actively involved in the site's history, yet the specific nature of this interaction remains to be seen. Evidence to date shows that while artifactual similarities with Chichén are strong, overall settlement and architectural patterns at Xuenkal are more reminiscent of other Classic period northern Maya centers such as nearby Ek Balam. These data suggest a model of limited occupation by Chichén, perhaps economically rather than politically motivated, late in the history of Xuenkal. Such a model would be more consistent with well documented Maya patterns of Classic period polity expansion than with invasion or replacement scenarios previously undocumented in the archaeological record of the northern lowlands. While we have only just begun the process of documentation, we are hopeful that future research will elucidate the nature of the complex relationship between Chichén and its secondary centers such as Xuenkal. Only by looking within the local region and examining the relationship between Chichén and its secondary centers will we be able to understand the dynamic nature of Chichén's exponential growth as one of the principal centers of Epiclassic Mesoamerica.

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