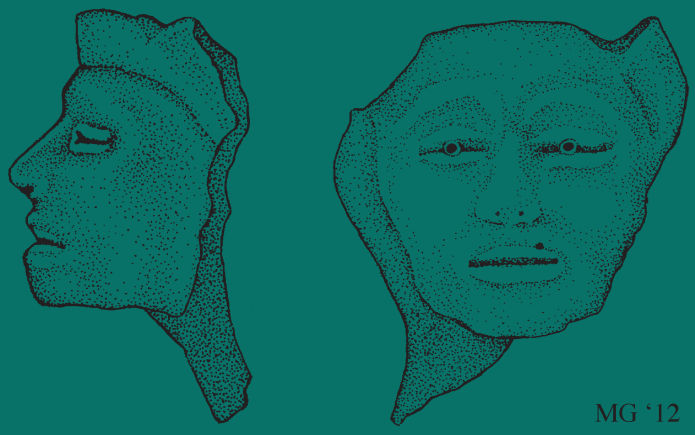
The 2012 Season of the Chan Chich Archaeological Project

EDITED BY

Brett A. Houk



MG '12

Papers of the
Chan Chich Archaeological Project, Number 6
Department of Sociology, Anthropology, and
Social Work
Texas Tech University • Lubbock, Texas
2012

Chan Chich Archaeological Project

CCAP

Chan Chich, Belize - Central America

The 2012 Season of the Chan Chich Archaeological Project

EDITED BY

Brett A. Houk

WITH CONTRIBUTIONS BY

Ashley Booher
Matthew C. Harris
Brett A. Houk
Krystle Kelley
Kevin A. Miller
Vincenet Sisneros
Fred Valdez, Jr.
AND
Chester P. Walker

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Acknowledgments

The return of the Chan Chich Archaeological Project after an 11-year hiatus would not have been possible with the assistance and support of numerous organizations and individuals. First and foremost, I would like to thank Dr. John Morris and Dr. Jaime Awe of the Institute of Archaeology (IA) for being supportive of our work and for issuing me a permit to conduct the research in 2012. The other staff members at the IA all deserve thanks, particularly Mr. Brian Woodye and Ms. Melissa Badillo.

It takes both a permit from the IA and permission from the landowner to conduct excavations in Belize. Therefore, I am extremely grateful to the Bowen family, and particularly Mr. Michael Bowen, for allowing us to work at Chan Chich. Initially, the idea to bring a field school back to the site was Zander Bowen's, and I'm very grateful for all the groundwork Zander laid for the field school before he left for life in Texas at the end of March 2012. With his departure, the co-managers of the lodge took over and treated our group like family. We are very grateful to Elder de Leon and Letty Martinez for being so kind and helpful. I would also like to thank the new manager of Gallon Jug, Alistair Macpherson, for being extremely supportive of the field school and archaeology in general on the property. We are looking forward to a long-term collaboration to put Gallon Jug and Chan Chich back on map, so to speak, in terms of scientific research.

We were assisted in the field by some of the staff from the lodge, and they made working at Kaxil Uinic possible by opening the road and clearing some of the structures. They also assisted us on backfilling day, the most special day of the season! We would like to extend our gratitude to Emil Flota, Eduardo (Yayo) Granados, Elias Romero, Pedro Barahona, Jorge Montuy, Migde Perdomo, and Jose Luis (Chelis) Monroy for all their hard work in the field.

The other crucial member of the lodge's staff was the head cook, Maritsa Montuy, who did a fantastic job of feeding our group with a remarkable rotation of fantastic meals. The rest of the staff all did their part to make the field school a pleasant and memorable experience. In no particular order, I would like to thank: Don Gilberto Vasquez, Don Israel Ramirez, Luis Romero, Massiel Carrillo, Shaira Carrillo, Jeremias Serminia, Yasmin Perdomo, Eulalio Corado, Esmeralda De La Rosa, Arlene Sanabria, Teresa Cordova, Olivia Cordova, Rosario Vasquez, Leny Sonabria, Raul Martinez, Marina Cortez, Karina Rodriguez, Marely Moh, Herminia Cortez, and Marvin Ramirez. I would also like to thank the staff of Gallon Jug for supporting our work and treating us kindly, in particular Alan Jeal and Hector Gomez.

Of course, another crucial component of research, particularly for a new project, is funding. I would like to thank Dean Lawrence Schovanec and Associate Dean Jeffrey Williams of the College of Arts and Sciences for providing start-up funds. I'd also like to thank Vice President for Research Taylor Eighmy and Associate Vice President for Research Michael San Francisco for also providing start-up funds. Dr. Yung mei Tsai, the now retired chair of the Department of Sociology, Anthropology, and Social Work, generously supported the

field school and my participation in the Belize Archaeology Symposium.

I would also like to thank Dr. Schovanec for visiting the field school in Belize this summer. I know that his presence made a big impression on the project staff and students, and I would like to thank him for his ongoing interest in the project. I would also like to thank Chan Chich Lodge for treating Dr. Schovanec so well during his visit.

I would like to acknowledge the contributions of Dr. Chet Walker to the project. He conducted an archaeo-geophysical survey of the Upper Plaza, and he tested the use of "drones" to conduct aerial flyovers of the site. We have big plans for 2013 based on the results! I would also like to thank Dr. Fred Valdez, our project ceramicist, for guest lecturing on ceramics and analyzing a large percentage of our 2012 assemblage. Dr. Lauren Sullivan assisted with the analysis, and her help is greatly appreciated. Additionally, Ms. Margaret Greco, on loan from the Programme for Belize Archaeological Project, illustrated a number of incensario fragments for us, including the one on the cover of this report.

I would be remiss if I did not acknowledge the hard work and financial sacrifice of the project staff. In particular, I'd like to thank Mr. Kevin Miller of SWCA, Inc. for taking two weeks out of his schedule to assist us in the field. His guidance was a tremendous help during the initial, frantic days of the project. I would also like to thank the three graduate students who helped train and supervise the field school students: Matthew Harris, Krystle Kelley, and Vincent Sisneros. Last but not least, Ashley Booher was our junior staff member and assisted in the Upper Plaza excavations.

Mr. Leroy Lee, the owner of American Seismic, LLC, was a special friend to the project. He shared the lodge with us for most of the field school and used his GPS to set up a control point for us. Everyone on the project is eternally grateful for his generous donation that made the end of season barbeque possible!

The CCAP is supported by the Field School in Maya Archaeology, a program run through Study Abroad at Texas Tech. I'd like to thank Sandy Crosier, Elizabeth McDaniel, and Rachel Jarnagin for working with the square peg that our project is in the round hole of study abroad programs. They made the process of dealing with international travel and 12 students from nine universities as simple as it could be.

The greatest thanks, however, go to the 12 students who chose this project over all the other possible choices. I said it in Belize, and I'll say it here: this group was the best group of students I've ever had on a field school. They are Alan Craig, Southeastern Louisiana University; Zachary Critchley, Franklin & Marshall College; Erica Gallis, George Mason University; Kelsey Herndon, Auburn University; Samuel LaGrone, Texas Tech University; Corey Kerkela, University of Central Florida; Rose Leach, University of Michigan; Sierra Mosier, University of North Texas; Tony Mouton, Texas Tech University; Carolyn Nettleton, University of Toronto; Edgar Vazquez Barrera, Texas Tech University; and Rachel Wall, Providence College.

One of the things that makes working in Belize so much fun is getting to see friends and colleagues on other projects. Dr. Fred Valdez graciously invited my group to a barbecue at the Programme for Belize Archaeological Project's field camp, and I got to see a lot of old friends, including Dr. Leslie Shaw, who passed away unexpectedly this fall. I would like to thank everyone there for their hospitality. The barbecue was just an excuse to hold the 1st Annual Belize National Washers Tournament. While the CCAP lost the lesser brackets, team "Parrots of the Caribbean" (Vince Sisneros and

2012 CCAP staff and students. From left to right, back row: Zachary Critchley, Alan Craig, Tony Mouton, Corey Kerkela, Samuel Lagrone, Edgar Vasquez, and Matthew Harris. From left to right, middle row: Vincent Sisneros, Krystle Kelley, Rachel Wall, Rose Leach, Kelsey Herndon, Emil Flota (Chan Chich Lodge), Ashley Booher, Erica Gallis, and Sierra Mosier. From left to right, front row: Brett Houk and Carolyn Nettleton. Not pictured: Kevin Miller and Chet Walker.

I) took home the win in the main bracket over Dr. Valdez and his teammate, Dr. David Hyde.

Finally, I would also like to give a shout out to the Belize River East Archaeological Project's professional staff including Dr. Saturo Murata, Dr. Astrid Runggaldier, Dr. Marieka Brouwer Burg, Mr. Adam Keating, Ms. Ana Maria Diaz Rocha, and particularly the project director, Dr. Eleanor Harrison-Buck, for letting me spend my first night in country at their version of a field camp. It was no Chan Chich, but it wasn't too shabby!

Wheels up!

Brett A. Houk, October 2012

Return to Paradise: An Introduction to the 2012 Chan Chich Archaeological Project

Brett A. Houk

Between 1996 and 2001, I had the pleasure of directing five seasons of the Chan Chich Archaeological Project (CCAP). Following the departure of the managers of Chan Chich Lodge, Tom and Josie Harding, after our 2001 field season, the project ended, and I moved on to other projects and places. Chan Chich, however, always remained near and dear to me, and it was my good fortune to be invited back to the site in 2012. This report documents the return of archaeology to Chan Chich after an 11-year hiatus.

Chan Chich is in the southwestern corner of the 135,000-acre Gallon Jug Ranch, which is owned by Bowen and Bowen, Ltd. and operated as Gallon Jug Agro-Industries. The boundary between Gallon Jug Ranch and Yalbac Ranch passes through the ruins of Chan Chich, south of the Upper Plaza. The site is approximately 4 km east of the border between Guatemala and Belize. In 2012, the CCAP conducted research at Chan Chich and the nearby site of Kaxil Uinic, also known as E'kenha (Figure 1.1).

PROJECT TIMELINE

In 2006, I was hired as an assistant professor at Texas Tech University, and from 2007 to 2011 I took Texas Tech archaeological field schools to work at La Milpa, only an hour's drive north of Chan Chich. In 2010, Zander Bowen, who had become the manager of Gallon Jug Ranch, approached me about bringing a field school back to Chan Chich. With an existing commitment to work at La Milpa in 2011, Zander and I did not begin serious discussions about renewing the archaeological investigations at Chan Chich until May 2011. Over the course of several months, we agreed on a rather small-scale project to run for about a month in 2012. Unfortunately, Zander departed Gallon Jug for other opportunities at the end of March 2012, but by then all the arrangements were in place, and the Chan Chich Archaeological Project resumed its scientific study of the ruins in May.

The project began with my arrival in Belize on May 21. The project staff arrived on May 22, and the field school students (12 in total) arrived on May 26. The field school students spent 25 nights at Chan Chich, departing on June 20. The project's field component ended on June 25, when the project staff departed Chan Chich.

PROJECT STAFF

In addition to myself, the project director, the professional staff included Dr. Chet Walker, an archaeo-geophysicist who worked with us before the field school students arrived, and Kevin Miller, a professional archaeologist from Austin, Texas, who worked for the first two weeks of the season as an assistant operation director at the Upper Plaza at Chan Chich. Two Texas Tech graduate students, Matthew Harris and Krystle Kelley, were operations directors at

Houk, Brett A.
2012 Return to Paradise: An Introduction to the 2012 Chan Chich Archaeological Project. In *The 2012 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 1–6. Papers of the Chan Chich Archaeological Project, Number 6. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

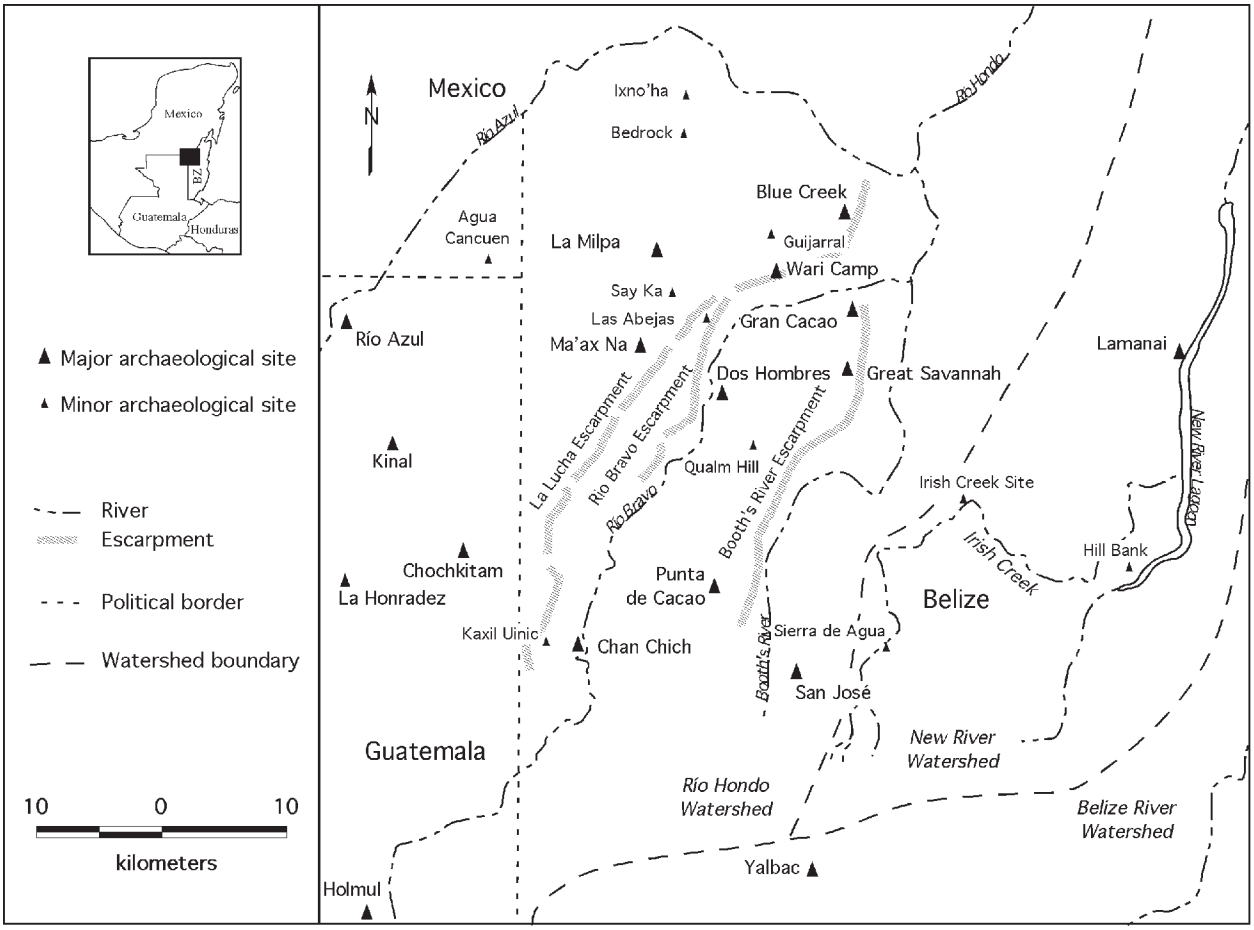

Figure 1.1. Map of archaeological sites in the vicinity of Chan Chich, Belize.

Kaxil Uinic and the Upper Plaza, respectively. Vincent Sisneros, another Texas Tech graduate student was the assistant operation director at Kaxil Uinic, and Ashley Booher, a Texas Tech undergraduate student, was a field assistant at the Upper Plaza. In addition to directing the project, I oversaw the operations of the field lab. Workers hired from Chan Chich Lodge assisted us in the field at times.

PROJECT FUNDING

Texas Tech's Field School in Maya Archaeology, a cost-sharing program run through Study Abroad, was the primary source of funding for the 2012 season of the CCAP. The Office of the Vice President for Research (VPR) and the College of Arts & Sciences provided additional start-up funding, and I was awarded a small grant prior to the field season through the FY12 Internal Competitive Funding Opportunity to Advance Scholarship in the Creative Arts, Humanities, and Social Sciences. That grant, provide through the VPR, allowed for the development and implementation of a digital data collection system in 2012, which is discussed in the seventh chapter of this report.

PROJECT PERMITTING

The Institute of Archaeology, part of the National Institute of Culture and History, issued Permit No. IA/H/2/1/12(12) to the author for the excavations at Chan Chich and Kaxil Uinic. Dr. Jaime Awe was the director of the IA, and Dr. John Morris was associate director of research and education at the IA at the time the permit was issued.

AN OVERVIEW OF THE 2012 SEASON

Practical Matters

Chan Chich Lodge is built in and around the Main Plaza of the ancient Maya site (Figure 1.2). In the plaza are 12 cabanas, the restaurant, and the bar. Outside of the plaza to the north are two large cabanas (casitas), a house (the former residence of the managers and the location of the lodge's business office), the lodge's laundry facility, and the swimming pool. The original plan had been for the field school to use the house as a lab, staff housing, and dining hall, but, as is often the case, plans changed. The staff and students ate at the lodge's restaurant and were housed in the casitas and in two cabanas. A third cabana served as my room and the lab.

Investigations at Chan Chich

When we mapped the ruins in 1996, GPS technology was not particularly accurate for determining elevations. Therefore, our contour map of the site was based on published topographic maps of the area, which, as it turns out, were also not very accurate for determining elevations. Mr. Leroy Lee, a seismologist working in and around Gallon Jug while we were at the lodge, used his GPS to establish a control point for us in the Main Plaza. We chose a point south of the bar near the edge of the asphalt drive for our control point, and Mr. Lee's GPS collected data for the better part of day to acquire a solution. The UTM coordinates for this location are Zone 16Q, Northing 19 40 412.846, Easting 2 75 875.557, and the elevation is 118.722 m. Based on our 1996 map, we had

Figure 1.2. Composite aerial photograph of Chan Chich Lodge, courtesy of Chet Walker, AGA-LLC.

estimated the elevation of the control points location to be approximately 20 m higher than its actual elevation. We have modified the site map accordingly, by subtracting 20 m from all our contour lines. An oversized version of the map is available online as a supplement to this report; a simplified version without contour lines is included as Figure 1.3.

In 1997, during the CCAP's first season of excavations, we discovered a Terminal Preclassic tomb in the Upper Plaza at Chan Chich (Houk et al. 2010). With the renewal of the project, we decided an intensive investigation of the Upper Plaza would be a primary component of our research. The goal of these investigations was to target the oldest part of the site to expand our understanding of the founding of Chan Chich and the evolution of the architectural core of the city. The Upper Plaza work was planned as a 2-year study, and the 2012 work included preliminary remote sensing work by Dr. Chet Walker (this volume) followed by exploratory excavations (Kelley et al., this volume). Texas Tech graduate student Krystle Kelley is using the Upper Plaza work as her thesis project.

Kaxil Uinic

The second research focus in 2012 was something that had always been on the project's agenda, an assessment of the nearby ruins of Kaxil Uinic. The name Kaxil Uinic applies to a ruin, also known as E'kenha, and a historic Maya village/early twentieth century chicle camp. The ruins and historic village are important to the history of archaeological research in Belize because Sir J. Eric Thompson (1963) had planned to excavate the ruins and live at the village in 1931, but was forced to change plans when the Belize Estates and Produce Company relocated the villagers to San José shortly before his arrival.

Our research interest at Kaxil Uinic centered around the hypothesis that it was connected to Chan Chich by a *sacbe* (see Houk et al. 1996). Our focus included assessing the age of the prehistoric site, documenting the stone monuments reported by both Thompson (1939) and Guderjan et al. (1991), and locating the historic village and associated *aguada*. I discuss the results of archival research on Kaxil Uinic in the fourth chapter of this volume, and Matthew Harris and Vincent Sisneros document the investigations at the ruins in the fifth chapter. Texas Tech graduate student Matthew Harris is using the work at Kaxil Uinic ruins as his thesis topic.

Relational Database

A significant element of the CCAP in 2012 was the implementation of a digital data collection system, built around a FileMaker Pro 11 relational database. Harris and I developed the database in the spring using a small internal grant. We were able to purchase software and three iPads with the grant, and the database was used successfully during the 2012 field season. The database replaces the old system of paper forms and provides much better integration of field and laboratory data than our old system.

REPORT ORGANIZATION

The bulk of this volume summarizes the results of the 2012 CCAP. In the second chapter, Chest Walker describes the archaeo-geophysical survey of the Upper Plaza, which, while unsuccessful, has provided us with new research directions for 2013. Krystle Kelley, Kevin Miller, and Ashley Booher document the excavations in the Upper Plaza, the first of two planned seasons of investigations to document the architectural history of what is arguably the seat of royal power at Chan Chich. In the fourth chapter, I detail the results of archival work on Kaxil Uinic and our reconnaissance of

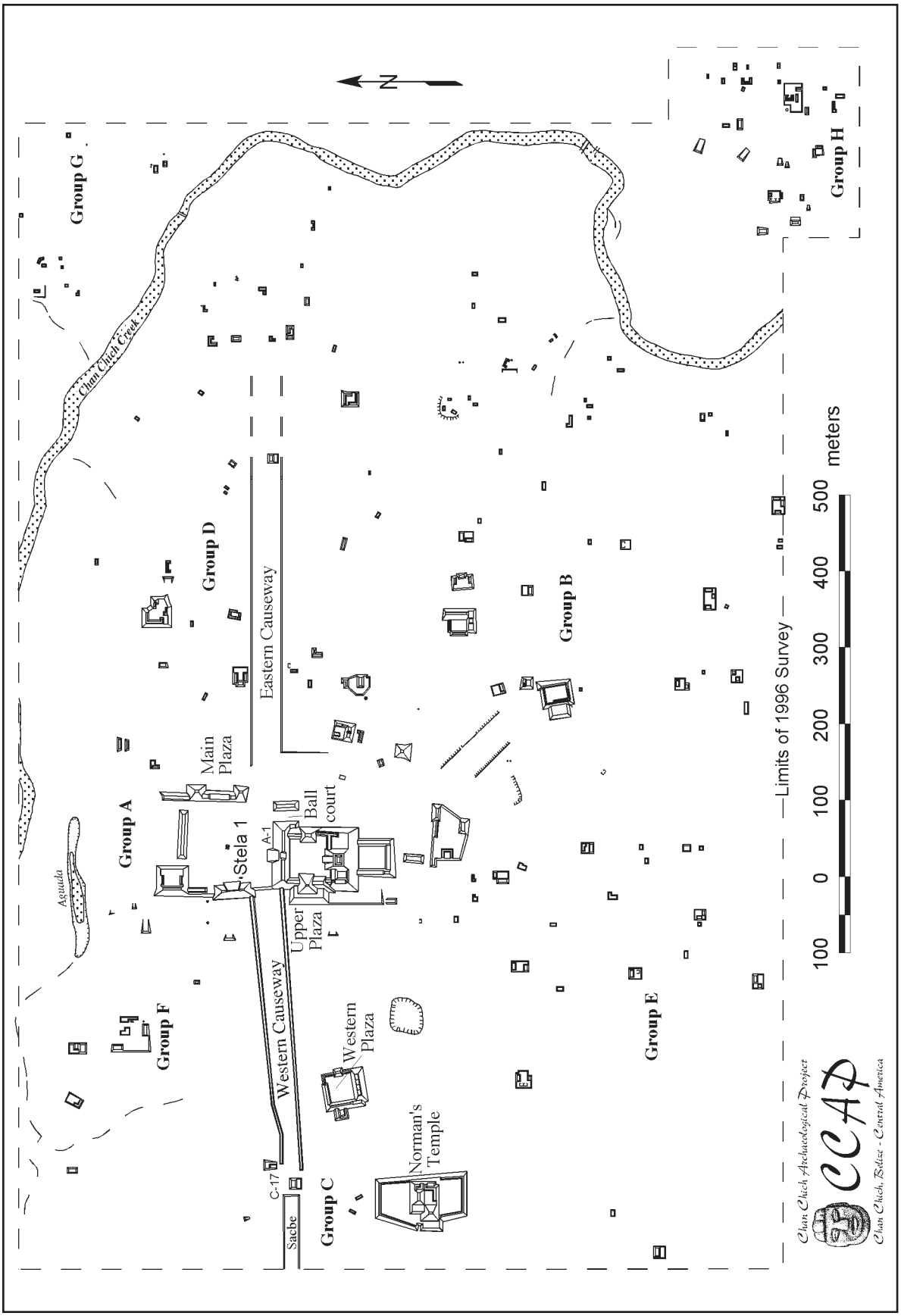

Figure 1.3. Map of the ruins of Chan Chich, Belize.

the area. This is followed by the contribution of Matthew Harris and Vincent Sisneros discussing the investigations at the prehistoric ruins of Kaxil Uinic. In the sixth chapter, Fred Valdez, the project ceramicist, and I update the Chan Chich ceramic sequence and discuss the ceramics from Kaxil Uinic. In the seventh chapter, I describe the CCAP relational database. Finally, Matthew Harris presents two unexpected pieces of correspondence from J. Eric S. Thompson, written shortly before his death, in the final chapter of this report.

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Multi-sensor Archaeo-geophysical Survey of the Upper Plaza at Chan Chich, Orange Walk District, Belize

Chester P. Walker, Ph.D.
Archaeo-Geophysical Associates, LLC

INTRODUCTION AND SUMMARY

This report presents the findings of a multi-sensor archaeo-geophysical survey conducted at the Upper Plaza of Chan Chich in the Orange Walk District of Belize. Data was collected May 22–26, 2012. The scope of the survey and location of the survey were based on consultation with Brett A. Houk of Texas Tech University and conducted by researchers from Archaeo-Geophysical Associates, LLC (AGA) and the Chan Chich Archaeological Project. The main goals of this survey were to assess the potential use of archaeological geophysics on sites with complex cultural stratigraphy and identify potential archaeological features.

Data were collected with a GSSI Sir 3000 Ground Penetrating Radar (GPR), GeoScan Research RM15 MPX15 Resistance Meter, and a Geonics EM38B Electromagnetic Induction Meter (Table 2.1). The total area surveyed was 800 m^2. This work successfully located several possible archaeological features at the Upper Plaza. Anomalies and possible archaeological features presented in this report were tested by Kelley et al. (this volume) and did not prove to be significant.

ARCHAEOLOGICAL GEOPHYSICS TECHNIQUES

Geophysical survey investigations have become an important part of the pursuit of North American archaeology and employ a range of techniques for the non-destructive prospecting of archaeological deposits (Gaffney and Gater

Table 2.1. Equipment and Settings Used

Equipment	Settings
GSSI SIR3000 GPR with 400 Mhz Antenna	1–0.25-m Traverse Interval 512 Samples Per Trace 16 Bit Data Format 40 Nano Second Range 120 Scan Rate 32 Scans Per Meter
Sokkia Radian IS RTK GPS	
Geonics EM38B Electromagnetic Induction Meter	1-m Line Spacing 8 Readings/m
GeoScan Research RM15 - MPX15 Resistance Meter	0.5-m Line Spacing 2 Readings/m

Walker, Chester P.
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2003; Kvamme 2008). Several techniques have been derived from geophysical prospecting and adopted for archaeological investigations through rigorous field collection techniques and unique data processing programs specifically developed for the study of the archaeogeophysical record (Clark 2000; Kvamme 2003). Techniques used mostly for archaeological research include soil resistivity, soil conductivity, magnetic susceptibility, magnetometry, and GPR (Clark 2000; Kvamme 2003). All produce different results and require different equipment. Magnetometers record the net sum of all magnetic fields, both induced and remnant; GPR records relative dielectric permittivity; and electromagnetic induction meters record both the conductivity of the soils as well as their induced magnetic properties (magnetic susceptibility). The geophysical instruments are differentially affected by variables such as moisture, metal trash or debris, and the transmission of signals such as cell phones and transmission lines. Data collection is also impacted differently for each of the geophysical instruments by physical impediments such as trees, pavement, fences, and vegetation. The different geophysical techniques that have been used in archaeology have been discussed in a number of seminal books and journal articles (Bevan 1998; Carr 1982; Clark 1990; Conyers 2004; Gaffney 2008; Gaffney and Gater 2003; Scollar et al. 1990; Weymouth 1986; Witten 2006).

Ground Penetrating Radar

GPR data are acquired by transmitting pulses of radar energy into the ground from a surface antenna, reflecting the energy off buried objects, features, or bedding contacts in the soil, and then detecting the reflected waves back at the ground surface with a receiving antenna. When collecting radar reflection data, surface radar antennas are moved along the ground in transects, typically within a surveyed grid, and a large number of subsurface reflections are collected along each line. As radar energy moves through various materials, the velocity of the waves will change depending on the physical and chemical properties of the material through which they are traveling (Conyers 2004). The greater the contrast is in electrical and magnetic properties between two materials at an interface, the stronger the reflected signal, and therefore the greater the amplitude of reflected waves (Conyers 2004). When the travel times of energy pulses are measured, and their velocity through the ground is known, distance (or depth in the ground) can be accurately measured (Conyers and Lucius 1996). Each time a radar pulse traverses a material with a different composition or level of water saturation, the velocity will change and a portion of the radar energy will reflect back to the surface and be recorded. The remaining energy will continue to pass into the ground to be further reflected, until it finally dissipates with depth.

The depths to which radar energy can penetrate, and the amount of resolution that can be expected in subsurface deposits, are partially controlled by the frequency (and therefore the wavelength) of the radar energy that is being transmitted (Conyers 2004). Standard GPR antennas propagate radar energy that varies in frequency from about 10 megahertz (MHz) to 1000 MHz. Low frequency antennas (10–120 MHz) generate long wavelength radar energy that can penetrate up to 50 m below the surface in certain conditions, but are capable of resolving only very large buried features. In contrast, the maximum depth of penetration of a 900 MHz antenna is about 1 m or less in typical materials, but its generated reflections can resolve features with a maximum dimension of a few centimeters. A trade-off, therefore, exists between the depth of penetration and subsurface resolution. In this survey, a 400 MHz antenna was used, which produced data

of good resolution at depths between 0.15 m and 1.5 m below the ground surface.

Electrical Resistance

Resistance surveys measure the resistance to the flow of electric currents through the ground (Gaffney and Gater 2003:26). Resistance surveys can record differences in soil compaction, moisture content, and locations of highly resistant features such as stone (as in stone walls or foundations). Resistance surveys are suited to the geological conditions of the desert and Great Plains as well as the well-defined archaeological targets such as pit houses and adobe structures that are found in those regions. Depending on local site and soil conditions, in North American prehistoric archaeological sites, most features recorded with resistance will be negative resistance features, meaning that they fall below the background resistivity of the site (Somers 2006:112). This is due to the fact that most prehistoric features in North American archaeological sites will take the form of some sort of negative relief feature composed mainly of, at varying degrees, soil disturbance.

Resistivity surveys are controlled by constant variables including electric current, voltage, and the geometry of the resistivity probe array. The most common probe configuration is known as the Twin Probe Array, and it was developed specifically for archaeological purposes (Gaffney and Gater 2003:27–34; Somers 2006:112–115). This array uses a set of mobile probes, one injecting the current and one recording the reading (which is an average of the resistance in the area between the two probes), usually spaced with a 0.5 m separation. Probe spacing can be changed to resolve geophysical data to different depths. The 0.5 m separation has proven to be the most useful in electrical resistance for shallow archaeological deposits (Gaffney and Gater 2003:60). A set of probes are placed off the collection grid at a distance 30 times the mobile probe separation from any point on the grid (i.e., 15 m off the grid when using a 0.5 m separation). The GeoScan Research RM15 resistivity meter was used during the geophysical survey of the Upper Plaza.

Conductivity and Magnetic Susceptibility (EM)

Conductivity surveys measure the ability to conduct an electric current (Clay 2006:79). This measurement is the theoretical inverse to resistivity; however, measuring conductivity entails a much more complex set of procedures than does resistivity (Bevan 1983:51; Clay 2006:79). The conductivity meter has a set of wire coils, one transmitting a low frequency signal and one receiving the signal. Rather than inserting probes into the ground, the conductivity meter is simply carried above the earth surface, and data are logged automatically. This makes conductivity surveys time and labor efficient.

Conductivity meters can resolve data at different depths by changing the separation of the transmission and receiving coil and by transmitting its signal at different frequencies. Some instruments allow for these variables to be changed and others, like the Geonics EM38—the most widespread conductivity meter used in American archaeology, and the instrument used in this project—are not adjustable. The EM38B will measure conductivity to approximately 1.5 m below the surface when set in the vertical dipole mode (Ernenwein 2008:133).

Magnetic susceptibility is a measurement of a material's ability to be magnetized (Dalan 2006:161). Changes or contrasts in the magnetic susceptibility of sediments are the results of a conversion of weakly magnetic oxides and hydroxides to more strongly magnetic forms (Dalan 2006:162). Burning episodes (both

natural and human-caused) as well as organic and inorganic pedogenic processes can cause magnetic enhancement of anthropogenic soils (Dalan 2006:162–163).

DATA PROCESSING

All data were processed and filtered to remove extraneous false readings (spikes and drop-outs). Data processing levels the datasets so adjacent grids are combined into a single image with no "grid lines." Datasets were processed to enhance the visibility of the target features and geophysical anomalies through statistical manipulation of the recorded data as well as through image processing of the image file output.

The general goal of data processing is to lessen the effects of background "noise" and to enhance the quality of the "signal" or "target." In field geophysics in general, and archaeo-geophysics in particular, the term noise is used to discuss any return that is not a result of the object under investigation—the latter being referred to as the "target" or "signal." Hence, in some cases what is discussed as noise can in another case become the signal or target (Milsom 2005:13–14). Accuracy of the geophysical readings are not as important for resolving targets as is the contrast between the target and its surrounding matrix.

The major data processing techniques are discussed in this section, along with details on the specific data processing workflow applied to each collection grid. Kvamme (2006b:236) is followed in the general approach to data processing. After each processing step, the results are closely compared to their previous state to assure that data manipulation is not in fact decreasing the clarity and quality of the data, and thus ensures that the findings are not products of data processing.

GPR Data Processing

GPR data was processed using GPR Slice. The initial data processing for the project involved the generation of amplitude slice-maps (Conyers 2004). Amplitude slice-maps are a three-dimensional tool for viewing differences in reflected amplitudes across a given surface at various depths. Reflected radar amplitudes are of interest because they measure the degree of physical and chemical differences in buried materials. Strong, or high amplitude, reflections often indicate denser or different buried materials, such as archaeological features. Amplitude slice-maps are generated through the comparison of reflected amplitudes between the reflections recorded in vertical profiles. In this method, amplitude variations, recorded as digital values, are analyzed at each location in a grid of many profiles where there is a reflection recorded. The amplitudes of all traces are compared to the amplitudes of all nearby traces along each profile. This database can then be "sliced" horizontally and displayed to show the variation in reflection amplitudes at a sequence of depths in the ground. The result is a map that shows amplitudes in map view, but also with depth. Often when this is done, changes in the soil related to disturbances such as trash pits or dense clusters of rocks can become visible, making many features visible to the human eye that may not be visible in individual profiles.

The data were also processed as GPR profiles or "Radiograms". These radiograms are the plots of the raw data files presented as 2D vertical profiles. Radiograms were processed using a background removal filter that removes the linear banding that is often visible in GPR profiles.

Electrical Resistance Data Processing

The most common processing techniques for electrical resistance data include high pass

filtering and despiking. High pass filtering calculates the mean of a window of a specified size, and then subtracts this mean from the center value. This is typically done using either Uniform or Gaussian weighting. With Uniform weighting means, all values within the window are given equal weight. Gaussian weighting gives a higher weight to values closer to the center of the window. With respect to resistivity data, the high pass filter is commonly used to remove the geological background readings from the data (Somers 2006:118–119). In addition, despiking is often used to remove outliers from the dataset. A uniform weighted window is passed through the data set to remove all values exceeding a specified threshold. Both the window size and threshold are adjustable, and mean or median values can be used for the threshold. In resistivity data, such outliers are often erroneous readings.

Electromagnetic Induction (Conductivity) Data Processing

Of the geophysical technologies employed in the current survey EM is the most straight forward to process. Data files are simply exported as XYZ files from the GeoMar TrackMaker data collection software. These data are then gridded in Surfer, exported as images, and then geo-referenced in ArcGIS.

SURVEY METHODS

The geophysical survey at the Chan Chich was located in the site's Upper Plaza. A 20-x-40-m collection grid was established using 50-m measuring tapes and a total data station, which was used to establish angles but not distances (Figure 2.1). The grid was oriented on a north/south axis, which is roughly aligned with the general orientation of the upper plaza. The survey crew plotted the location of trees in the grid prior to conducting the survey (Figure 2.2). The entire collection area was covered with GPR at a 1-m line spacing. Resistance data was collected over as much of the total collection area as possible (given the amount of standing trees and rock on the plaza surface). Both the GPR and resistance data were processed and a 10-x-10-m collection grid was established over a series of interesting high amplitude reflections (Figure 2.2). The 10-x-10-m subset was recollected at high resolution with the GPR and EM. High resolution GPR data were collected along both the x and y axis at 25-cm line spacing. EM data were collected at 50-cm line spacing.

RESULTS

The GPR data (Figure 2.3) show a series of high reflection anomalies (shown in red on these images). The 1-m data show high amplitude reflections in the northeast and western portions of the grid. The high amplitude reflections on the western portion of the 1-m GPR grid correspond well with a high resistance anomaly from the resistance survey (Figure 2.4).

A 10-x-10-m grid was established over this GPR and resistance anomaly and additional data were collected as noted above. The high resolution GPR data increased the clarity of this anomaly (see inset on left side of Figure 2.3). This anomaly was chosen for testing due to its appearance in two of the geophysical data sets as well as its location in relation to the upper plaza. The results of these test excavations are discussed by Kelley et al. (this volume), but in general were areas of loosely consolidated construction fill. The EM data (Figure 2.5) was non-conclusive and only produced one anomaly that was caused by ferrous objects on the surface.

Although the geophysical survey was unsuccessful in the Upper Plaza, I am optimistic that under the proper conditions one or more of the remote sensing techniques we tested at Chan Chich could prove useful on Maya

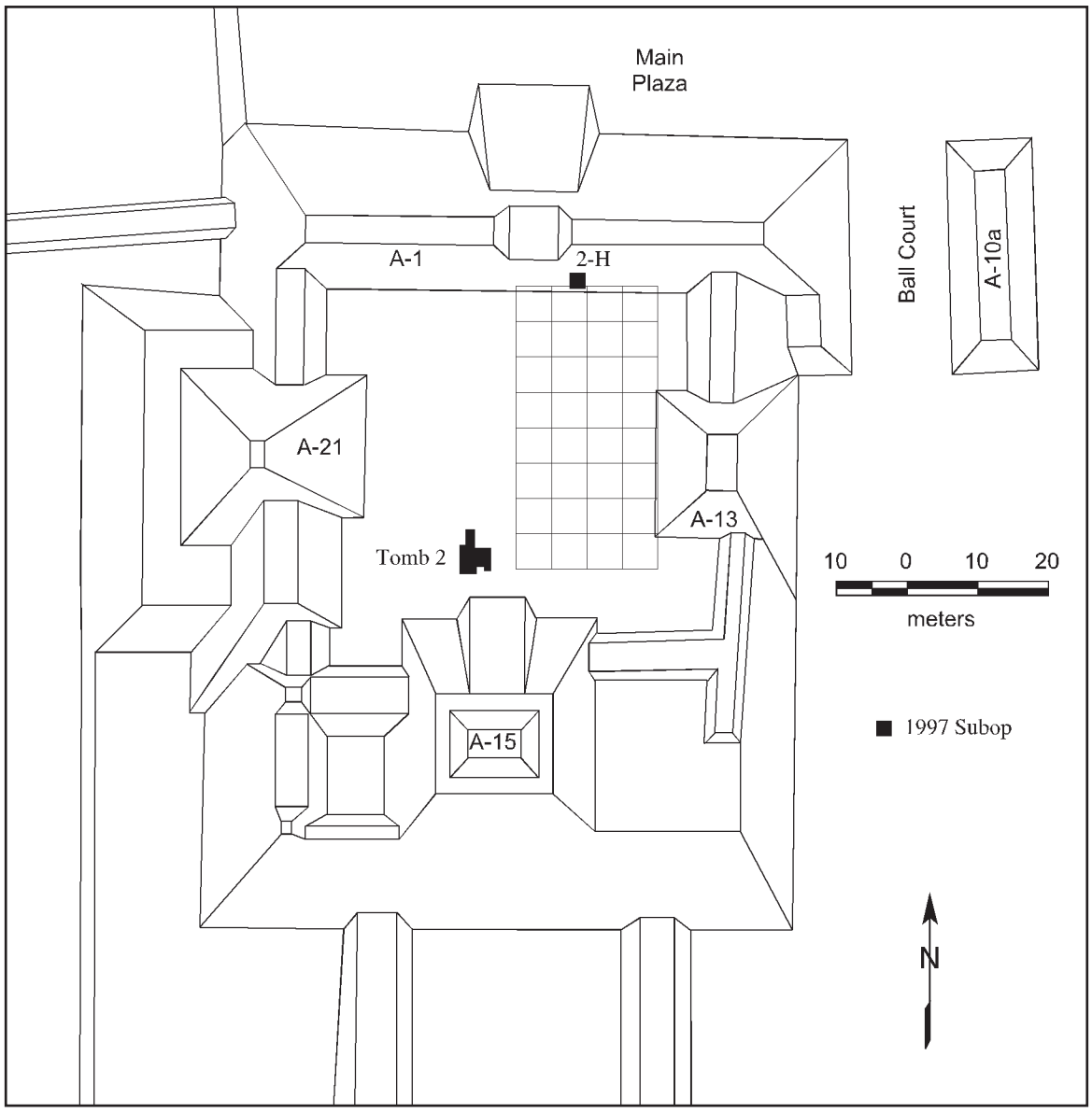

Figure 2.1. Map of the Upper Plaza showing the geophysical survey grid in relation to structures and prior plaza excavation units (subops).

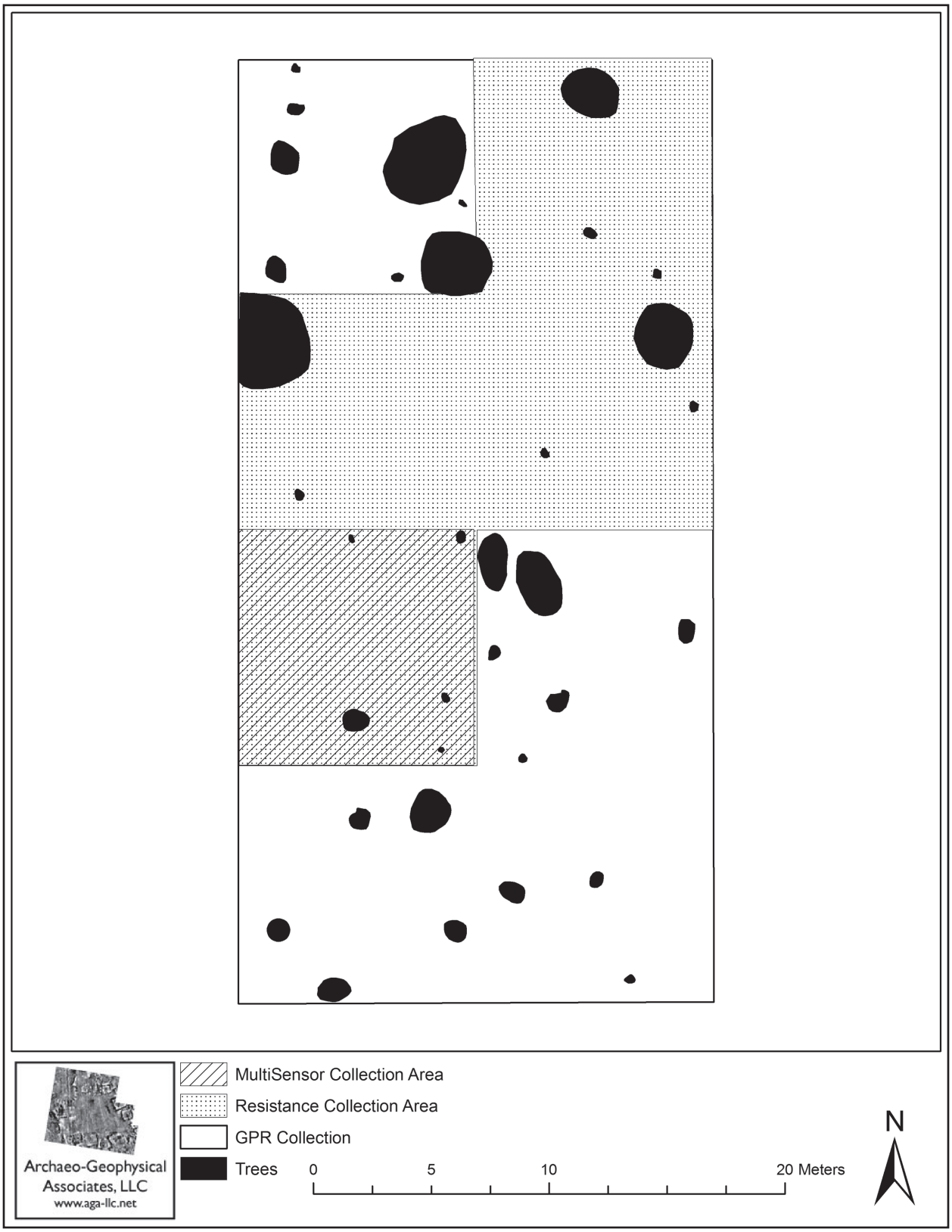

Figure 2.2. Map of survey grid showing the locations of trees and archaeo-geophysical collection areas.

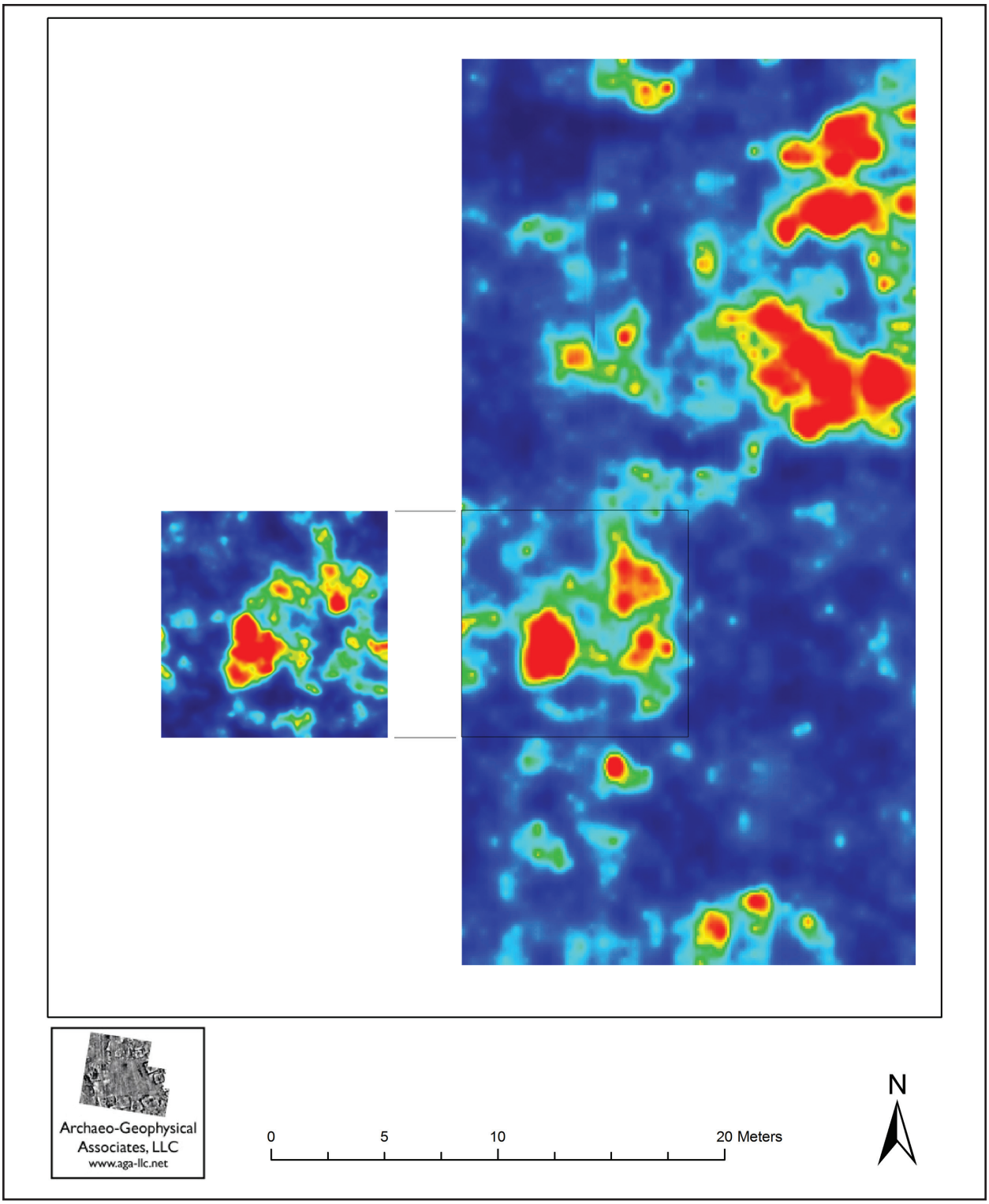

Figure 2.3. Right: GPR Amplitude Time Slice from 80–100 cmbs. Left: High Resolution GPR Amplitude Time Slice from 80–100 cmbs. These data were collected along both the x and y axis of a subset of the overall collection area. Line spacing was 0.25 m, which equals 8 times the amount of data points than in the same area in the initial survey. Red areas on the image represent high amplitude reflections and the blue areas represent low amplitude reflections.

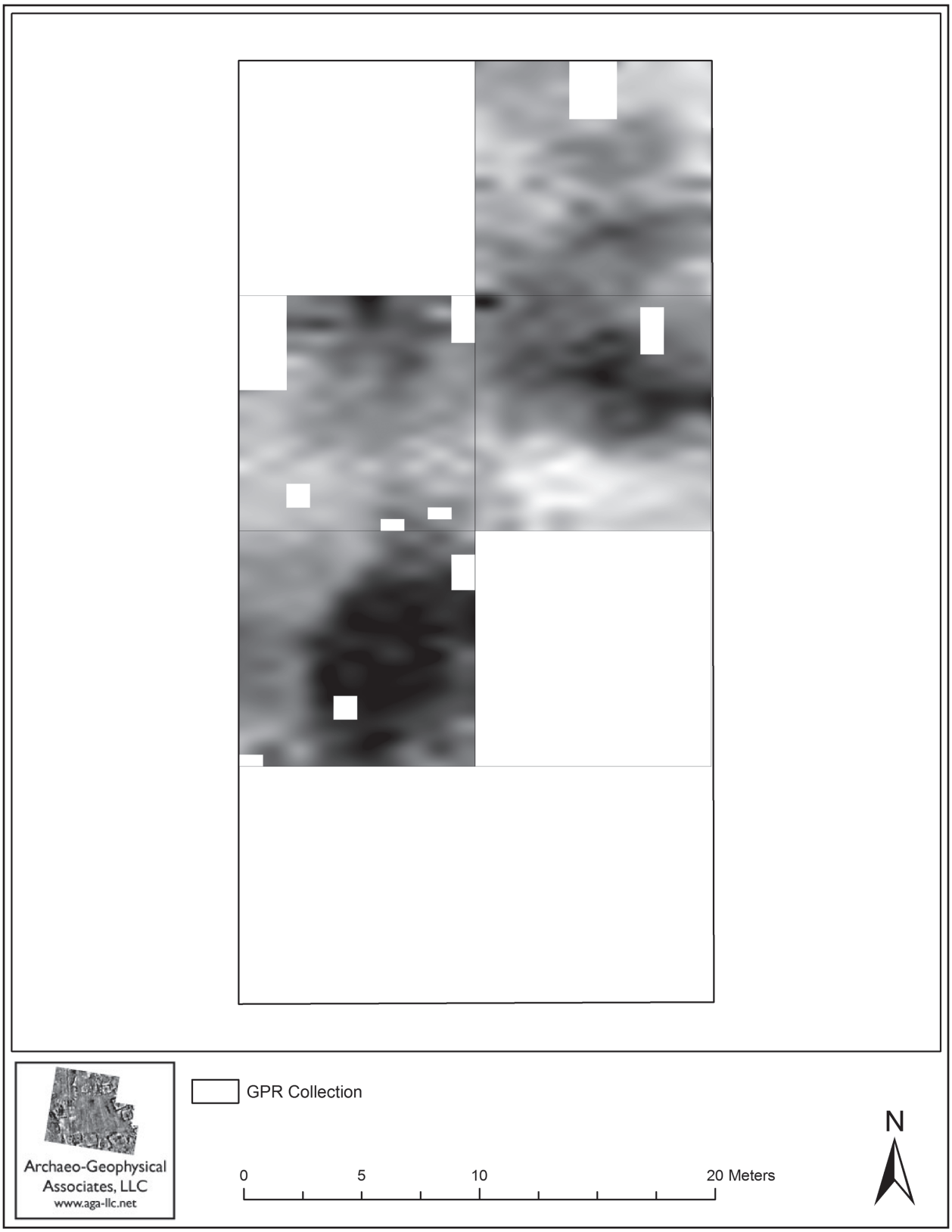

Figure 2.4. Resistance Data from the Upper Plaza survey grid.

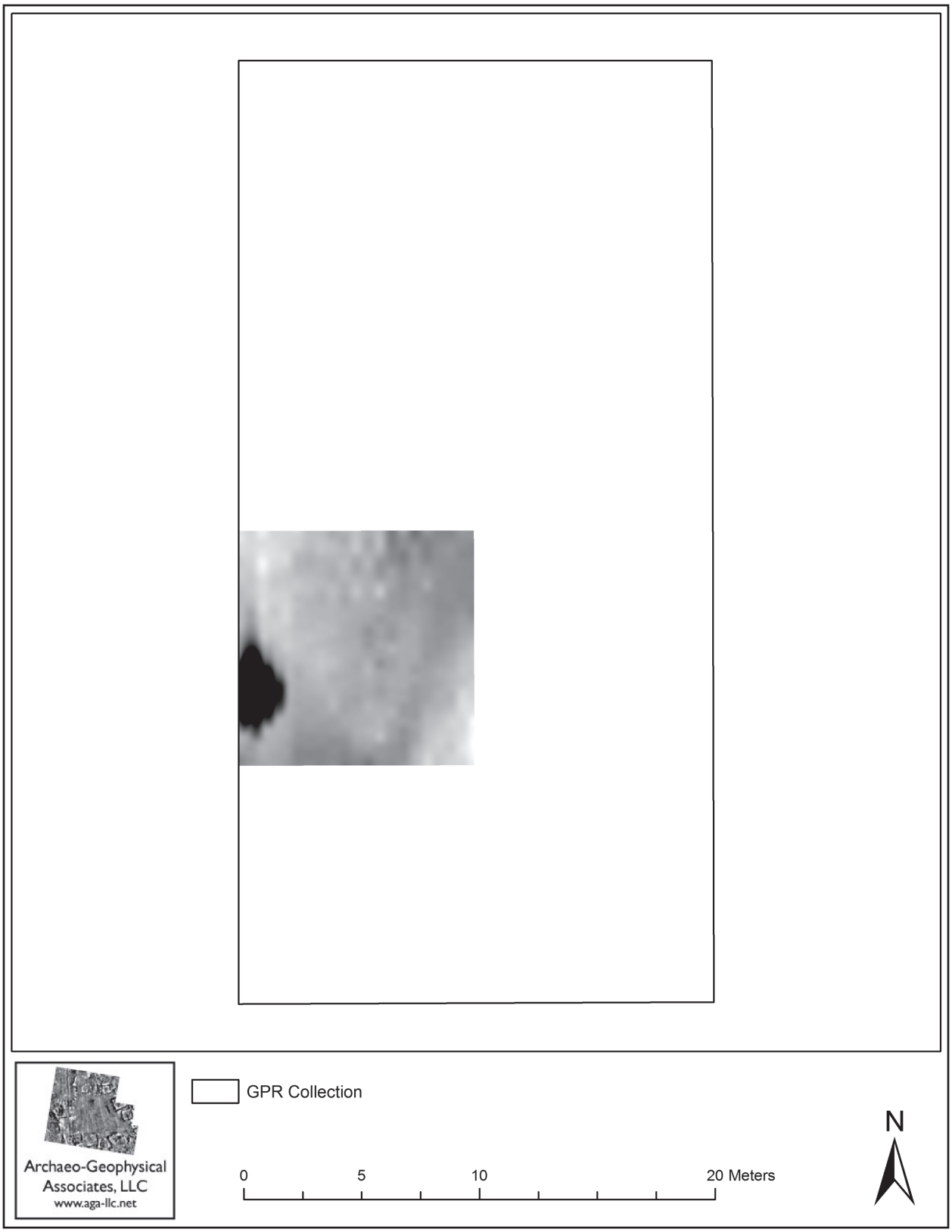

Figure 2.5. Conductivity Data from the Upper Plaza survey grid.

architecture. Specifically, in settings without thick deposits of dry-laid cobble fill, I believe we would get more useful data. Furthermore, the test flight of a small unmanned aerial vehicle (drone) proved successful in producing a photogrammetric model of the Main Plaza at the site. Although I did not discuss that test in this report, Houk (first chapter of this volume) featured the results in Figure 1.2. I believe combining a photogrammetric model of a single structure with detailed GPR data might allow for the creation of a three-dimensional projection of buried architecture.

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Chan Chich: 2012 Investigations of the Upper Plaza

Krystle Kelley, Kevin A. Miller, and Ashley Booher

INTRODUCTION

During the 2012 field season of the Chan Chich Archaeological Project (CCAP), excavations were conducted for the first time in over a decade in the Upper Plaza of the site. This season's work at the Upper Plaza was designated Operation CC-10, and began on May 23, spanning a four-week period in which the authors and a total of 12 students, rotating in teams of 6 at a time, worked under the overall guidance of project director Brett A. Houk. These excavations were the first season of a two-year plan of archaeological work to be conducted in the Upper Plaza, focused on deposits in the plaza. The main goal of the 2012 investigations was to gather preliminary data on which the 2013 research design would be based. These future excavations will be aimed at uncovering details surrounding the utilization of space in the Upper Plaza during the Maya occupation of Chan Chich, which began sometime in the Middle Preclassic and carried on into the Late Classic period (Robichaux et. al. 2000).

This was not the first season of archaeological excavation in Chan Chich's Upper Plaza, but rather an expansion on previous excavations conducted in the 1997–1999 CCAP field seasons led by Hubert Robichaux (2000). The Upper Plaza was first documented by Thomas Guderjan (1991), but it was not until the late 1990s when the CCAP was established that the first archaeological excavations were completed in this critical part of the site. Over those early seasons of investigation, the Upper Plaza was fully mapped, and a Middle Preclassic midden and a royal protoclassic tomb were documented in excavations beneath the plaza (Moses 1999; Robichaux 1999; Robichaux et. al. 2000; Robichaux 2000). These previous excavations also focused on the structures associated with the Upper Plaza, specifically Structure A-13 on the eastern edge of the plaza, and the long range building, Structure A-1, on the northern side dividing the elite Upper Plaza from the Main Plaza below (Robichaux et. al. 2000). Our research design for the 2012 season concentrated on the plaza itself.

Five suboperations were opened over the course of the 2012 CCAP season in the Upper Plaza, and are depicted in Figure 3.1. This season's excavations were located primarily in the west-central area and the northeast corner of the plaza.

RESEARCH DESIGN AND METHODOLOGY

The 2012 CCAP investigations utilized field methodologies outlined in *The La Milpa Core Project Field Manual* by Houk and Zaro (2011). However, this season also incorporated a new database system that utilized iPads to streamline the field reporting process (see Houk, this volume). This system allowed data entry for operations, suboperations, lots, artifacts, special finds, maps, and photographs directly

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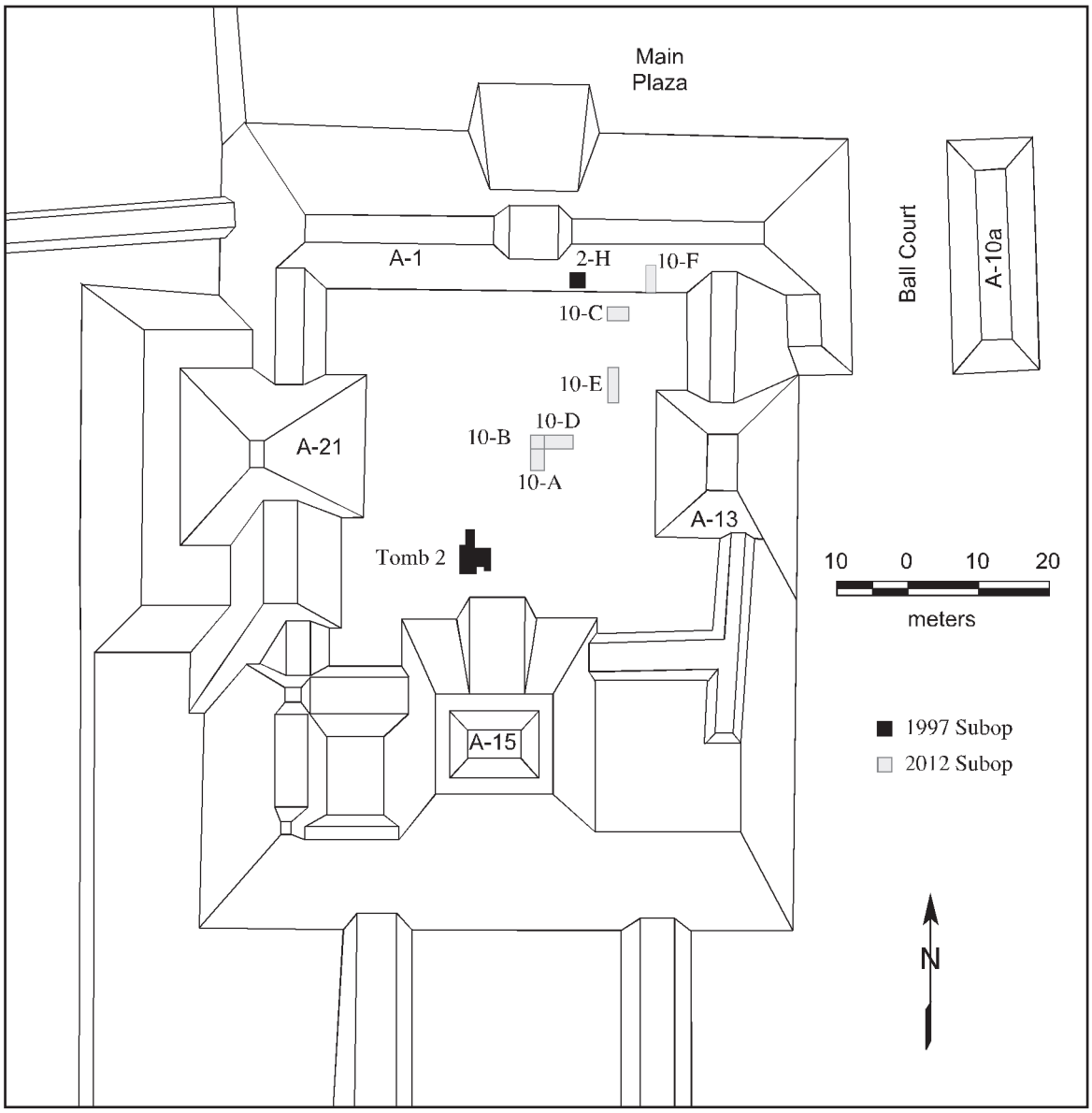

Figure 3.1. Layout of 2012 Upper Plaza excavations (Op CC-10) in relation to structures and previous units.

into the database from the field, and improved the process for collecting and processing data.

The earliest stages of the 2012 season in the Upper Plaza involved the utilization of several types of remote sensing techniques on the plaza surface done by Dr. Chet Walker of Archeo-Geophysical Associates, LLC. The methodology and results of these investigations are outlined further by Walker (this volume). The goal of the remote sensing was to identify anomalies situated below the plaza floor that would assist us in establishing initial excavation units. First, the plaza was swept of all leaf litter and other debris, clearing the surface for the equipment. A grid was established, measuring 20 m east-west by 40 m north-south and covering the areas of the plaza most suitable for remote sensing techniques. After analyzing the results of ground penetrating radar (GPR), electrical resistance, and magnetometery on this area, we determined the locations of Subops CC-10-A, -B, and -C, which targeted

apparent subsurface anomalies revealed in the data. On the surface, these areas appeared in no way unusual from the rest of the plaza floor, but strong contrasts in the data led us to believe there may have been buried architecture below. However, after removing approximately 1 m of fill in each of these subops (see details below), we realized that anomalies revealed in the remote sensing work were probably explained by the voids or air pockets within the large rock construction fill below the most recent plaza floor. This conclusion was reached after a careful comparison of stratigraphy with the GPR data, which confirmed that these air pockets between the larger rocks were located in areas that corresponded to those areas of greater contrast in the data.

In light of this realization, which caused us to question the significance of our remote sensing data, we abandoned the plan for opening further units based strictly on anomalies identified by the remote sensing. We then opened Subop CC-10-D, extending 4 m due east of Subop CC-10-B, to investigate the very center of the plaza for any possible ceremonial or ritually significant features. Subop CC-10-E, a 5-x-1.5-m trench running north-south, was opened next to investigate an approximately 50-cm discrepancy in floor elevations between subops in the central area of the plaza and Subop CC-10-C in the northeast corner of the plaza. Finally, Subop CC-10-F was opened in the last week of excavations on the southeastern side of Structure A-1 in an attempt to tie in the base of the structure to the associated plaza floors.

The locations of all units were recorded with a Total Data Station (TDS) and referenced to the geophysical grid. Because we began to notice errors in our depth measurements (using line levels and datums near units) during excavations, the elevations of floors encountered during excavations were also measured using the TDS.

EXCAVATION RESULTS

Subops CC-10-A, -B, and -D

Subops CC-10-A, -B, and -D were laid out to form a large, L-shaped trench, with Subop CC-10-D situated over the direct center of the plaza floor (Figure 3.2). These three connected units revealed comparable stratigraphy throughout

Figure 3.2. Subops CC-10-A, -B, and -D, facing east with Subop CC-10-D in the foreground.

(Table 3.1). The artifacts collected at each level were of similar type and style. In total, six separate pieces of obsidian blades were found scattered throughout the various lots of Subops CC-10-A, -B, -D, along with numerous polychrome sherds, an unworked chunk of metamorphic stone, and lithic flakes as well as a few bifaces. The floors that were uncovered showed no break or discrepancy and were consistent throughout the area (Figure 3.3). The most recent plaster floor, which lies near the current level of the modern ground surface is floor number 8 in this area (numbered from oldest to most recent). It was very badly deteriorated and in most places no longer detectable. Notably, this poorly preserved floor covered one substantial construction event in which the previous floor was covered with approximately 1 m of dry-laid construction fill, ranging from extremely large cobbles and small boulders to smaller cobble fill. This construction fill was used to drastically raise the plaza surface in a single, large-scale construction event. As noted earlier, anomalies revealed in the remote sensing study were found to be portions of this fill composed of large rocks and air pockets.

Below this meter of construction fill excavations uncovered a series of floors. The first surface we came to below the fill was a compact dirt surface made of silty loam that was about 20-cm thick. There were some small rocks and ceramics within this layer, as well as sporadic pieces of burnt limestone, jute shell, obsidian. Below this layer we uncovered a plaster floor

Table 3.1. Summary of Lots and Floors in Subops CC-10-A, -B, and -D

Lot Description	Lot #	Floor #	Artifacts
Topsoil	CC-10-A-1 CC-10-B-1 CC-10-D-1	(8)	Ceramic sherds, lithic flakes, lithic biface, small piece of bone
Dry Laid Construction Fill	CC-10-A-2 CC-10-B-2 CC-10-D-2	8	Ceramic sherds, lithic flakes, two obsidian blades, jute shell
Compact Dirt Surface	CC-10-A-3 CC-10-B-3 CC-10-D-3	--	Ceramic sherds, four obsidian blade fragments, lithic flakes, jute shell
Plaster Floor	CC-10-A-4 CC-10-B-4 CC-10-D-4	7	Ceramic sherds, lithic flakes, unworked metamorphic stone, chert, river shell, charcoal
Plaster Floor	CC-10-A-5 CC-10-D-5	6	Ceramic sherds, river shell, lithic flakes
Thick Plaster Floor	CC-10-A-6 CC-10-D-6	5	Ceramic sherds, lithic flakes, charcoal
Plaster Floor (possibly resurfaced)	CC-10-A-7 CC-10-D-7	4	Charcoal, river shell
Burial	CC-10-A-8	--	Burial 10 (unexcavated)
Plaster Floor	CC-10-D-8	3	Ceramic sherds, river shell, lithic flakes
Plaster Floor	CC-10-D-9	2	Ceramic sherds, river shell, lithic flakes, charcoal
Plaster Floor	CC-10-D-10	1	Ceramic sherd, river shell, charcoal
Subfloor to Bedrock	CC-10-D-11	--	Ceramic sherd, river shell, charcoal

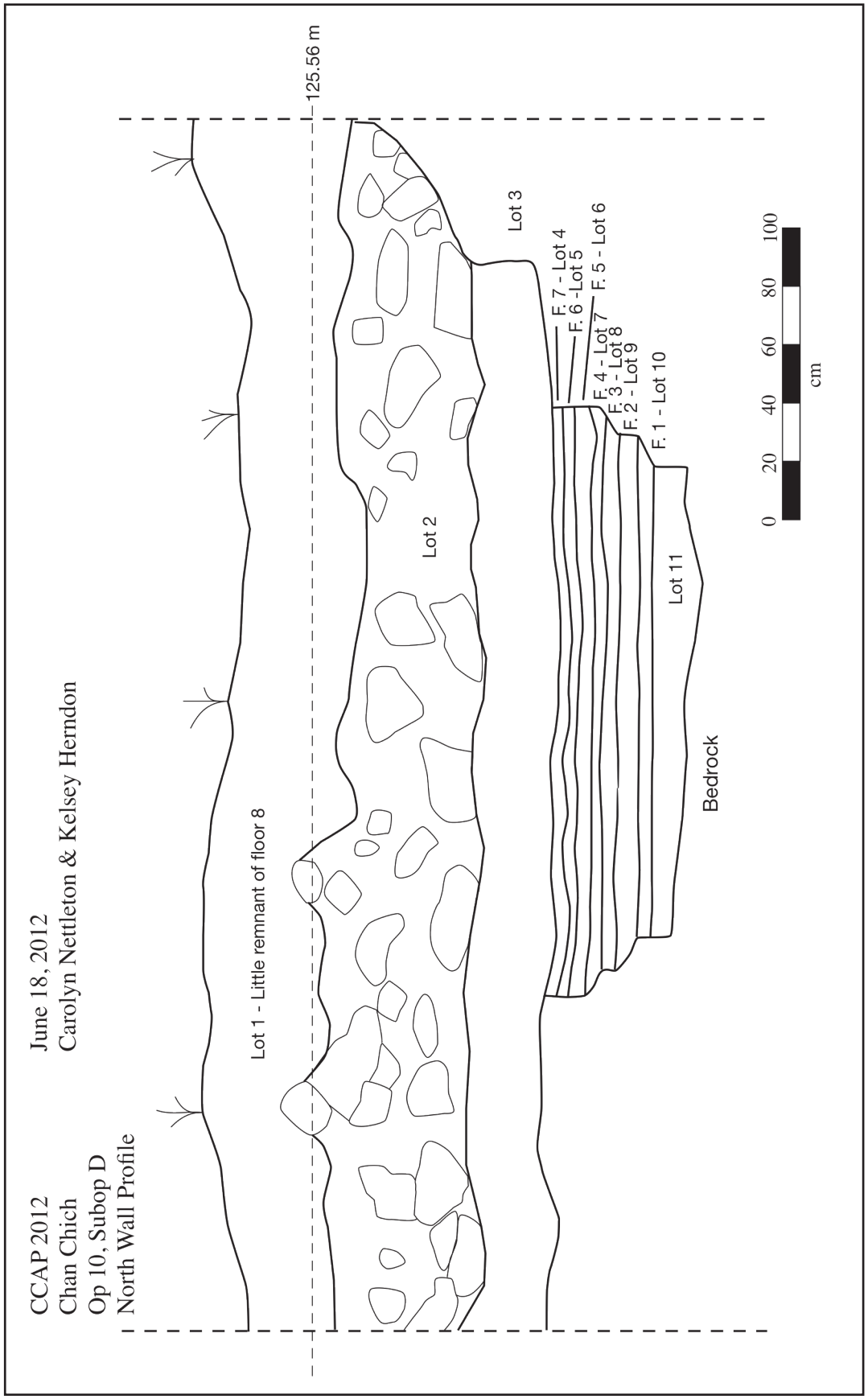

Figure 3.3. North wall Profile of Subop CC-10-D.

approximately 10-cm thick in the areas of good preservation, which was sitting directly on top of yet another plaster floor with almost no construction fill in between. Fewer artifacts were found in these layers. Each floor after this was plaster and poorly preserved, and separate floors became increasingly hard to distinguish from resurfacings, with very little to no fill between them (Table 3.2). This series of floors was variably preserved from one floor to the next, and between different areas of the same floor.

While we anticipated we might find something in the center of a plaza to denote it as an area of relative significance or cultural use, no stone monuments or caches were found in this area. Admittedly, our system of using tape and compass to identify the center of the plaza has a margin of error that is larger than Subop CC-10-D. However, in the southeast corner of Subop CC-10-A, we uncovered a burial, which was cut into at least one plaster floor (Floor 3) then covered over. This burial was designated Burial 10, and the exposed area of the burial cut measures approximately 90 cm north-south and 40 cm east-west. The burial appears to extend under an unexcavated section of Floor 7 in the western half of Subop CC-10-A, and may continue to the south beyond the limits of the subop. Due to time limitations, we did not excavate this burial this season, however a more thorough excavation will be conducted in the 2013 season. Prior to backfilling the burial's location was marked with layer of empty artifact bags, approximately 10 cm of sterile, screened dirt, and a layer of orange flagging tape.

Subops CC-10-C

Subop CC-10-C was originally opened to investigate a possible anomaly that was detected in the GPR study near the northeast corner of the GPR grid. However, our observations here were consistent with the hypothesis that the radar was picking up on air pockets in the top meter of construction fill. After this was determined, we decided to excavate Subop CC-10-C to bedrock to gather data for a comparison between the northeast corner of the plaza and Subops CC-10-A, -B, and -D in the center. Stratigraphy in Subop CC-10-C was dissimilar to that of Subops CC-10-A, -B, and -D. The floor in Subop CC-10-C that lay below the dry laid construction fill which upheld the most recent plaza floor, was about 50-cm lower than the corresponding floors in Subops CC-10-A, -B, and -D. In addition, Subop CC-10-C had no compact dirt surface. There were only

Table 3.2. Elevations of Tops of Floors in Subops CC-10-A, -B, and -D, Determined by TDS

Floor #	CC-10-A Top Elevations (m)	CC-10-B Top Elevations (m)	CC-10-D Top Elevations (m)	Average Thickness (cm)
8	125.67	125.66	125.64	1
Compact Surface	125.07	124.93	124.95	15
7	124.80	124.81	124.79	6
6	124.74	124.65	124.70	5
5	124.65	--	124.64	3
4	124.58	--	124.56	2
3	124.51	--	124.53	4
2	--	--	124.47	5
1	--	--	124.41	1
Bedrock	--	--	124.26	--

six floors in Subop CC-10-C, as opposed to eight, and they contained more fill in between them (see Figure 3.4 and Tables 3.3 and 3.4 for comparison). Near the bottom of Subop CC-10-C we uncovered part of the midden deposit located on the north end of the plaza that was documented in 1997 (Robichaux 1999). Abundant amounts of jute shell, numerous ceramic sherds, a broken polished stone celt, and a small piece of jade were found in this deposit (Lot CC-10-C-7).

Subop CC-10-C is the only subop for which we have ceramic data from 2012. As shown in Table 3.3, all lots had Late Preclassic Chicanel ceramics, except for the lowest lot, which contained Middle Preclassic sherds.

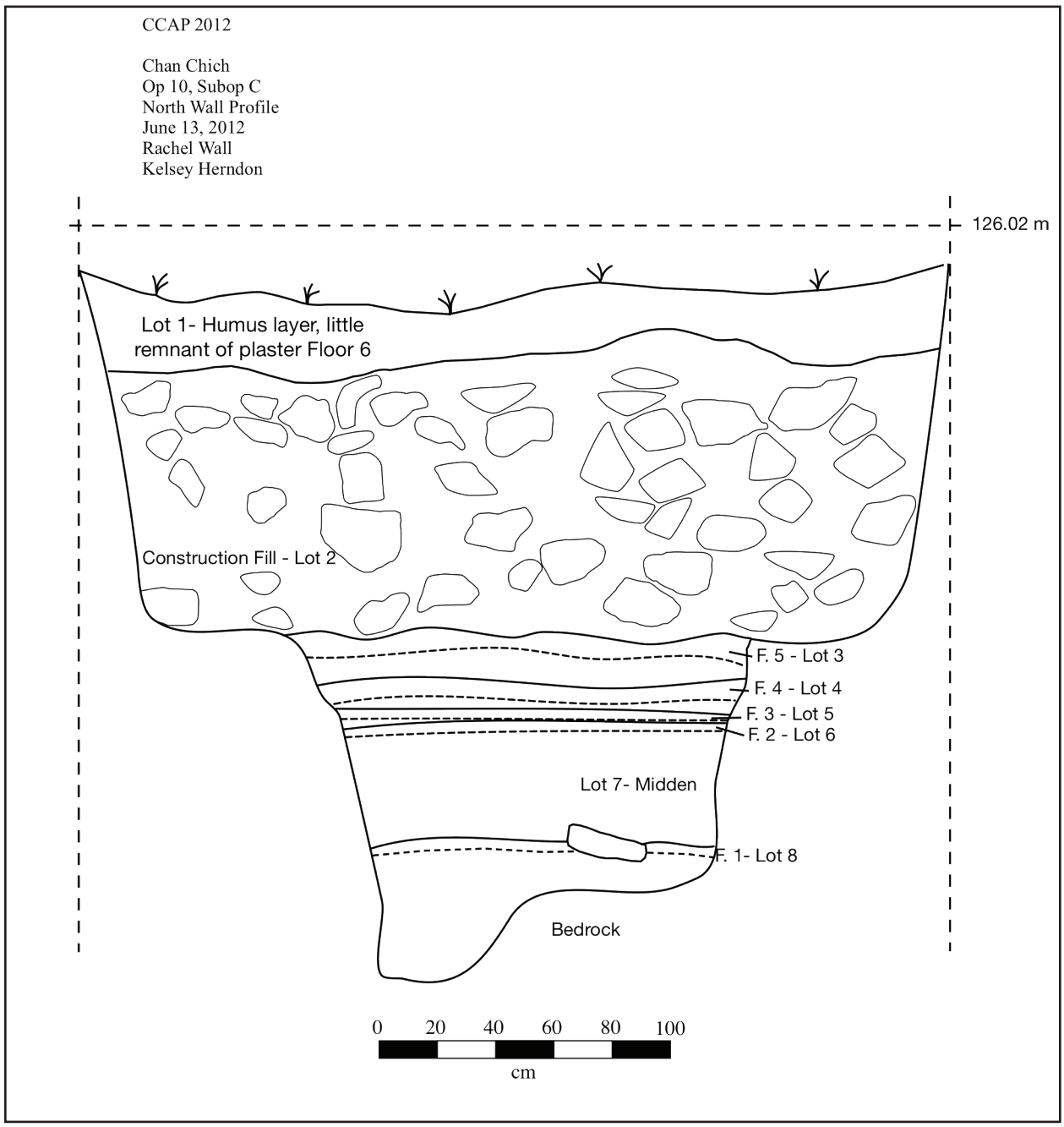

Figure 3.4. North wall profile of Subop CC-10-C.

Table 3.3. Summary of Lots and Floors in Subop CC-10-C

Lot Description	Lot #	Floor #	Artifacts	Ceramic Assessment
Topsoil	CC-10-C-1	--	Ceramic sherds, lithic flakes	Chicanel
Dry Laid Construction Fill	CC-10-C-2	6	Ceramic sherds, lithic flakes, river shell, polished stone celt fragment	Chicanel
Plaster Floor	CC-10-C-3	5	Ceramic sherds, lithic flakes, river shell, faunal bone, charcoal	Chicanel
Plaster Floor	CC-10-C-4	4	Ceramic sherds, lithic flakes, faunal bone, river shell, charcoal	Chicanela
Plaster Floor	CC-10-C-5	3	Ceramic sherds, lithic flakes, charcoal	Chicanel (early?)
Plaster Floor	CC-10-C-6	2	Ceramic sherds, lithic flakes	Preclassic (generic)
Midden	CC-10-C-7	--	Ceramic sherds, lithic flakes, charcoal, polished greenstone, jute shell	Swasey
Plaster Floor to bedrock	CC-10-C-8	1	Ceramics, lithic flakes, lithic biface, ground stone spheroid, jute shell	Swasey (?)

Table 3.4. Elevations of Tops of Floors in Subop CC-10-C, Determined by TDS

Floor	Top Elevation (m)	Average Thickness (cm)
6	125.75	1
5	124.62	6
4	124.49	4
3	124.36	3
2	124.34	4
1	123.90	3
Bedrock	123.48	--

Although we believe that at least the upper part of the plaza (Lots CC-10-C-1 and -2) is Late Classic in age, the Late Preclassic and Middle Preclassic age assessments for the lower floors are consistent with the previous investigations in the plaza (e.g., Houk et al. 2010; Robichaux et al. 2000).

Subop CC-10-E

Subop CC-10-E was a 1.5-x-5-m trench running north-south located between Subop CC-10-C and Subops CC-10-A, -B, and -D. The purpose of excavating this subop was to search for an architectural interface that would explain the differences in floor elevations between the floors in Subop CC-10-C and those in Subop CC-10-A, -B, and -D. This unit did not unearth the exact location of the shift in elevations, however it confirmed that the elevation of the floors in this area of the plaza were still analogous to those found in Subops CC-10-A, -B, and -D (Figure 3.5). These results from Subop CC-10-E indicated that the elevation shift must lie somewhere between this subop and the northeast corner of the plaza where Subop CC-10-C is located. Within the first meter of fill in Subop CC-10-E, a small obsidian blade fragment, numerous ceramic pieces, and a round limestone disk, possibly used as a weight or a game piece, were uncovered. Subop CC-

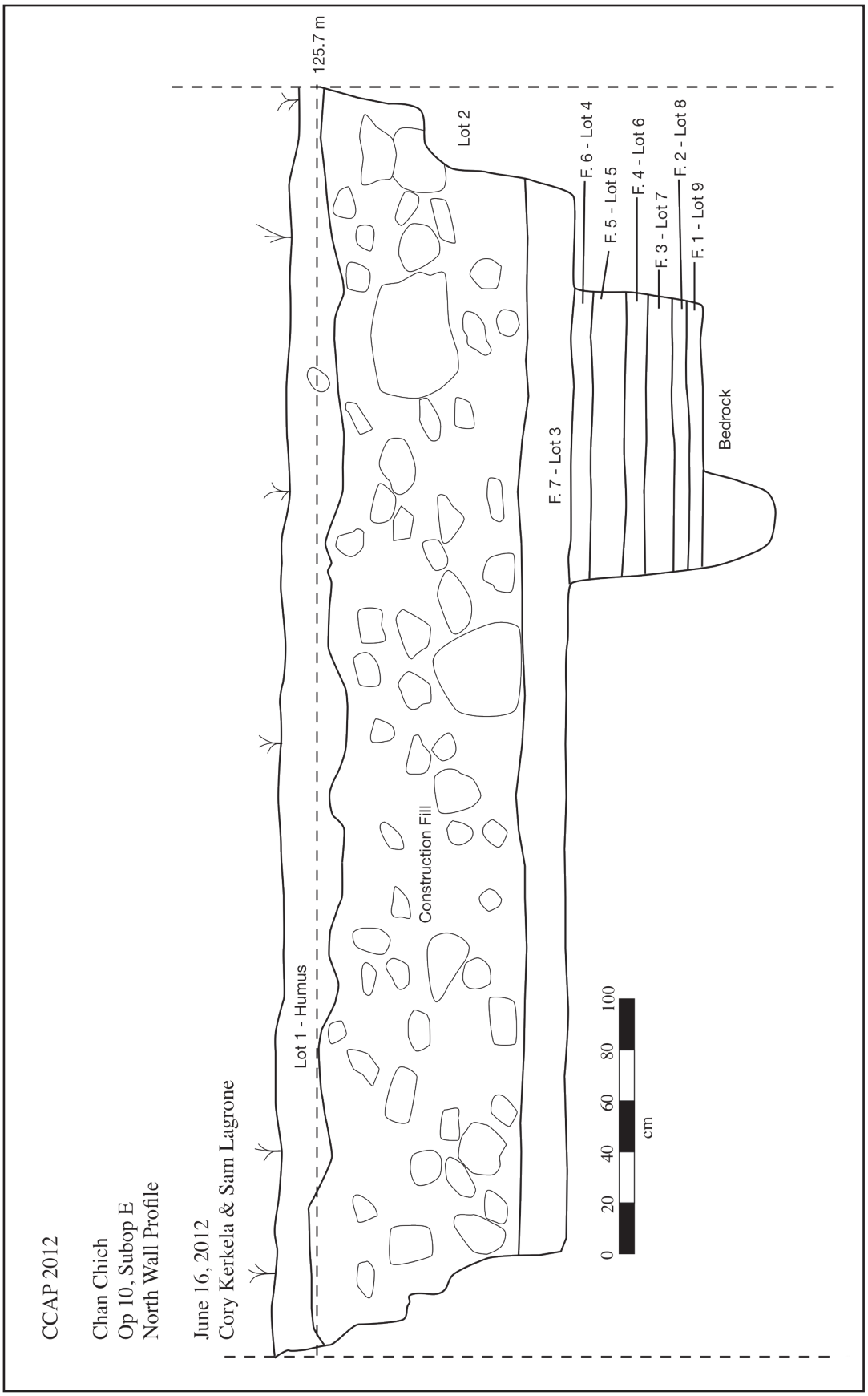

Figure 3.5. North wall profile of Subop CC-10-E.

10-E was excavated down to bedrock, which occurred at an elevation of 123.89 m.

Subop CC-10-F

Subop CC-10-F was a 4-x-1.5-m unit running north-south located on the southeastern side of Structure A-1. This subop was opened with the intention of exploring the association of the structural architecture with the various plaza floors that were built up over time. However, Subop CC-10-F was placed too low on the mound, and all that was excavated was collapse debris from Structure A-1 and the final plaza floor, which was well preserved beneath the collapse debris. As it was the last week of the season, the subop was closed rather than extended. More excavations higher up on the mound are planned for next year.

CONCLUSIONS AND FUTURE RESEARCH

This season's excavations in the Upper Plaza provided us with as many questions as it did answers. However, these questions will be the guiding force behind the 2013 excavation plans for the CCAP. In total, six suboperations were opened up in four separate locations. Initially these locations were selected in an effort to investigate anomalies observed in remote sensing data. However, later units (Subops CC-10-D, -E, and -F) were opened based on questions that arose from the previous subops. Although not all of our questions were answered, the 2012 data gave us a direction in which to proceed for next year's field season.

During the 2013 field season, excavations will attempt to complete a north-south section across the entire Upper Plaza. This will resolve the discrepancy in floor elevations between the center and northeast corner of the plaza by locating the architectural interface (perhaps a platform edge) the we now know lies somewhere north of Subop CC-10-E. We will also excavate Burial 10, discovered this season in Subop CC-10-A. Additional suboperations will attempt to relate stratigraphy documented during the previous excavations of the royal tomb from the 1997–1999 seasons to our current data (e.g., Houk et. al. 2010; Robichaux et. al. 2000).

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Kaxil Uinic: A Report on Archival Investigations and Reconnaissance of the Historic Maya Village

Brett A. Houk

INTRODUCTION

Since I first started the Chan Chich Archaeological Project (CCAP) in 1996, I have been interested in Kaxil Uinic. My interest was in both the small prehistoric ruins there (recorded by Guderjan et al. [1991] as E'kenha), which were reported to posses a carved stela and which I believed were possibly connected to Chan Chich by a *sacbe*, and the associated historic Maya village turned chicle camp, which had been abandoned in 1931. My only first hand visit to the site prior to 2012 had been in 1998, when I led a group of field school students and staff on a Saturday morning hike toward the border with Guatemala. We made a short stop at the ruins and inspected the stela, and I thought at the time the site would make an interesting component to the research at Chan Chich. As it turned out, that research would have to wait until 14 years later.

This chapter details the results of an initial literature review on the historic village of Kaxil Uinic, archival research of records stored at the Field Museum of Chicago, Illinois regarding Sir J. Eric S. Thompson's 1931 archaeological expedition to Belize, a several reconnaissance trips to first relocate and subsequently assess the condition of the historic site. The archival research was funded by a grant (the Gloria Lyerla Library Memorial Fund Research Travel Grant) from Texas Tech University (TTU) and the Department of Sociology, Anthropology, and Social Work at TTU. The literature review has been an ongoing project of mine for several years. Initially focused on the prehistoric Maya site of Kaxil Uinic (Houk 2011), the review has been expanded to include the historic Maya village of the same name.

I visited the Field Museum and accessed the archives on March 29, 2012, prior to the 2012 field season of the CCAP. The museum's archivist, Armand Esai, pulled the pertinent files and arranged for my viewing of them in the department's library. I had access to two separate collections of records: Dr. Thompson's files from the 1920s–1930s and the Museum Director's files from 1931. To speed the research, I photographed all pertinent records.

The reconnaissance trips to find and assess the historic village took place as part of the 2012 CCAP field season, while excavations were being conducted at the prehistoric ruins (see Harris and Sisneros, this volume). The goal of those trips was to determine the research potential of the historic site and the feasibility of conducting a historical archaeologicy project there.

One of the over-arching goals of the archival study and literature review was to determine whether or not the archaeological site of Chan Chich is the same site that Thompson planned to excavate in 1931. A key to answering that question is determining Thompson's route from

Houk, Brett A.
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San José to Kaxil Uinic during Easter week in 1931. As I argue in this chapter, the two sites are not the same place, and it is probable that Thompson never even saw the ruins that are today known as Chan Chich.

Because, as it turns out, the historic village and the prehistoric Maya site of the same name are located 0.5 km apart, the two are spatially and temporally distinct entities, nevertheless linked by proximity and name. I treat them as such here, discussing first the historic village and second the prehistoric ruins. To minimize confusion, I refer to the historic settlement as Kaxil Uinic village and the prehistoric site as Kaxil Uinic ruins.

A comment about the name shared by the two places is in order. The literature review and the archival study demonstrate that the name of the place is spelled in a wide variety of ways. In my research, I found it spelled "Kaxil Uinic" (Thompson 1939, 1963), "Kaxiluinic" (Jones 1977), "Kaxilvinic" (Maler 1910: 151), "Kaxi Uinic" (Third Marshall Field Archaeological Expedition to British Honduras: Preliminary Report [3MFAEBH:PR], Field Museum Archives, Chicago [FM]), "Xaxe Venic" (Miller 1887; Colonial Secretary to Alcalde, Xaxe Venic, letter, [Colonial Secretary] March 5, 1931, FM), "and "Kaxwinik" (Memorandum on a Proposed Maya Archaeological and Ethnological Expedition [Memorandum], 1931, FM), among others. Xaxe Venic is the earliest spelling I have found, on a map by William Miller published in 1887, and it appears that variation was preferred locally and by the Belize Estates and Produce Company, the landowner in the early 1900s. Even today, the name Xaxe Venic appears on signs and trail maps at Chan Chich Lodge. J. Eric Thompson, himself, may have been responsible for changing the name to Kaxil Uinic, which is Yucatec Mayan for "forest man" or "wild man."

THE HISTORIC MAYA VILLAGE OF KAXIL UINIC

The Archival Evidence

"Xaxe Venic" is depicted on an 1887 map published by William Miller as part of his official survey of the border between British Honduras and Guatemala in the late 1880s. Miller (1887:420) was one of several surveyors who oversaw the survey and cutting of the border between the two nations, noting in his report to the Royal Geographical Society that the boundary "has been cleared through the bush…and has been cut 12 feet wide."

Of interest on his map (Figure 4.1) are the roads shown connecting Kaxil Uinic to San José to the southeast, Yalloche in Guatemala to the southwest, Ycaiche in Mexico to the north, and the Peten to the west. Miller (1887:422–423) notes, "All the roads which I have marked are mere paths through the bush, the majority of them so bad that even a mule could not travel on them." It is unclear how accurately drawn the roads are, however, or if Miller followed them all while working in the area. He notes that the "villages shown on the map are inhabited by Indians...The Indians of these villages are not savages. They cultivate the soil and grow maize, rice, and beans, and raise pigs and fowls" (Miller 1887:422).

Another interesting element on the map is Chan Chich Creek (spelled Chan Chiich on the map, but Chan Cheëch in his report text). Chan Chich Creek begins in Guatemala where it is a series of small pools during the dry season. It and Little Chan Chich Creek both flow generally southwest to northeast, joining to become the Rio Bravo a few hundred meters north of the ruins of Chan Chich. The ruins, which take their name from the creek, are located on a bend in Chan Chich Creek, on its west bank. Near the ruins, the creek flows year round, being fed by small springs. Miller's (1887:422) description

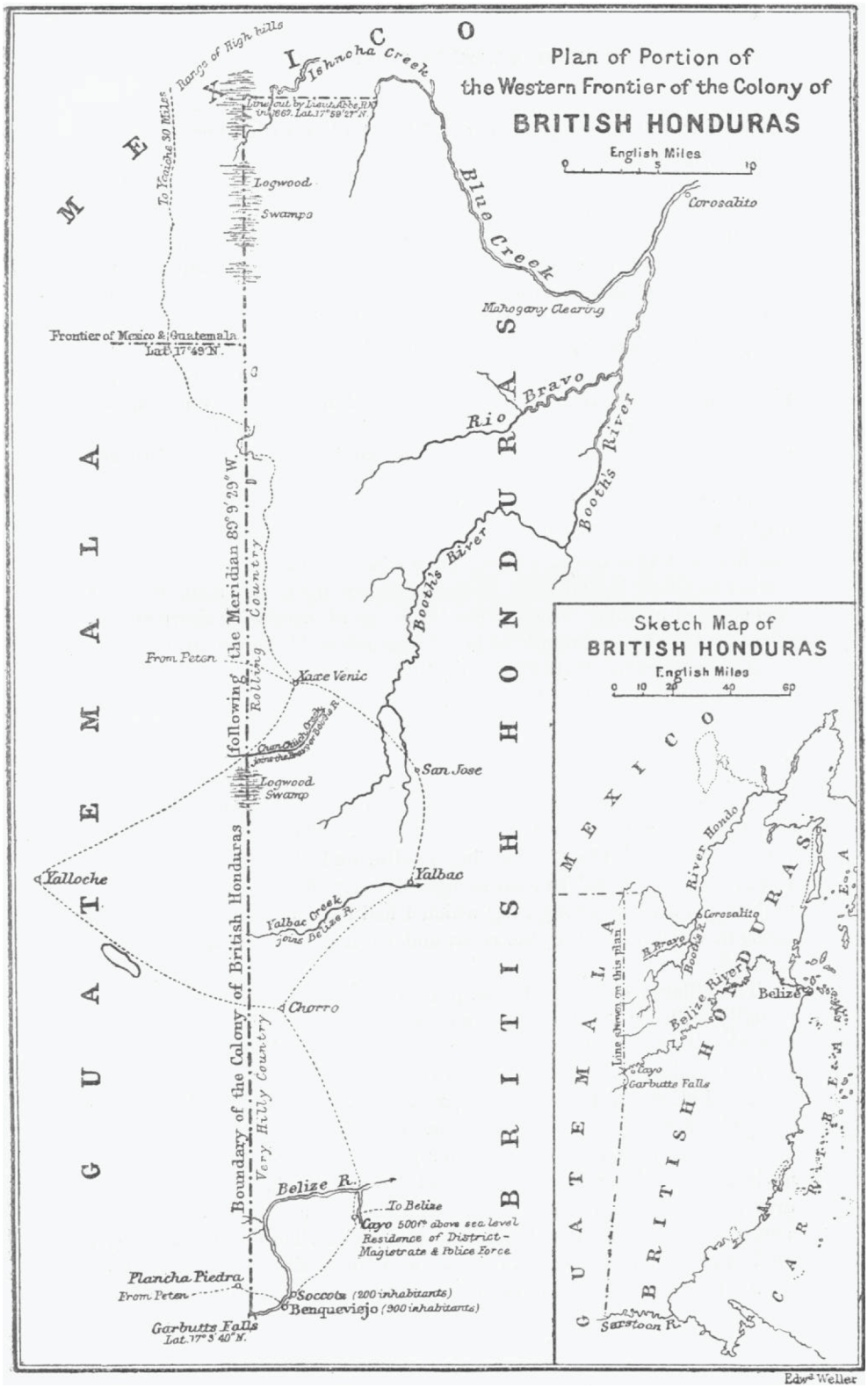

Figure 4.1. Miller's (1887:421) map of the western frontier of British Honduras.

of the creek in his report as a succession of pools in the dry season and the fact that his map does not show the creek connecting to the Rio Bravo suggest that he only crossed the creek southwest of the ruins of Chan Chich, certainly along the border between Guatemala and British Honduras, but possibly along the road between Kaxil Uinic and San Jose.

To return to the issue at hand, Kaxil Uinic village, Teobert Maler (1910:151) makes two mentions of "Kaxilvinic" on his journey from Merida in Yucatan to Lake Peten-Itza in Guatemala. Departing the small village of Chúnkutil, Mexico on May 9, 1895, Maler (1910:151) reported:

> The second day's march brought us to the wholly abandoned settlement of Santa Rita…From this Santa Rita a path branches to the left, to the east, toward Kaxilvinic, three days' journey distant, and Icaiché, the dread retreat of the free Mayas, is two days distant from Kaxilvinic. Today this path is untraveled and wholly overgrown.

Icaiche was a settlement in southern Quintana Roo, infamous for harassing the British in northern Belize in the nineteenth century (Bolland 1977). The Maya living at Kaxil Uinic were a splinter group that had migrated from the Chichanha region of Mexico into the area following the Caste War in 1857 (Jones 1977). This group, which moved into an unoccupied region of Belize and Guatemala, became known as the San Pedro Maya, named after the principal village south of Labouring Creek (Jones 1977:141). Jones (1977:157, 162) reports that Kaxil Uinic was settled in the 1880s as the third village in what he calls the San José Minor Cluster, speculating that migrants from a Holmul cluster village named Holuitz that was abandoned sometime after 1868 may have originally settled Kaxil Uinic village. Jones also (1977:161–162) provides the most detailed account of the settlement in the literature:

> Kaxiluinic was on the Río Bravo, about 19 kilometers west-northwest of San José and about 5 kilometers from the western boundary line. It does not appear in the historical record until January 1885, when Mexicans were said to have escaped through the settlement following some grisly murders committed by them at a mahogany bank near San José. Later that year a British party under William Miller began to resurvey the western boundary line and ran into difficulty with the inhabitants of Kaxiluinic, who apparently considered themselves to be on Mexican territory. Gov. Roger Tucksfield Goldsworthy asked Gen. Gabriel Tamay of Icaiche to order the *alcalde* of Kaxiluinic, one Antonio Baños, to put a stop to the disturbances. Tamay, however, had already denied knowledge of the settlement. Tamay's denial was false, for in July there were further "disquieting rumours from the village of Kaxi Venic regarding the attitude of the Indians of Ycaiche towards the Survey Party," and the survey party later crossed "an old trail that was supposed to be lead from Xaxe-Venic to Ycaiche." Miller's map of the Western frontier shows Kaxiluinic connected with both Icaiche and San José by this path.

The intersection of the discussions about Kaxil Uinic village and Kaxil Uinic ruins come in the form of Sir J. Eric S. Thompson (1963), who planned to excavate the ruins using labor from the village in 1931. Thompson mentioned that "There is a Maya village at Kaxwinik, where it should be easy to obtain labor, thus avoiding the expense of importing labor and the laborers' food, the transportation of which during the

1928–29 season formed such an expensive item" (Memorandum, pages 4–5, FM).

Some clues as to the nature and extent of the village come from Thompson's correspondence with officials in British Honduras as he prepared for the "Third Marshall Field Archaeological Expedition to British Honduras" sponsored by the Field Museum of Natural History. For example, there is a small bit of information about Kaxil Uinic village in a telegram to Thompson from the Office of the Conservator of Forests in British Honduras (Telegram, September 15, 1930, FM). The telegram was written in response to Thompson's request for a concession to excavate "in the area around Xaxe Venic." It notes, "The village of Xaxe Venic is shown on the plans in the Surveyor General's office as being included in the Belize Estate & Produce Company's estate 'Armstrong' on Rio Bravo. It is in the extreme north-western corner and while the Company collect rents etc. in the village it is extremely likely that the surrounding lands outside of a radius of say quarter of a mile on the north-west and south-west are Crown lands" (Telegram, page 1, FM). The telegram notes, "there is a Court House at Xaxa Venic which is quite habitable" (Telegram, page 2, FM). In a letter dated March 15, 1931, the Colonial Secretary's Office directed the *alcalde* at Kaxil Uinic to assist the expedition and informed him that Thompson's party would be glad if given permission to use the "Cabildo" in the village during their stay (Colonial Secretary, page 1, FM).

Thompson (1963:6, 228) notes in his memoirs, he was forced to change his plans. Upon arriving in Belize, he learned that the chicle camp of Kaxil Uinic had been closed by the Belize Estates and Produce Company and its inhabitants moved to the town of San José because company officials thought the village had become a chicle smuggling center. Thompson had planned on using local labor for his excavations at Kaxil Uinic, and, with no workers available, was forced to shift his research to some ruins near the village of San José. During Easter week of 1931, he took a break from his work and passed through Kaxil Uinic on his way to visit the large Maya site of La Honradez in Guatemala. Thompson (1963:233) mentions that visit in his autobiography and provides a brief description of the village (Figure 4.2):

> Late in the afternoon of the first day we reached Kaxil Uinic, near which we had originally intended to work. The score of huts scattered around a dirty water hole presented a melancholy appearance…I did not find Kaxil Uinic attractive. There were too many fleas, and the hogs wallowed in our drinking water. We were on our way by sunrise. A few miles brought us to the British Honduras-Guatemala frontier, marked by a straight swathe cut through the forest, and about an hour later we were at Chochkitam, "peccary entrails," a plant.

Thompson (1963:238) notes that on his return to San José he "passed through Kaxil Uinic,

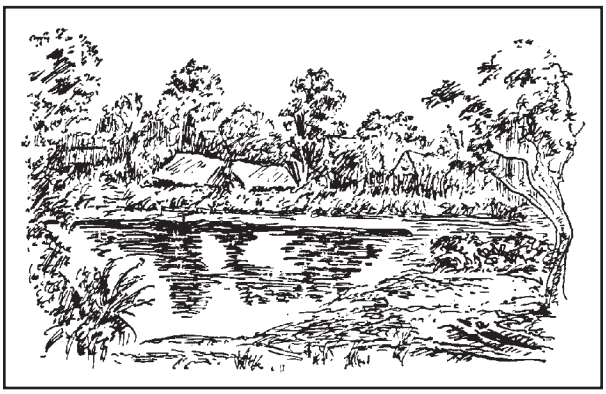

Figure 4.2. Thompson's (1963:Fig. 22) sketch of Kaxil Uinic. The original caption reads, "Part of Abandoned Kaxil Uinic Water hole in foreground, frequented by hogs and mules for wallowing, was only source of drinking water for villagers."

completely deserted, and rested by the Rio Bravo." From that description, from his sketch of the settlement, and his caption on that sketch, which describes the water hole as the "only source of drinking water for villagers" (see Figure 4.2), I conclude that Kaxil Uinic village was located some distance from the Rio Bravo and not on it, as reported by Jones (1977:161). The "dirty water hole" mentioned by Thompson is a feature known as an *aguada*, and it is around this feature, not the river, that the village was located.

The Archaeological Evidence

When Chan Chich Lodge was opened in the late 1980s, the presumed location of the village and its *aguada* was found by lodge staff, and until the late 1990s the trail to "Xaxe Venic"—an old logging road that passes through the Main Plaza of Chan Chich and heads west toward Guatemala—was kept opened and maintained by the lodge. Long-time lodge guide Hilberto Vasquez (personal communication, 2012) reported the lodge staff used to put bananas by the *aguada* to attract tapirs and that at one point a guide had found "the big stones the Maya women used to wash clothes" at the edge of the *aguada* and placed them at the base of a tree.

The trail from the lodge passes through the prehistoric Kaxil Uinic ruins (see discussion below), but it had grown over with disuse since the late 1990s. To make matters worse, Hurricane Richard in 2010 had severely damaged the forest around Kaxil Uinic, destroying the canopy and littering the ground with massive tree falls. As Harris and Sisneros (this volume) report, the amount of debris forced us to alter our research design at the ruins.

The lodge sent workers to reopen the trail and conduct initial clearing at the ruins prior to the arrival of the project staff in late May 2012. Once the project staff arrived and identified where we wanted to work, we employed lodge staff for several days to continue clearing the ruins. While that was going on, I asked one of the older employees at the lodge, Jorge Montuy, to look for the *aguada*, which the guides remembered as being several hundred meters south of the ruins. Montuy—who had incidentally accompanied us on our 1998 hike—and another worker spent several hours cutting through dense growth and hurricane debris, ultimately reporting that afternoon that they had reached the *aguada*. Although it turned out that they had not actually reached the *aguada*, they were very close, and two other workers and I managed to locate it off their trail the next morning.

The area around the *aguada* is a dense cohune forest made thicker by hurricane debris. The *aguada* is a natural depression on the landscape. By the end of the dry season in May 2012 it retained water in its center (about 40 m in diameter) and was covered in aquatic vegetation (Figure 4.3). It is likely, based on the vegetation and topography, that the *aguada* doubles in diameter during the rainy season. The feature is approximately 500 m south/southeast of the prehistoric ruins of Kaxil Uinic, which places the village on Yalbac Ranch, the property that borders Gallon Jug Ranch to the south. A quick reconnaissance to the southern side of the feature found a fairly recent trail cut from the south and marked with orange flagging tape, so it is likely that workers on Yalbac Ranch have occasion to visit the *aguada*.

The first indication that we were near the *aguada* was the large number of beer bottles scattered about the ground. In fact, glass bottles are the only indication of a historic settlement that we discovered, other than one metal pot. The few bottles that were collected or photographed include three beer bottles from the early 1900s (two from New York and one from Detroit) and a hair tonic bottle (Table 4.1). Church et al. (2010:187) report finding "a tremendous

Figure 4.3. Photograph of the *aguada* at Kaxil Uinic as it appeared on June 5, 2012.

number of bottles" at San Pedro Maya sites, and they conclude that it is likely the bottles were reused as containers for local products and did not represent alcohol consumption by the villagers.

Table 4.1. Select List of Bottles Observed at Kaxil Uinic Village in 2012

Product	Color	Embossing
Beer	Clear	Jacob Ruppert Brewer New York
Beer	Clear	Eichler New York Registered
Beer	Clear	Pure Food Goebel Beer Registered Detroit
Hair Tonic	Clear	Barry's Tricopherous New York, USA

Research Potential

Given the recent interest on the part of the Institute of Archaeology in the Colonial period of Belize's history (Jaime Awe, personal communication, 2012), Kaxil Uinic village would make a timely research project. This brief archival review has barely scratched the surface; much more information is undoubtedly located in the archives in Belmopan, including birth and death records (Jason Yaeger, personal communication, 2012). Additionally, old Belize Estates records may be housed at Bowen and Bowen, Ltd., the current landowner of Gallon Jug or perhaps at Yalbac Ranch, the current landowner of the village site.

The greatest hindrance to working at the site is the appallingly thick vegetation in that part of the forest, the result of 2010 hurricane damage. Depending on the scope of the investigations, days if not weeks of vegetation clearing would be necessary to adequately assess the site and map surface artifact scatters. Logistical issues exist as well, including lodging and labor. However, the project holds great potential to inform about not only the San Pedro Maya but also Colonial commercial enterprises in Belize during the early twentieth century.

THE PREHISTORIC RUINS OF KAXIL UINIC

Prior to the opening of Chan Chich Lodge in the late 1980s, there was no controversy over the ruins of Kaxil Uinic, probably because no one had even tried to visit them for over 50 years. As noted above, Kaxil Uinic was to be the focus of excavations for the Third Marshall Field Archaeological Expedition to British Honduras under the direction of Thompson and sponsored by the Field Museum of Natural History in 1931. How Thompson selected Kaxil Uinic for study is not entirely clear. The first mention of ruins near Kaxil Uinic that I have been able to find is a curious entry by Maler (1910:150), who reports the following account from his 1895 expedition through the Peten:

> The people of Chúntukil assert that about the middle of the nineteenth century the ruins of Tikal were discovered by a party of hunters from their settlement, who had penetrated the eastern forests. Discerning the lofty temples from a distance they had gone to see what they were. The people know of no other ruins except only by hearsay of the so-called *casa cerrada* near Kaxilvinic... or "Man in the mountain," which is a well preserved massive structure with neither entrances nor decoration. Other Indians have told me of this ruin, but they said it consisted of two buildings placed close together, and they called this site of ruins *Polcoh* (*Cabeza de Leon*).

The next mention of ruins near Kaxil Uinic is in a 1928 article by Frans Blom (1928:170), who, in a discussion about ball courts, mentions:

> A ball court was found among a large group of mounds and completely ruined buildings located a few hours' ride southwest or Kashuinik, a small Maya Indian settlement in British Honduras. These ruins are situated just over the border in the Department of Peten, of Guatemala, and the place has no name.

Thompson referred to Blom's report (and apparently got the date wrong, unless he speaking of a subsequent trip by Blom) in the memorandum (Memorandum, page 4, FM) in which he proposed the expedition to Kaxil Uinic:

> Kaxwinik was cursorily visited by Mr Frans Blom of the department of Middle American Research, Tulane University, La. in 1929, but not examined in detail. The site is not very large, but was undoubtedly a center of ceremonial importance, as Mr Blom reports finding a Ball court of the type used in the Maya ceremonial game, as well as two very weathered stelae. There is a good possibility that a careful search and clearing of the forest would reveal fallen sculptured monuments… However, at Kaxwinik work would be concentrated more on the outlying dwelling sites, which, although somewhat unpretentious, are more likely to yield good results, for in these burials are likely to be found.

Although diverted from his original plan to work at Kaxil Uinic, Thompson (Monthly report No. 1 [Feb. 23 to Mar. 23], page 2, FM) reported to the director that he hoped to make "a reconnaissance trip to Kaxi Uinic and neighboring ruins in Guatemala at the end of this week." It is clear from his autobiography that he made the promised trip through Kaxil Uinic over Easter week in 1931, as quoted above (Thompson 1963:233). However, it seems that he never reported the results of his reconnaissance in a subsequent monthly report, because it appears that he never filed a subsequent monthly report. In a letter dated April 23, 1931, written at Hill Bank, a Belize Estates station at the southern end of the New River Lagoon, Thompson (Thompson to Museum Director, letter dated April 23, 1931, FM) reported to the director that work at San José had to be temporarily abandoned because Charles Wisdom, the archaeologist that Thompson left in charge during his Easter reconnaissance, had come down with a bad case of malaria and Thompson had blood poisoning from a cut on his leg (acquired during his Easter trip). He notes that "owing to my present condition I am unable to send you at present my second monthly report, but this will be written as soon as I return to the ruins and have gotten things into order there" (Thompson to Museum Director, letter dated April 23, 1931, page 2, FM). However, as far as I could tell from the Field Museum archives, Thompson's (Thompson to Museum Director, letter dated May 1, 1931, page 2, FM) next communication to the museum was on May 1, reporting that he had returned to the ruins on April 27 but had himself come down with malaria on the way. The next communication in the files is a letter written at International Hotel, Belize, dated May 16, 1931, to the Colonial Secretary requesting permission to export "archaeological objects" from San José (Thompson to Museum Director, letter dated May 16, 1931, FM).

It is, therefore, unknown if Thompson even saw the ruins during his brief stay at or return trip through Kaxil Uinic village in 1931, although I cannot imagine that he did not take the time to inspect the ruins. He includes the following entry for the site in Appendix C, an index of ruins in British Honduras, of the San José report (Thompson (1939:280):

> KAXIL UINIC. (Xaxe Venic, Kax Uinic). Mounds, sculptured stela, plain altar. *Second group* on west bank of R. Holmul (Bravo) one league southeast. Ball-court group in Guatemala "some hours away" listed by Blom under this site name. Blom, 1928, p. 170; Thompson, field notes, 1931.

I emphasized his description of Kaxil Uinic as the second group on the west bank of the river because I think it is important to clearing up the confusion over the relationship between Kaxil Uinic and the site now known as Chan Chich. Thompson (1963:238) mentions in *Maya Archaeologist*, speaking of his return from Guatemala to San José in 1931:

> After another day in Chochkitam we started home. We got off at 6:15 A.M., passed through Kaxil Uinic, completely deserted, and rested by the Rio Bravo… There was a pleasant group of ruins near the river which I briefly examined, one of the hundreds of small unrecorded sites scattered over the whole Maya area. It was placed on top of a low hill with a court surrounded by mounds, the tallest thirty feet high.

Thompson (Marshall Field 3rd Arch. Expedtn. To Bt. Honduras, Field Notes, Page 3, FM) included a similar description of this site in his San José field notes, dubbing the site "the Rio Bravo ruins:"

> Short mile west of Bravo on trail S. Jose to Kaxi Uinik. On hill (natural?) raised

> plaza about 25 ft. above country. About 30 mts. sq. East side good pyramid about 30ft high. North & west sides each 1 semi-pyramid about 18ft high. S. side low long mound 12 ft high. 70 yds west detached pyramid about 18 ft high.

With the return of archaeologists to northwestern Belize in the late 1980s, Kaxil Uinic once again appeared in the archaeological literature as researchers attempted to locate new sites and relocate ones reported in the past. With the selection of a ruin in the southwestern corner of the Gallon Jug property as the location of a jungle lodge, Kaxil Uinic's location became a topic of interest. Thomas Guderjan (1991:35), as part of a regional reconnaissance in northwestern Belize, visited the site where Chan Chich Lodge (named after the nearby creek) was to be constructed in 1987, as the brush was being cleared, and returned in 1988 and 1990 to map the ruins and record features at the site. Guderjan (1991:35) opted to call the ruins "Chan Chich," even though he believed they were actually the site of Kaxil Uinic:

> Eric Thompson had previously named the site "Kaxil Uinic" after the chicle camp about two miles west of the site, following his standard practice of naming ruins after the nearest named habitation. . . Thompson planned to excavate at the site, but Belize Estates had abandoned the Xaxe Venic (or Kaxil Uinic) camp just prior to Thompson's arrival (Thompson 1963) and he shifted his work to San José. The only discrepancy between Thompson's description of Kaxil Uinic and Chan Chich is that Thompson noted a carved stela present at Kaxil Uinic. We can only assume that this has since been plundered.

In his description of Chan Chich, Guderjan (1991:35) notes that west of the site "is a *bajo* or low-lying area. On the far side of the bajo is the site of E'kenha." Guderjan et al. (1991:59) include the following description of E'kenha (the emphasis is added):

> E'kenha is also the location of the 1930's chicle camp of Kaxil Uinic, the community after which Thompson named the site of Kaxil Uinic, now Chan Chich. The water source illustrated in Thompson's autobiography (1961:233) [sic], only about 200 m south of the E'kenha site core, as well as artifactual evidence of the chicle camp, have both been located. . . E'kenha consists of at least 13 structures. . . Structures 3, 6–9, and 12 enclose a small plaza. In the plaza, in front of the major building, Str. 3, is a very badly damaged *carved stela and altar.*

One of the main goals of my archival trip to Chicago was to resolve the question of whether or not the ruins known as Chan Chich today were actually the same ones that J. Eric Thompson called Kaxil Uinic in the 1930s. Unfortunately, that question cannot be resolved based on the material in the Field Museum archives because Thompson did not include a detailed description of Kaxil Uinic in his field notes. There is enough circumstantial evidence, however, to conclude that Thompson's Kaxil Uinic is not the site of Chan Chich. I believe that Thompson's Kaxil Uinic is the same site that Guderjan et al. (1991) recorded as E'kenha and that Thompson did not pass through Chan Chich. My reasoning is this:

- Thompson reported a carved stela and plain altar at Kaxil Uinic. The site Guderjan et al. (1991) called E'kenha has a carved stela and plain altar. Stelae and altars are rare in northwestern Belize, and carved monuments are extremely rare.

- Thompson (1963:238) reports that on his way back to San Jose from Guatemala he passed through the abandoned Maya village of Kaxil Uinic and then rested by the Rio Bravo "near a pleasant group of ruins." He also describes Kaxil Uinic as the second group of ruins once you cross the river coming from San Jose (Thompson 1939:280). Therefore, he did not consider the pleasant group of ruins, which he dubbed Rio Bravo Ruins in his notes, to be the same as Kaxil Uinic.

- If the road Thompson followed to Kaxil Uinic is the same road that cuts through Chan Chich today, then Chan Chich would have been the first group of ruins he came to across the river. The description of the Rio Bravo Ruins does not match Chan Chich; therefore, they are not the same site.

- If he bothered to record the Rio Bravo Ruins, which are considerably smaller than Chan Chich, surely he would have recorded Chan Chich if he had seen it.

- It is therefore more likely that Thompson followed a different route from San José and never saw Chan Chich. I suspect that he followed a more southerly route, one that would have passed through the Maya village, rather than the ruins, of Kaxil Uinic—the modern trail passes through the ruins, 500 m north of the *aguada* and historic village. Supporting this conclusion is Miller's (1887:422) map of roads and villages in his report on the border survey. The road to San José travels in a southeasterly route from Kaxil Uinic village. With the ruins' lying 500 m north of that starting point, even allowing for a large degree of error in Miller's map, it seems unlikely that the road Thompson took in 1931 is the same road that connects the Kaxil Uinic ruins and Chan Chich today; that road runs almost due east-west.

CONCLUSIONS

The site Guderjan et al. (1991) recorded as E'kenha is most assuredly Thompson's Kaxil Uinic, and for that reason I prefer to call it Kaxil Uinic ruins. I am equally confident that the *aguada* 500 m south of the ruins is the former site of the San Pedro Maya village of Kaxil Uinic (Figure 4.4). As reported in this volume by Harris and Sisneros, we have completed an initial assessment of the prehistoric site. We have, however, barely scratched the surface of the historic village. Despite the dense vegetation, the village site holds tremendous research potential. Additionally, it is possible that the area around the *aguada* has significant prehistoric Maya deposits as well. I have proposed elsewhere (Houk et al. 2012) that the *aguada* may be the source of the Cunil material found at Kaxil Uinic ruins (see Harris and Sisneros, this volume; Valdez and Houk, this volume). If that were the case, Kaxil Uinic's *aguada* would provide fitting bookends to Maya archaeology in Belize, from the Early Preclassic period at one end of the chronological chart to the Colonial period at the other.

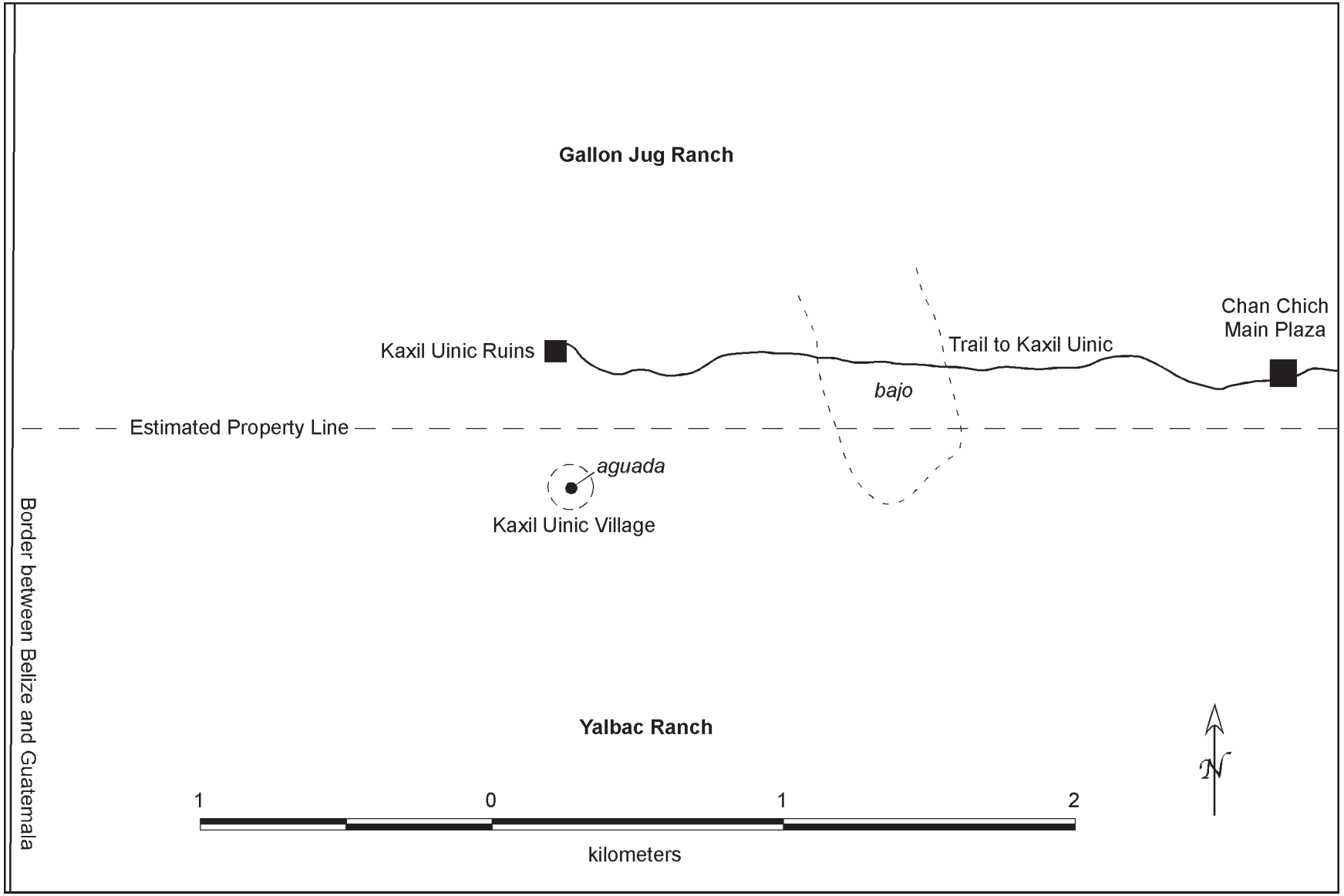

Figure 4.4. Map showing the locations of Chan Chich, Kaxil Uinic ruins, and Kaxil Uinic village. Based on Google Earth and GPS data collected by Matthew Harris.

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Results of the 2012 Excavations at Kaxil Uinic Ruins

Matthew C. Harris and Vincent M. Sisneros

INTRODUCTION

The first season of investigations at Kaxil Uinic ruins (Figure 5.1) took place as part of the 2012 field season of the Chan Chich Archaeological Project (CCAP). The focus of the investigations included determining the extent, condition, and nature of the prehistoric site, the age of the site, the conditions of the monuments at the site, and the site's relationship to Chan Chich. The 2012 CCAP field season commenced on May 23, 2012, and ended on June 20, 2012. The authors, both Texas Tech University graduate students, served as field supervisors to six field school students and several workmen hired from Chan Chich Lodge to assist in the field.

Sir J. Eric S. Thompson (1963) planned to conduct fieldwork at the site in 1931, using workers from the nearby chicle camp (see

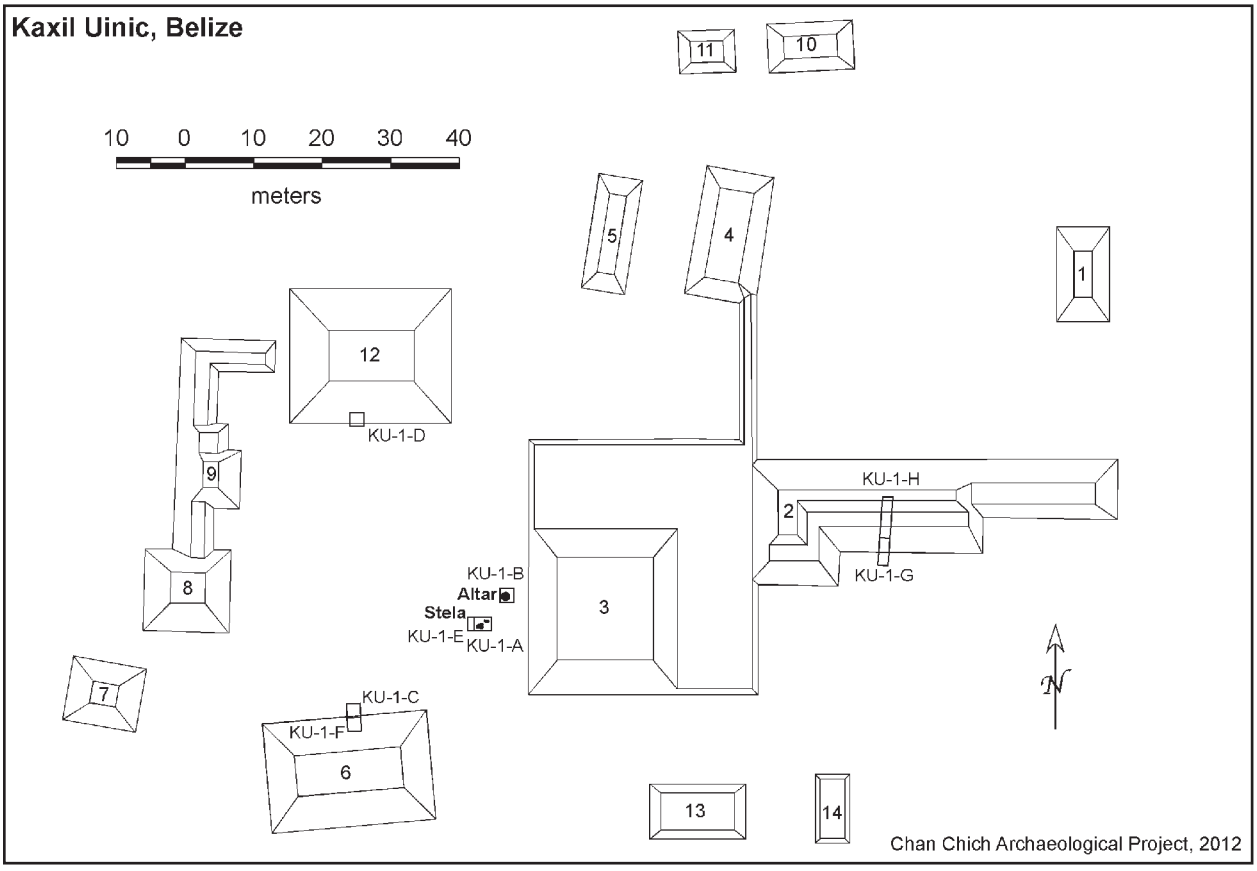

Figure 5.1. Map of the ruins of Kaxil Uinic based on Guderjan et al. (1991:Figure 33).

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2012 Results of the 2012 Excavations at Kaxil Uinic Ruins. In *The 2012 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 45–64. Papers of the Chan Chich Archaeological Project, Number 6. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

Houk's [this volume] discussion of the historic village and chicle camp). However, when the camp was closed and the workers moved prior to his arrival in March 1931, he decided not to do any excavations at Kaxil Uinic and instead conducted excavations near the village of San José (Thompson 1963). In the San José report, Thompson (1939:280) published a brief description of Kaxil Uinic and the structures associated with it: "[m]ounds, sculptured stela, plain altar. Second group on west bank of R. Holmul (Bravo) one league southeast." Thompson (1963:233) later published his description of the chicle camp of Kaxil Uinic in Maya Archaeologist as "…huts scattered around a dirty water hole…"

After Thompson's departure from British Honduras, archaeologists would not study the area for over 50 years. The land where Kaxil Uinic is located was once owned by the Belize Estates Land Produce Company. In the 1980s a Belizean named Barry Bowen purchased part of the former holdings, including the land where the ruins of Kaxil Uinic are located. Today, this property is known as Gallon Jug Ranch. The archaeological site of Chan Chich, also situated on the property, was chosen as the location of a jungle lodge (Houk 2011a:5). During the 1987, 1988, and 1990 field seasons of the Rio Bravo Archaeological Project, Thomas Guderjan (1991:35) and his teams conducted mapping of the ruins at Chan Chich.

Guderjan et al. (1991:59) also recorded a site called E'kenha, which Houk (this volume) has concluded is actually the site Thompson referred to as Kaxil Uinic. Guderjan's crews mapped 12 structures and "a very badly damaged carved stela and altar" at the site, but conducted no excavations (Guderjan et al. 1991:59).

Following the Rio Bravo Archaeological Project, Brett A. Houk conducted formal archaeological investigations at Chan Chich in 1996–1999, 2001, and again in 2012. During the 1996 CCAP field season Houk (2011b:13):

> …discovered a sacbe running west from Chan Chich, but the length of the sacbe was never determined. It is hypothesized that it connects Chan Chich to Kaxil Uinic. If confirmed, this would be an important discovery; thus far no sacbe terminus group has been documented in the eastern half of the Three Rivers Region.

The site of Kaxil Uinic is 2.6 km west of Chan Chich, with a bajo located between the two sites. The aguada and the associated historic chicle camp described by Thompson (1963) are about 500 m south of Kaxil Uinic ruins, on what is today Yalbac Ranch. The La Lucha Escarpment is about 900 m west of the ruins. Kaxil Uinic is on a small rise west of the bajo.

RESEARCH DESIGN

As discussed below, due to the condition of the vegetation at the prehistoric site we were unable to completely follow through with our original research design. The vegetation was very thick and there were many felled trees as a result of a hurricane that struck the area in 2010. Therefore, the original research design had to be almost completely revised to conduct investigations at the site. Below is an explanation of the original and modified versions of the research design.

Original Research Design

We had planned to clear the vegetation in the two courtyards at Kaxil Uinic to enable better visibility of the structures, monuments, and features. A datum was to be established in the western courtyard (southwest of Structure 3), and an east-west oriented baseline was to be cut extending about 200 m in both directions. At 25-m intervals along the baseline, we planned

to cut perpendicular brechas extending 100 m to the north and the south. This would have created a 200-x-400-m survey block centered on the main courtyard of the prehistoric site. Following the same system used to map Chan Chich (see Robichaux and Houk 1996), the ruins, cultural features, topography, and vegetation were to be mapped in this block. Based on the success in identifying the Western Causeway at Chan Chich using this system in 1996 (see Houk et al. 1996), we believed it would be possible to determine if a sacbe enters Kaxil Uinic from the east, as hypothesized.

Using the primary datum for the survey block, we proposed to use a total data station (TDS) to make a detailed topographic map of structures at Kaxil Uinic. The map would show the locations of excavation units, looters' trenches, and monuments. Looters' trenches were to be cleaned and profiled, if possible. Ceramics from undisturbed contexts in the trenches were to be collected if found.

Test pitting was to be conducted in selected locations at Kaxil Uinic. Preliminarily, we proposed a 2-x-2-m test pit be excavated in each courtyard to collect information on construction sequence, chronology, and depth of cultural deposits. More excavations were to be conducted at the discretion of the principal investigator, possibly on structures or at the base of the stela and altar. If carvings proved to still be visible on the stela and altar, we proposed taking photographs of them at night with battery-powered lights.

Additionally, mapping crews would attempt to locate the remains of the historic chicle camp. According to Thompson's (1963) description, the camp should be near the aguada. If the aguada proved to be located outside of the designated survey area around the ruins, we planned to extend the block or create a new one to include the historic site in the survey. We proposed to map visible features and use shovel testing to try to locate historic trash middens. The purpose of the historic investigations at this point was to locate the remains of the camp, assess its condition, and determine its extent.

Modified Research Design

As noted above, the thick vegetation and debris resulting from the 2010 hurricane rendered our initial research design unfeasible. To clear the site to the degree needed to make a detailed TDS map would have taken weeks, and cutting survey brechas was pointless because the vegetation was too thick to allow mapping along the brechas. We scaled back our investigations accordingly. The vegetation in the courtyards was cleared enough to enable excavations in areas of interest and to locate many of the structures originally mapped by Guderjan et al. (1991). What Guderjan et al. (1991) called the western courtyard we call the main courtyard due to the fact that the eastern courtyard is not a true courtyard. The main courtyard was cleared enough to gain access to the stela and altar that are situated at the western base of Structure 3. Vegetation was also cleared on the north side of Structure 6, the south side of Structure 12, and the south side of Structure 2 to allow for excavations intended to expose architecture. Trails were cut around the site to allow for access between excavation areas. A datum was established north of Structure 2 and 50-m long brechas were cut by the workmen to the north and south of the datum to enable us to look for the hypothesized sacbe connecting Kaxil Uinic to Chan Chich. A detailed topographic map of the site proved to be an impossible task to complete due to the thick vegetation and felled trees at the site. However, modifications were made to Guderjan et al.'s (1991) map, including the correction of the orientation of some structures as well as the addition of two structures that are located to the south of Structures 2 and 3.

The TDS was used to map the locations of the excavation units and monuments, but we did not map the looters' trenches due to dense vegetation. The looters' trenches were also not cleaned or profiled because their walls had collapsed and showed no intact architecture.

A test pit was not conducted in the courtyard at Kaxil Uinic due to the nature of the vegetation. Instead, excavation units were opened around the monuments and on the slopes of chosen structures to expose architecture. However, excavations targeting the monuments and at the base of Structure 6 were excavated to sterile levels and/or bedrock, serving as test pits. Excavations at Kaxil Uinic were designated as "KU" in the field recording system to avoid confusion with work at Chan Chich (CC).

The aguada and associated historic village/camp were located by the workmen who cut a brecha extending south of Structure 6. No excavations took place at the historic chicle camp, but it was definitively located due to a concentrated surface scatter of glass bottles and a kettle (see Houk, this volume).

METHODS

The 2012 excavations at Kaxil Uinic were designated Operation KU-1. All excavation units at Kaxil Uinic were oriented east-west or north-south to ensure continuity between the units. During the field season, eight suboperations (subops) were excavated, designated Subops KU-1-A to KU-1-H, which ranged from excavation units around monuments to excavation units situated on the slope of selected structures (Table 5.1).

Table 5.1. Operation KU-1 Suboperations

Subop	Size (m)	Location
KU-1-A	2 x 2.5	Stela, adjacent to KU-1-E's east side
KU-1-B	2 x 2	Altar
KU-1-C	2 x 2	Slope of Structure 6, centrally located on north side
KU-1-D	2 x 2	Slope of Structure 12, centrally located on south side
KU-1-E	1 x 2	Stela, adjacent to Subop KU-1-A's west side
KU-1-F	2 x 2	Slope of Structure 6, adjacent of Subop KU-1-C, south side
KU-1-G	1.5 x 4	Slope of Structure 2, adjacent to Subop KU-1-H's south end
H	1.5 x 6	Slope of Structure 2, adjacent to Subop KU-1-G's north end
SF	n/a	Surface finds

RESULTS

Site Layout

As you head west from Chan Chich down the old logging road, the first structures at Kaxil Uinic you encounter are Structure 1 to the north and Structure 2 to the south (Table 5.2). Continuing farther you enter an open area defined by Structure 2 to the south and Structures 4 and 5 to the north (Figure 5.1). This is what Guderjan et al. (1991) called the eastern courtyard. As one goes farther west into the site you come across Structure 3, the largest mound at the site; the stela and altar are associated with this structure. The eastern boundary of the courtyard at Kaxil Uinic is defined by Structure 3. Structure 6 defines the southern extent of the courtyard, Structure 12 the northern extent, and Structures 8 and 9 the western extent. Structure 7 is a small mound to the southwest of Structure 8. Structures 13 and 14 are small mounds, only about 1.5 m tall, south of Structures 2 and 3. Structures 10 and 11 were never relocated due to dense vegetation.

Table 5.2. Summary of Structures at Kaxil Uinic

Str. #	Length (m)	Width (m)	Height (m)
1	?	?	6
2	47	18	5
3	26	22.5	5
4	30*	12*	?
5	27*	7*	?
6	16.5	23.5	5
7	11*	9*	?
8	13*	12*	?
9	31*	9*	?
10	12*	8*	?
11	8*	6*	?
12	21	23	4
13	14	8	1.5
14	11	5	1.5

*dimensions after Guderjan et al. (1991:Figure 33).

Stela and Altar

In the main plaza of Kaxil Uinic located at the west base of Structure 3 the stela and altar mentioned by Thompson and mapped by Guderjuan et al. (1991) were identified and targeted for investigation. The results of the excavations around and below Stela 1 (Figures 5.2 and 5.3) are presented below, and the results from Altar 1 follow.

Stela Excavations

Subop KU-1-A was a 2-x-2.5-m unit that encompassed Stela 1 and was oriented east-west to match Structure 3's orientation. An additional unit was appended to the west, designated Subop KU-1-E, a 2-x-1-m unit sharing Subop KU-1-A's orientation. The two fragments of the stela were designated Stela Fragments 1 and 2. The fragments are

Figure 5.2. Photograph of Subop KU-1-A, facing west/southwest. On the right is Stela Fragment 1 (KU-1-A-2), and on the left is Stela Fragment 2 (KU-1-A-3), prior to excavations.

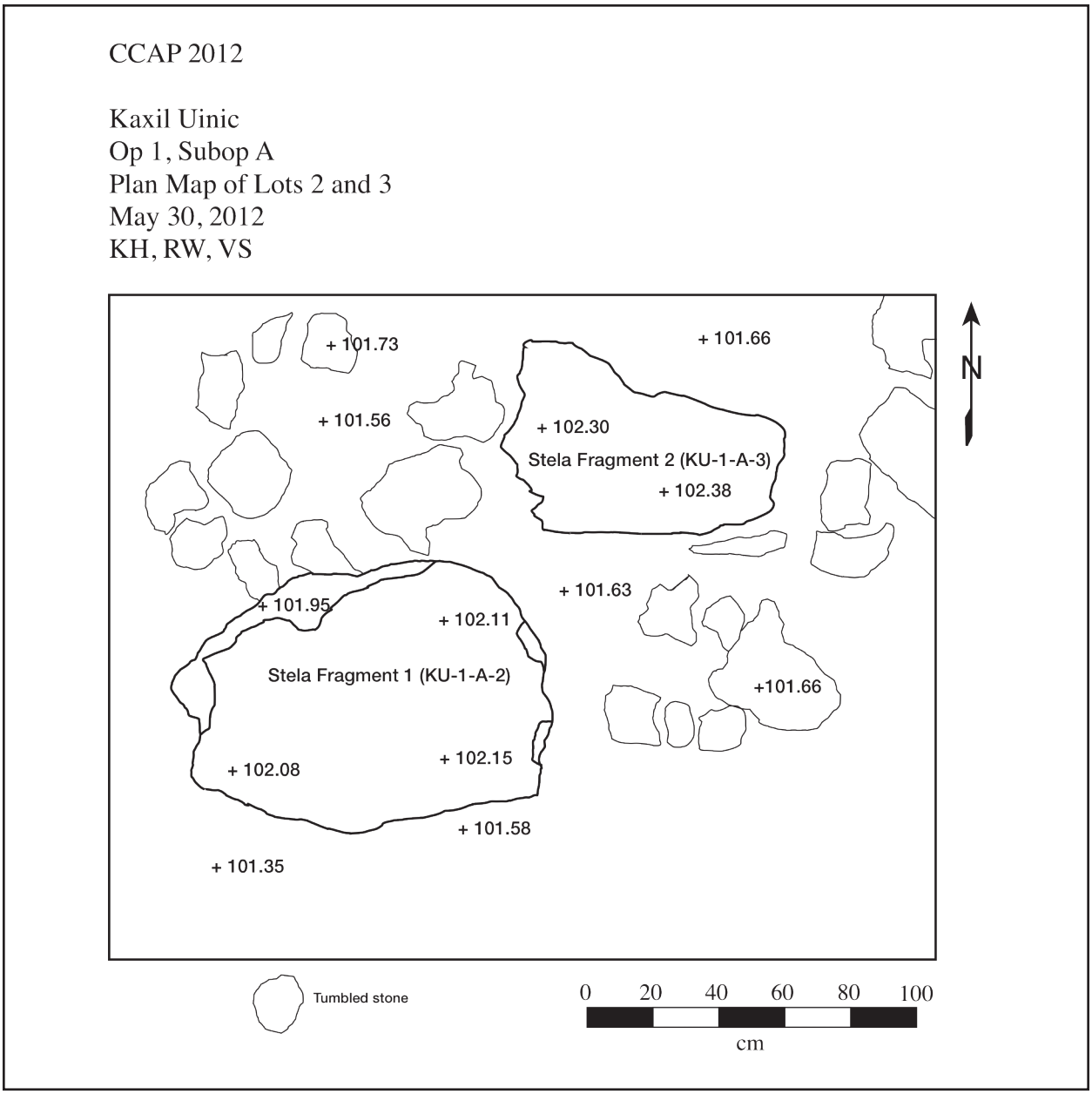

Figure 5.3. Plan map of Subop KU-1-A showing the location of Stela Fragments 1 and 2.

approximately 20 cm apart and 2.5 m southeast of the altar. Both Subops KU-1-A and -E were designed to locate the stela socket and gather chronological information; only the latter goal was accomplished.

Stela Fragment 1 (Lot KU-1-A-2) was laying flat, oriented east-west in front of Structure 3 (Table 5.3). Our guess is that Fragment 1 is the bottom of the stela and the side to the west would have originally been placed in the ground or connected to a piece broken off in the ground. The top surface of Fragment 1 has faint traces of carvings; however, the condition of the carvings is so poor that we can only state that the monument was once carved. No details are discernible. Regardless, the presence of a carved stela is important since so few are known from the region. Once the fragment was removed from the unit, the flat surface facing the ground was inspected for indications

Table 5.3. Summary of Lots

Subop	Lot	Definition	Ceramic Comments
KU-1-A	1	Humus	Tepeu 3, Chen Mul modeled (Late Postclassic)
	2	Stela fragment 1	none
	3	Stela fragment 2	none
	4	Construction fill	Tepeu 2 , Chicanel
	5	Construction fill	Tepeu 1-2, Chicanel
	6	Construction fill	Tepeu (general)
KU-1-B	1	Humus	Tepeu 3
	2	Altar	none
	3	Building collapse debris	Floral Park, Mamom trace
	4	Construction fill	Chicanel, Mamom admix, Pre-Swasey (?) trace
	5	Partially reconstructable vessel	none
	6	Plaster floor and construction fill	Chicanel, Mamom trace
KU-1-C	1	Humus and building collapse debris	Tepeu 3, Tzakol 2 trace, Chicanel trace
	2	Platform face	none
	3	Construction fill	Tepeu 2, Chicanel trace, Mamom trace
	4	Construction fill	Floral Park (?) trace, Chicanel, Mamom trace
KU-1-D	1	Humus	Tepeu 3 (?)
	2	Building collapse debris	Tepeu 2, Chicanel/Floral Park trace
	3	Platform face/stairs	none
	4	Plaster floor	none
KU-1-E	1	Humus	Tepeu 3
	2	Construction fill	Tepeu 2, Chicanel
KU-1-F	1	Humus	Tepeu 3, Chicanel trace, Mamom trace
	2	Platform face	none
	3	Construction fill	Tepeu 2
	4	Plaster floor	none
KU-1-G	1	Humus and building collapse debris	Tepeu 3 (?)
	2	Building collapse debris	Tepeu 2
	3	Steps	none
	4	Floor	none
KU-1-H	1	Humus/collapse debris	Tepeu 2
	2	Building collapse debris	Tepeu 2
	3	Spine wall of Str. 2	none
	4	Step	none
	5	Plaster floor/landing	none
KU-1-SF	1	Chert biface	none
	2	Chert biface	none
	3	Chert hammerstone	none
	4	Incomplete chert biface	none
	5	Groundstone mano	none

of carvings, but none were recognized. The dimensions of Fragment 1 are: 40 cm wide on the western edge, 80 cm wide on the eastern edge, 1.1 m in length, and 50–55 cm thick.

Stela Fragment 2 (Lot KU-1-A-3) was standing in an upright position, perpendicular to Structure 3, and is considered to be the top half of the stela. The north face of Fragment 2 matches the top surface of Fragment 1. It was once carved, but no details are preserved. We have concluded that Stela Fragment 2 was reset into its current position, explaining its orientation perpendicular to the building, instead of the more common parallel placement to its associated structure. Dimensions of stela Fragment 2 are 75 cm wide, 85 cm in length, and 50 cm thick.

Once both of the fragments were removed from Subop KU-1-A, they were positioned next to each other confirming that they once fit together, with only one face of the monument apparently carved. Together the two fragments would have measured 1.95 m tall, 75–80 cm wide, and 50–55 cm thick. If our interpretation is correct, when Stela 1 was in an upright position the carvings would have been visible from the plaza looking east toward Structure 3.

During the excavations of the two suboperations, the humus layer (Lot KU-1-A-1 and Lot KU-1-E-1) consisted of dark (10YR3/2, very dark grayish brown) organic soil with lots of rootlets and several medium roots. Lot KU-1-A-1 was arbitrarily terminated upon reaching a change in soil color to a lighter matrix (10YR5/2, grayish brown). Also, because of the location around Stela 1, all of the topsoil was screened to maximize collection of artifacts. In the topsoil surrounding the base of Stela 1 (Lots KU-1-A-1 and -4) multiple fragments of Chen Mul modeled ceramics with incising and molded appliqué were collected. Smith (1971:Chart 1) places Chen Mul modeled in the Tases ceramic phase in the Yucatan, which he dates to the Late Postclassic period (A.D. 1300–1450). Their use as incensarios is assumed because of the presence of burned concave surfaces and their style. Among the collected ceramic assemblage were two complete arm and hand fragments decorated with molded appliqué bracelets, two molded and incised figurine faces—one complete and one broken in two pieces—and several other molded fragments with applique (Figure 5.4).

Lot KU-1-A-4 below topsoil consisted of a very dark grayish brown matrix (10YR4/2) mixed with small limestone cobbles. This lot varied in depths from the north meter where a mixture of larger limestone blocks was uncovered (Lot KU-1-A-5) and the southern meter where a compact cobble and marl mixture was uncovered (Lot KU-1-A-6). The thickness of Lot KU-1-A-4 averaged approximately 5 cm in the north meter and 15 cm in the south meter. Additionally, in the northern half of Subop KU-1-A, a single ammunition cap from a center fire shotgun shell was collected, indication of continued visitation to the site, possibly from the historic chicle camp nearby (see Houk, this volume).

Below the northern section of Lot KU-1-A-4 was Lot KU-1-A-5, which consisted of a 20-cm thick layer of limestone cobble and cut limestone blocks that have been interpreted as construction fill for the plaza surface, which has completely eroded. Lot KU-1-A-5 was terminated upon reaching the same compact mixture of small cobbles and marl matrix in the southern half of the unit. Lot KU-1-A-6 was a mixture of clay with small marl matrix, and medium sized cobbles containing a limited amount of artifacts. KU-1-A-6 averaged depths of 10–15 cm; difficulty excavating the clay matrix resulted in terminating Subop KU-1-A to shift focus onto Subop KU-1-E which allowed excavations to reach a culturally sterile level (discussed below).

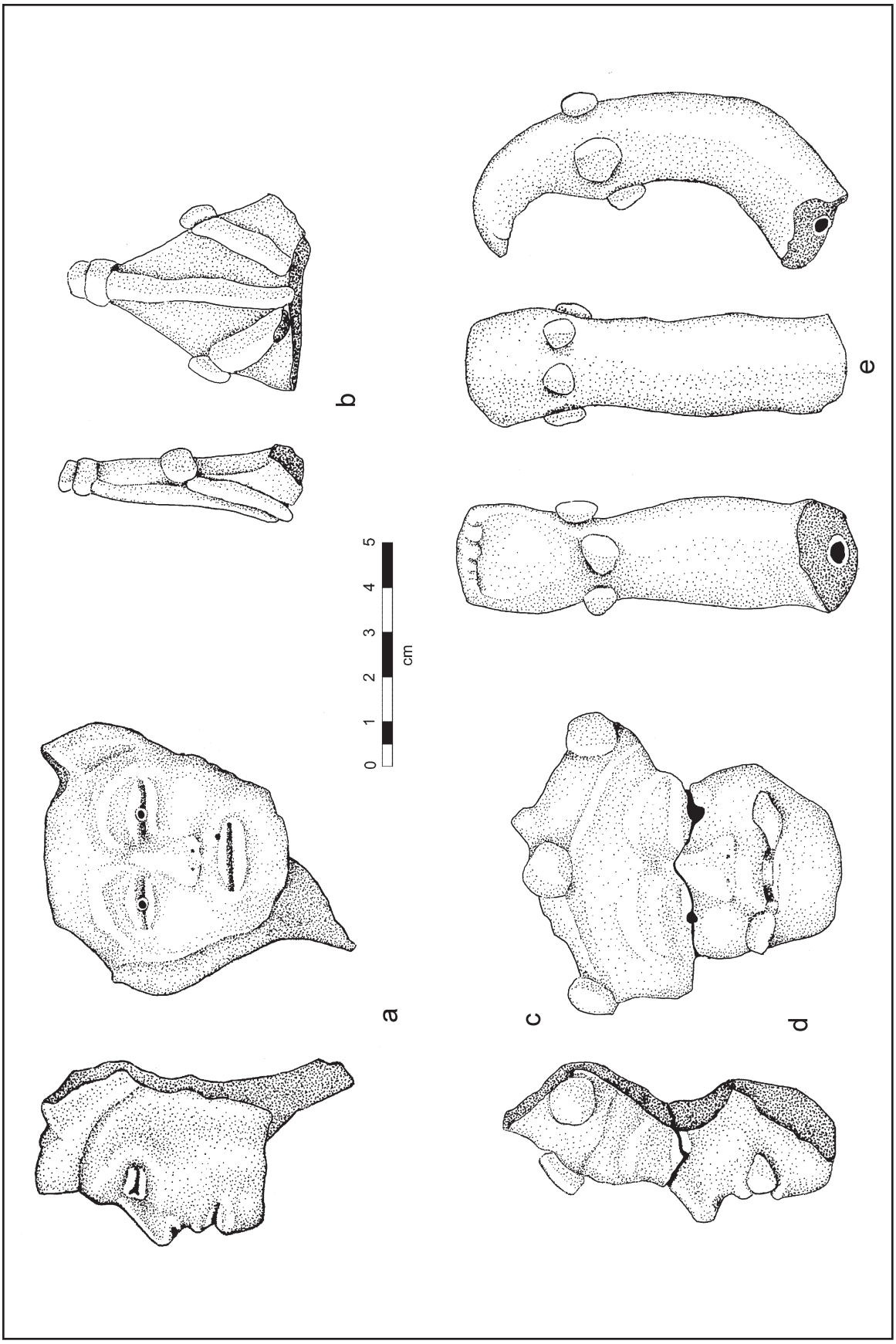

Figure 5.4. Chen Mul modeled incensario fragments from Lots KU-1-A-1 (a, b, c, and e) and -4 (d). Illustrations by Margaret Greco.

Subop KU-1-E was a 1-x-2-m extension of Subop KU-1-A to the west. This unit was opened to look for the stela socket. Lot KU-1-E-1 consisted of thick clayey topsoil that was saturated from rain. It was excavated to the same level as Lot KU-1-A-6, reaching depths of approximately 45 cm. The socket for Stela 1 was not identified, but excavations continued to obtain chronological data. Lot KU-1-E-2 was approximately 2 m deep and consisted of three layers. The uppermost layer was a continuation of the same clayey deposit from Lot KU-1-E-1, which continued an additional 60 cm, making the clayey deposit a total of approximately 1 m thick. Below this was a mixture of small and medium sized cobble fill approximately 1 m thick with the largest cobbles near the top and smaller below them, ranging in size from 10–20 cm thick for the larger cobbles down to 2–5 cm for the smaller ones. It is possible that there may have been a floor near the top of the cobbles; however, there was no evidence of a floor visible during excavations. Finally, in the bottom 30 cm of Subop KU-1-E, still in Lot KU-1-E-2, we encountered a buried A-horizon that is culturally sterile. The last plaza surface was not identified, however it is likely that it was near the top of the current surface and has completely transmuted into the organic topsoil.

Altar Excavations

Subop KU-1-B was a 2-x-2-m unit placed on the courtyard floor at the base of Structure 3 and encompassing Altar 1. Structure 3 is oriented 90 degrees east of north and measures about 5 m in height. The north-south axis measures 22.5 m in length and the east-west axis measures 26 m in length. The unit was placed so that Altar 1 was as close to the center of it as possible (Figures 5.5 and 5.6). This subop was opened to investigate the area around the altar and to collect dateable material from under the altar

Figure 5.5. Photograph of Altar 1 (KU-1-B-2), facing east.

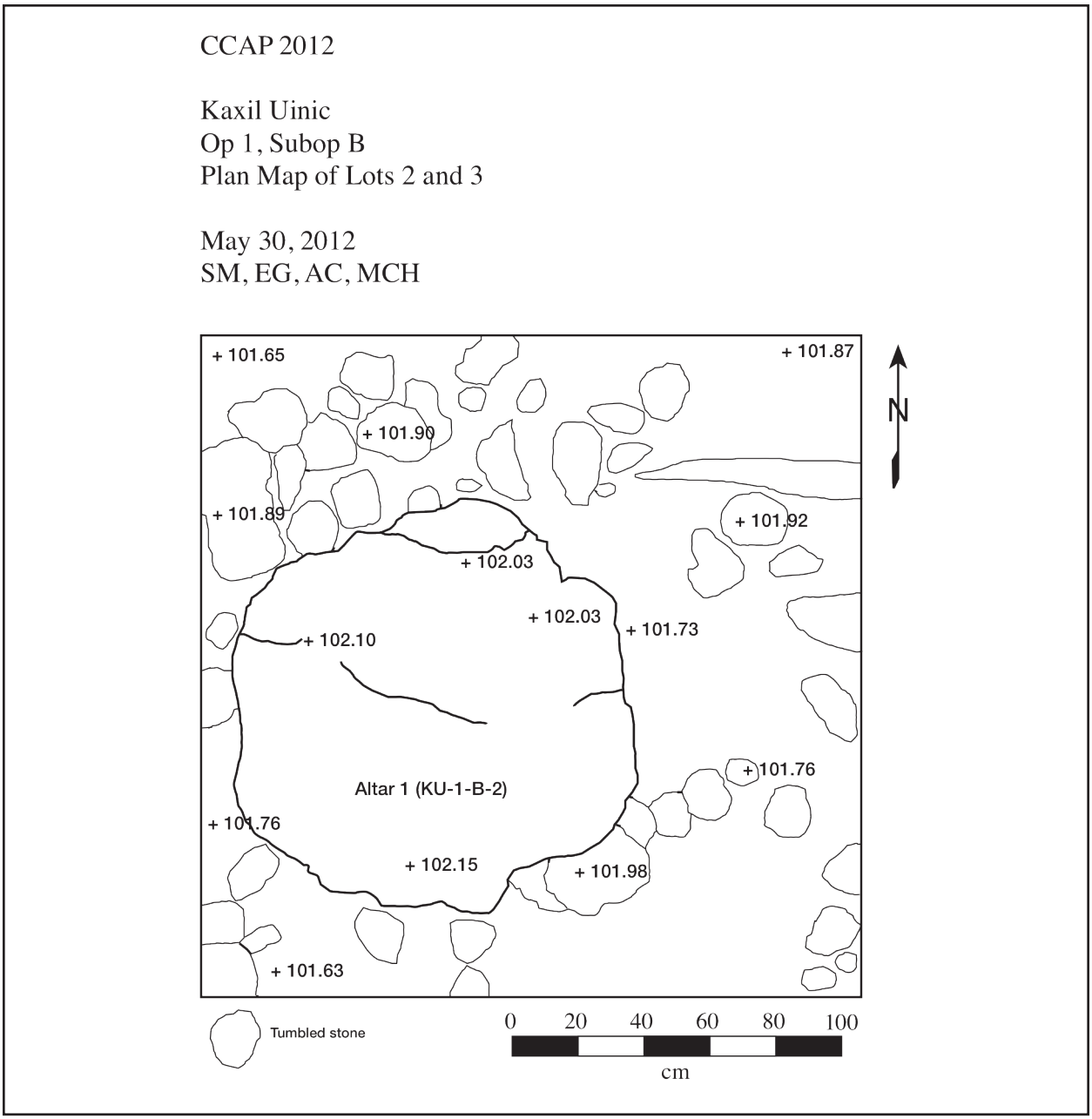

Figure 5.6. Plan map of Altar 1 in Subop KU-1-B.

to aid in establishing a chronology for the site. One of the intentions in moving the altar was to hopefully find a cache, which would have assisted in dating the site.

The humus layer (Lot KU-1-B-1) was a thin layer of dark grayish-brown (10YR 3/2), loamy matrix with thicknesses varying from 10 to 20 cm. The unit was riddled with roots and rootlets from two fairly large trees in close proximity to it. Several large cobbles were found on and near the surface surrounding Altar 1, which could possibly be broken pieces of the altar or perhaps fragments of a stand for the altar. The lot was terminated once the soil composition started to change.

Altar 1 was designated Lot KU-1-B-2 and removed from the subop. The altar's measurements varied from 120 to 130 cm in

diameter and from 25 to 30 cm in thickness. It is made of limestone and does not appear to have been carved. The altar was removed from the unit by using a log as a lever and the cobbles that were removed earlier as a fulcrum. At the end of the season the altar was moved back to its original location.

Lot KU-1-B-3 was directly beneath the altar. This was excavated in hopes of locating a cache or offering beneath the altar, but nothing of this nature was found. This lot's soil was a dark grayish-brown (10YR4/2) with cobbles scattered in it that were likely tumble from the slope of Structure 3. Not many artifacts were found other than ceramic sherds and a bifacial tool. A plaster floor may have once been present, but it was not identified during excavation. The lot was terminated when it became obvious that the excavations were in construction fill.

Lot KU-1-B-4 was construction fill that consisted of white, powdery matrix and cobbles. It was 40 to 60 cm thick and terminated on an earlier floor surface (Lot KU-1-B-6). In Lot KU-1-B-4 a yellow, chalky rock was found, possibly ochre. The ceramic assemblage from this lot dated to the Middle to Late Preclassic (1000 B.C.–A.D. 250). An interesting ceramic sherd was found that resembles the Cunil type found mostly in the Belize Valley and dating to the Early Preclassic (Valdez and Houk, this volume:68, Figure 6.2).

Lot KU-1-B-5 was a concentration of sherds embedded in the underlying plaster floor that appeared as though it was partially reconstructable. The type of ceramic could not be determined, but it was slipped with a reddish-orange color. The vessel fragments embedded in the floor measured about 12-x-12-cm.

Once Lot KU-1-B-5 was removed from the floor, the floor and associated contexts below it were designated Lot KU-1-B-6. We continued only to excavate the 1-x-2-m southern half of the subop until we came down on bedrock, which was 94–97 cm deeper than the top of the floor. Artifacts found in this context include ceramic sherds, unifacial tools, jute, and terrestrial land snail shells. This subop was terminated on bedrock about 2 m below the surface.

Structure 2

Structure 2 (Figure 5.7) at Kaxil Uinic is a range structure oriented east-west. It is a total of 52 m in length and at the widest point it is 18 m. The building's form is unusual. It is widest on the western end, and narrower towards the center section, and narrowest on the eastern end. The building faces south, based on the presence of steps ascending the structure, as well as a landing that appears to extend across most of the south face of the building. Structure 2 is located in the southeastern area of Kaxil Uinic and was originally believed to be enclosing an eastern plaza; however, after the 2012 field season it has been determined that this structure is associated with an unknown area to the south. Extremely thick vegetation, resulting in limited visibility restricted further examination for associated constructions.

Workers from Chan Chich Lodge had cleared the structure of undergrowth and hurricane debris, leaving only larger trees, prior to our arrival, making it possible for us to excavate a large area on the south face of the mound. These two contiguous subops were opened to document the latest phase of construction on the structure and gain a better understanding of the architecture at Kaxil Uinic.

Subop KU-1-G was a 1.5-x-4-m unit, and Subop KU-1-H was a 1.5-x-6-m unit. Both were oriented north-south perpendicular to Structure 2's long axis. Subop KU-1-G extended from the base of the mound to approximately half way up the structure, where it joined Subop KU-1-H, which continued to the summit of the mound. Together, the two units encountered

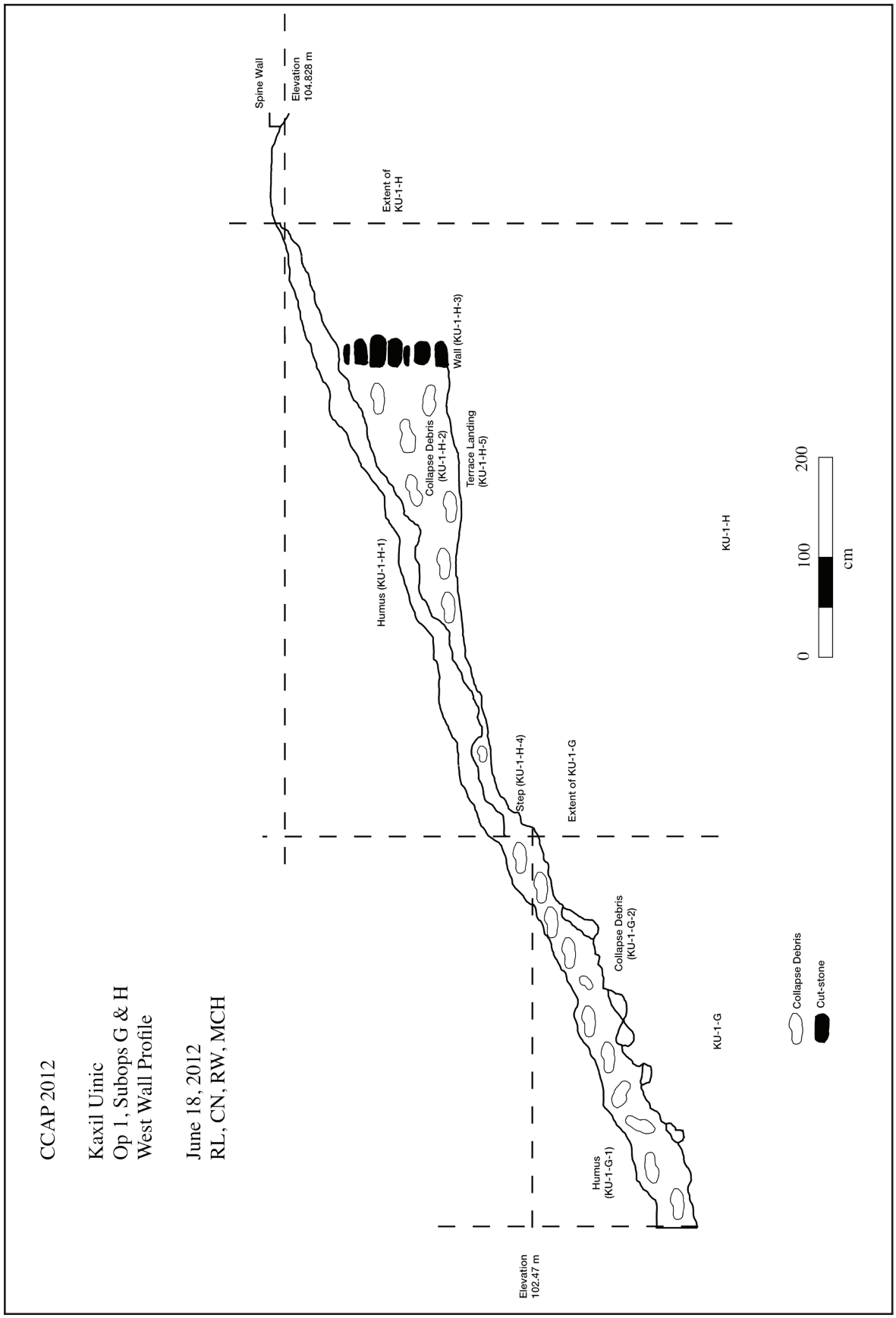

Figure 5.7. Western profile of Subops KU-1-G and KU-1-H.

an eroded floor at the base of the mound, very badly preserved steps on its face, an eroded plaster landing (or other surface), and a wall near the summit of the mound.

Topsoil and Collapse Debris

Lots KU-1-G-1 and KU-1-H-1 were the topsoil, which consisted of a matrix of dark loamy soil with many small roots and rootlets. The thickness of these lots averaged between 10 to 25 cm. Below the topsoil was collapse debris (Lots KU-1-G-1 and KU-1-H-1), which was excavated over the entire area of both subops and consisted of both cut and uncut, tumbled limestone blocks above intact architecture. Some of the blocks may have originally served as steps; however, the final phase of architecture was very poorly preserved, and the blocks had clearly shifted from their original positions. The matrix around the collapse consisted of a lighter soil, with some small roots, rootlets, and one medium size root (10 cm diameter) in the northern half of Subop KU-1-G. The thickness of collapse debris averaged approximately 25 cm in Subop KU-1-G. In Subop KU-1-H, the thickness of the collapse debris ranged from 10 to 20 cm in the northern part of the unit and 25 to 60 cm in the southern section of the subop above the landing, described below.

Courtyard Floor

A plaster floor (Lot KU-1-G-4) in extremely poor condition was only recognizable from the mixture of small limestone pebbles and lighter matrix color at the base of the steps of Structure 2. The matrix was light brownish gray (10YR6/2). This eroded floor is presumably part of a courtyard or similar surface in front of Structure 2, but the thick vegetation prevented us from investigating the area.

Steps

The steps (Lot KU-1-G-3 and 1-H-4) ascending Structure 2 were in extremely poor preservation with many of the cut stones missing. A total of nine steps was documented. The lower eight were located in the northern 3 m of Subop KU-1-G and the ninth and uppermost step in the southern 50 cm of Subop KU-1-H. The lowest step was located 120 cm from the south edge of Subop KU-1-G. From the courtyard floor, the steps ascend the structure approximately 2 m to a plaster landing in Subop KU-1-H. The steps average 21 cm in height, and their treads average 21 cm deep. All were very poorly preserved, and none were intact across the width of the units.

Landing

At the top of the steps in Subop KU-1-H, excavations encountered a plaster landing extending 4 from the top of the steps to the base of the wall, described below. Presumably, based on the surface morphology of the mound, the landing extends across the front of the central part of the structure for approximately 26 m. The plaster surface was in poor condition, and it is unclear if there were any resurfacing events. Although the plaster was poorly preserved, it was the best-preserved plaster surface excavated at Kaxil Uinic.

Wall

A wall (Lot KU-1-H-3) was uncovered during excavation on the summit of Structure 2, located in the northern 1.20 m of Subop H (Figure 5.8). The wall runs perpendicular to the subop, oriented east-west, and was preserved at its highest point to 1.2 m. At the highest point the wall has seven courses of cut stone, each course averaging approximately 20 cm. The wall is made of well-cut limestone blocks, ranging in size from larger blocks averaging 40 cm wide by 20 cm high to smaller blocks averaging 20 cm by 20 cm. The wall extends outside of our subop to the north; however, additional exposed cut stone on the surface of

Figure 5.8. Photograph of Subop KU-1-H facing north, with the wall (Lot KU-1-H-3) visible at the north end of the unit.

the mound 1 m to the north of the unit indicate that the wall is approximately 2 m thick.

Structure 6

Structure 6 is a pyramid structure that is situated at the southern edge of Kaxil Uinic's main courtyard. Structure 6 is oriented 265 degrees east of north and is about 5 m tall. Its north-south axis is about 16.5 m long, and its east-west axis is about 23.5 m long. A 2-x-2-m unit designated Subop KU-1-C was opened on the north slope of the structure in hopes of exposing architecture. Based on the large number of artifacts recovered from the topsoil of this first subop and the realization that the unit was too low on the mound to catch intact architecture, an additional 2-x-2-m unit (Subop KU-1-F) was opened on the southern end of Subop KU-1-C.

Humus Layer

The humus layer (10YR3/2, dark grayish brown) was designated Lot KU-1-C-1. Many roots and rootlets were present in this lot, including three larger roots approximately 10 cm in diameter. The ceramic assemblage found in this lot was mixed with types ranging from the Middle Preclassic to the Terminal Classic. This was also the case in the extension designated KU-1-F. Two pieces of speleothems or travertine were found in Lot KU-1-F (Figure 5.9). This is a rock that is formed in caves and there are no caves known in close proximity to the site.

A large bifacial tool measuring about 16 cm in length was found in this the topsoil of KU-1-F as were several more fragments of speleothems/ travertine.

Steps

Lots KU-1-C-2 and KU-1-F-2 were three cut-stones that spanned both subops, forming the lowest step to the structure's stairs (Figure 5.10). The largest and most exposed of the cut-stones measured 34 cm in width, 57 cm in length, and 26 cm in height. The size of these stones possibly suggests an Early Classic or Late Preclassic construction date. Any additional steps above this lower level were not preserved well enough to be detected during excavations. When it was apparent that the excavators had exposed construction fill above and south of the well-preserved step (Lot KU-1-F-2), Lot KU-1-F-3 was designated. This construction fill was excavated to collect a ceramic sample to help in dating the construction of the structure. The construction fill contained Palmar Orange polychrome, which dates to the Late Classic period, suggesting that the final phase of construction of Structure 6 took place during this period. Lot KU-1-F-4 was a fairly well

Figure 5.9. Photograph of speleothems found in Subop KU-1-C .

Figure 5.10. Photograph of cut-stones forming lowest step to Structure 6 (KU-1-C-2 and KU-1-F-2), looking west.

preserved plaster floor under the construction fill, about 1 m below the surface. The floor could have possibly been a floor to a structure from an earlier phase of construction. The subop was terminated at this point.

Courtyard Floor

To test the courtyard construction, excavations continued in Subop KU-1-C north of the preserved step. Lot KU-1-C-3 appeared to only be construction fill for about 40 to 50 cm. It was not until the profile was visible that it appeared there were two badly eroded floors that were not visible during excavation. Also, more speolethems/travertine fragments were found in this context. Lot KU-1-C-4 was construction fill that continued down into a dark alluvium. In the dark alluvium some marine shell and terrestrial land snails were found. Bedrock was found about 2 to 2.5 m below the surface, and the subop was terminated at this point.

Structure 12

Structure 12 is a stepped pyramid on the northern side of the main courtyard. It is oriented 90 degrees east of north and measures about 4 m in height. Its north-south axis measures 21 m in length and its east-west axis measures 23 m in length. A 2-x-2-m excavation unit designated KU-1-D was opened on the

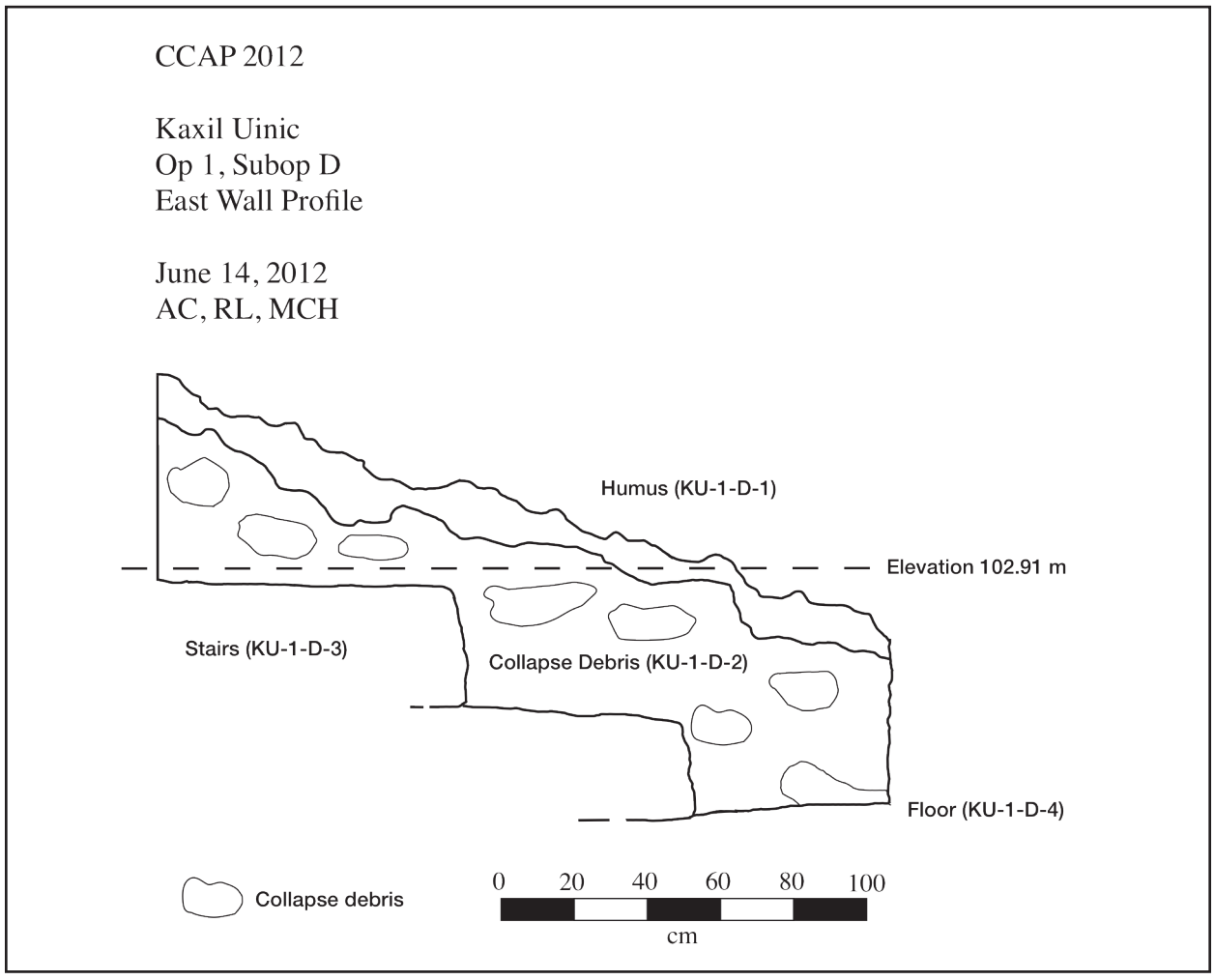

Figure 5.11. Suboperation KU-1-D, eastern profile.

south slope of the mound with the intention of exposing architecture (Figure 5.11).

Humus Layer

The humus layer was designated Lot KU-1-D-1 and measured about 10 to 20 cm in thickness. The humus was a dark organic, loamy soil. This lot yielded ceramic sherds, a bifacial tool, jute shells, and two obsidian blades. The two obsidian blades were the only pieces of obsidian found at the site. Lot KU-1-D-2 was collapse debris that was 10 to 20 cm thick. The ceramics in this lot were dated to the Late Pre-Classic (300 B.C.–A.D. 250) and Late Classic (A.D. 600–A.D. 800) periods, including Chicanel and Tepeu II ceramic types.

Steps and Floor

What was designated Lots KU-1-D-3 and KU-1-D-4 were four cut-stones and a floor, respectively. Lot KU-1-D-3 consisted of cut-stones, the largest of which measured 1.85 cm in length and about 25 cm in height. One of the steps measured only about 40 to 50 cm in width. This was the most intact of the steps that comprised the stairs to Structure 12. The plaster floor (Lot KU-1-D-4) at the base of step was fairly intact compared to other floors seen at the site. Only a small portion of the floor was exposed since it was found in the 20 to 30 cm between the lowest step and the extent of the subop. The excavations did not penetrate the intact architecture.

Surface Finds

Surface finds of tools were collected when discovered. To comply with the conventions of the laboratory processing system, all surface finds were collected as part of Subop KU-1-SF, and each individual tool was given its own lot number. Lot KU-1-SF-1 was found just north of Structure 3 on one of the trails we cut to access the site. It is a bifacial tool made of chert measuring about 8 cm in length. Lot KU-1-SF-2 was found on the south side of Structure 12 about 2 m south of Subop KU-1-D. It is a bifacial tool made of chert that measures about 5 x 1 cm. Lot KU-1-SF-3 was also found on the south side of Structure 12 about 3 m south of Subop KU-1-D. It is a hammerstone made of chert measuring approximately 6 cm in diameter. Lot KU-1-SF-4 was found on the south side of Structure 2 about 5 m west of Subop 1-G. It is a fairly large, unfinished chert biface. It measures about 20 cm in length. Finally, Lot KU-1-SF-5 was also found on the south side of Structure 2 about 7 m west of Subop 1-G. It is a mano made of granite. It measures about 7 x 13 cm.

SUMMARY

In summary, the 2012 excavations at Kaxil Uinic aided in the rectification of the map made by Guderjan et al. (1991), and two additional structures were discovered at the site (Structures 13 and 14). Our limited explorations did not find evidence that the sacbe that extends west from Chan Chich connects to Kaxil Uinic, but the dense vegetation prevented as thorough a search as we had planned. The ceramics found at the site varied greatly between lots. There were mixed contexts that contained ceramics from primarily the Late Preclassic and Late Classic periods, but the single Cunil-like sherd suggests there could be Early Preclassic occupations in the area. Also, the speleothems found on Structure 6, the southern structure of the courtyard, supports the idea that the Maya associated the cardinal directions with cosmological concepts. In this instance south is associated with water and the underworld, as are caves and the things found within them (Ashmore 1991).

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Preliminary Comments on the 2012 Ceramics Analysis

Fred Valdez, Jr. and Brett A. Houk

INTRODUCTION

The 2012 season of the Chan Chich Archaeological Project (CCAP) marks a renewed research effort in a poorly understood prehistoric Maya region of northwest Belize. Investigations this season included research at Chan Chich and excavations at Kaxil Uinic, with ceramic finds from both sites. Six functionally complete complexes had been previously defined for the Chan Chich ceramic sequence (Valdez and Houk 2000). Ceramics analyzed and reported from the 1997–1999 seasons along with some material from the 2012 investigations serve to define the ceramic sequence herein presented. From the 2012 assemblage, all of the ceramics from Kaxil Uinic were analyzed, but only the ceramics from one suboperation (CC-10-C) at Chan Chich were analyzed. The chronological data from the ceramic analysis have been incorporated into the Kaxil Uinic and Chan Chich Upper Plaza chapters in this report (Harris and Sisneros, this volume; Kelley et al., this volume). This chapter will serve as a baseline for future ceramic analysis of the CCAP at both Chan Chich and Kaxil Uinic.

Valdez and Houk (2000:127) outlined the three major objectives that guided the original ceramic analysis for the CCAP and that remain of prime interest:

> First was the establishment of a chronological sequence for the site. This sequence also serves other research interests both internally (i.e., within the site) and externally to other sites and regions. A second interest of the ceramic analysis is its potential use concerning internal site ceramic patterns. In this respect the distribution of pottery within the site may reflect degrees or levels of social, economic, and political interaction within the community. This aspect of the analysis is still in progress. The analysis of ceramic patterning may also assist in determining initial settlement foci as well as changing settlement preferences over time. The third benefit of this analysis concerns correlating external interaction. Ceramics may be used to gage intersite and interregional trade, communication, and cultural evolutionary developments.

CERAMIC ANALYSIS

The analysis of the Chan Chich and Kaxil Uinic ceramic collections has been undertaken utilizing the long established type:variety-mode system of analysis (Adams 1971; Gifford 1976; Sabloff 1975; Smith et al. 1960). This system has been applied at most sites across the Maya lowlands including Altar de Sacrificios (Adams 1971), Becan (Ball 1977), the Belize Valley (Gifford 1976), Cerros (Robertson-Freidel 1980), Chan Chich (Valdez and Houk 2000),

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2012 Preliminary Comments on the Ceramics Analysis. In *The 2012 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 65–72. Papers of the Chan Chich Archaeological Project, Number 6. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

Coba (Robles 1980), Colha (Valdez 1987), Cuello (Kosakowsky 1987; Kosakowsky and Pring 1998; Pring 1977), El Mirador (Forsyth 1989), K'axob (Lopez Varela 1995), Kichpanha (McDow 1997; Meskill 1992; Reese and Valdez 1987), Laguna de On (Mock 1997), Nakbe (Forsyth 1993), Northern River Lagoon Site (Mock 1994), Oxkintok (Varela 1992), Rio Azul (Adams and Jackson-Adams 2000), Santa Rita (Chase and Chase 1988), Seibal (Sabloff 1975), and the regional effort of the Programme for Belize Archaeological Project (Sullivan and Valdez 2000; Valdez et al. 1993). An important aspect of this analysis requires ceramic type descriptions that help to define the grouping of typological units that may then be defined into chronologically significant segments.

The type:variety-mode system of analysis then allows for the ceramics to be used as a tool for chronological assessments which is usually of immediate interest to excavators. The chronological segments defined for Chan Chich and Kaxil Uinic are approximated from comparisons with other Maya sites with similar ceramics. Specific temporal designations may be later affirmed for Chan Chich with the results of absolute dating methods.

THE CERAMIC SEQUENCE

Seven ceramic complexes are currently represented in the Chan Chich sequence (Figure 6.1) and a sequence for Kaxil Uinic is being considered. All of the complexes are functionally complete as defined by Adams (1971), however, the Early Classic period (Tzakol Sphere) is still a poorly represented complex. Late Postclassic visitations occurred at Chan Chich as is common at numerous other sites and represented thus far only by censer material. The ceramic complexes for the currently defined Chan Chich sequence are named after birds observed inhabiting the research area. It is believed that additional excavations will provide data to support and refine the general ceramic chronology as currently understood. Each season of research promises to allow for a refinement of the chronology through clearer definitions of ceramic types, complexes, complex facets, and comparative materials.

Kiskadee Ceramic Complex

Early Middle Preclassic, Swasey Sphere. The Kiskadee Complex is the earliest occupation evidence at Chan Chich thus far. The complex begins about 900 BC and extends to 600 BC and fits well, given the ceramic artifacts, within the northern Belize Swasey Sphere.

Oropendola Ceramic Complex

Late Middle Preclassic, Mamom Sphere. Dated to approximately 600 BC to 400 BC, the Chan Chich Oropendola Ceramic Complex is safely placed within the Mamom Sphere. The Mamom ceramic sphere is pan-Maya, but does maintain regional variations in certain ceramic characteristics.

Jacamar Ceramic Complex

Late Preclassic, Chicanel Sphere. A beginning date of 400 BC is designated for this ceramic complex at Chan Chich with an ending date of about AD 150. The Late Preclassic is generally extended to AD 250, however, a separate complex is posited for the following Terminal Preclassic period at Chan Chich because of the presence of Floral Park sphere ceramics. The Late Preclassic complex at Chan Chich is nearly identical in types and many varieties to other ceramic complexes of the same period in the Maya lowlands i.e., very uniform in shape, slip color, and surface treatment in this period.

Correlation	Time	Major Periods	Chan Chich	Altar de Sacrificios	Barton Ramie	Colha	Cuello	El Mirador	Seibal	Tikal	Uaxactun
	1200	*Late Postclassic*									
		Middle Postclassic				Ranas				Caban	
10.10.0.0.0.	1100			Jimba	New Town	Canos					
	1000	*Early Postclassic*				Yalam			Bayal	Eznab	
	900			Boca	Spanish Lookout				Transition		Tepeu 1 2 3
		Terminal Classic	**Pauraque**			Masson		Post Lac Na	Tepejilote	Imix	
10.0.0.0.0.	800			Pasion Chixoy							
		Late Classic	**Motmot**		Tiger Run						
9.10.0.0.0.	700			Veremos		Bomba		Lac Na		Ix	
	600			Ayn							
					Hermitage			Acropolis	Junco	Manik	Tzakol 1 2 3
	500					Cobweb					
9.0.0.0.0.	400	*Early Classic*	**Jabiru**	Salinas							
8.10.0.0.0.	300				Floral Park			Paixbancito	Cantutse	Cimi	Chicanel
		Terminal Preclassic	**Trogon**			Blossom Park					
	200										
8.0.0.0.0.	AD/BC										
		Late Preclassic	**Jacamar**	Plancha	Mount Hope	Onecimo	Cocos-Chicanel	Cascabel		Cauac	
	200										
	300										
7.10.0.0.0.	400										
	500		**Oropendula**	San Felix	Jenny Creek Late Facet	Chiwa	Lopez-Mamom	Monos	Escoba		Mamom
	600			Late Facet							
		Middle Preclassic		Early Facet							
	700		**Kiskadee**								
	800			Xe		Bolay	Bladen		Real		
	900						Swasey				

Figure 6.1. The Chan Chich ceramic complexes and other ceramic sequences from the Maya Lowlands.

Trogon Ceramic Complex

Terminal Preclassic, Floral Park Sphere. Estimated to date ca. AD 150–250, is the Terminal Preclassic Trogon Complex at Chan Chich. The Trogon Complex falls within the early facet of the protoclassic ceramic stage (as discussed by Brady et al. 1998), which is often considered to be a period of innovation when polychrome pottery was introduced and most slips had developed a "hard, glossy" appearance versus the traditional "waxy wares" of the Preclassic. At Chan Chich the Trogon Complex is well represented by the assemblage of vessels from the Terminal Preclassic royal tomb excavated in the Upper Plaza (Houk et al. 2010).

Jabiru Ceramic Complex: Early Classic, Tzakol Sphere

Dated from AD 250—600, the Chan Chich Early Classic is not well represented in the ceramic artifacts. While significant ceramic types have been identified, the quantity of material recovered/identified implies a rather weak occupation. "Several complete Early Classic vessels recovered from looter's activity point to more significant Early Classic development than implied by the project's sherd recovery" (Valdez and Houk 2000). A larger sample may be required to help resolve this concern.

Motmot Ceramic Complex

Late Classic 1-2, Tepeu Sphere. The Late Classic 1-2 phase is currently dated to ca. AD 600–800. The Motmot Ceramic Complex at Chan Chich is placed within the similarly related northern Belize and eastern Peten ceramic developments of the Late Classic period.

Pauraque Ceramic Complex

Late Classic 3, Tepeu Sphere. The Pauraque Ceramic Complex at Chan Chich is dated at ca. AD 800–850 and designated as Late Classic 3. The ceramic composition of this complex allows for its placement as Terminal Classic. The findings are very similar to many sites in the Maya lowlands.

KAXIL UINIC COMMENTS

The ceramics recovered from Kaxil Uinic are in very many ways very similar to those from Chan Chich. The relationship between the two sites will be for later discussion, however. For the purposes of this report, the Kaxil Uinic sequence seems to follow very closely, if not identically, to the Chan Chich ceramic complexes with two exceptions. First, a deposit at Kaxil Uinic is identified as being among the earliest in Belize with direct stylistic and decorative ties to the Cunil Ceramic Complex of the Belize Valley (Jaime Awe, personal communication, 2012). An example of the early ceramic material is seen in Figure 6.2. If this assessment holds true, Kaxil Uinic may have a Maya occupation extending back to perhaps 1200 BC. The second noteworthy difference between Chan Chich and Kaxil Uinic is the presence of Chen Mul Modeled ceramics of the Postclassic (and possibly utilized into the

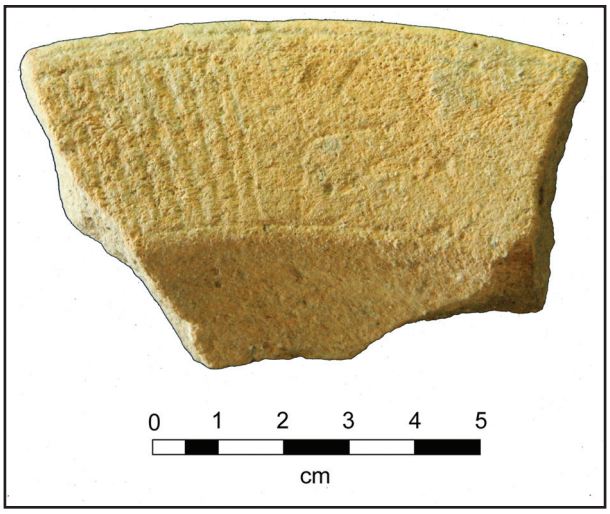

Figure 6.2. Sherd from Kaxil Uinic (KU-1-B-4) that resembles Cunil sherds from the Belize River Valley.

early historic period). While Chan Chich lacks the presence of Chen Mul Modeled, Kaxil Uinic produced several interesting fragments of the anthropomorphic censers (see Harris and Sisneros, this volume, Figure 5.4).

SUMMARY

As concluded by Valdez and Houk (2000:136), "the ceramic analysis indicates that the ancient city of Chan Chich was first settled ca. 900 BC and abandoned by AD 850." After preliminary observations of the ceramic artifacts from the 2012 season, the statement remains accurate. The Chan Chich data are briefly summarized below and for now include most of the findings for Kaxil Uinic. The only exception or significant difference of information concerning Kaxil Uinic has been presented above.

The Middle Preclassic complexes as part of the Swasey and Mamom Spheres are certainly related to other early sites in northern Belize and northeastern Peten. Although regional variation is noteworthy. The Late Preclassic ceramics seem to represent a period that was of more intensive interaction between sites and perhaps regions. The Chicanel Sphere is the designation for this phase at Chan Chich. In the Late-to-Terminal Preclassic, Chan Chich was actively involved in the trade (and communications) systems common throughout the Maya lowlands. The final Preclassic phase at Chan Chich is the Terminal Preclassic (Floral Park Sphere) Trogon Complex.

Following the new developments or innovations of the Terminal Preclassic, Chan Chich transitioned into the Early Classic Jabiru Complex (Tzakol Sphere). While it is clear that Early Classic occupants were active at Chan Chich, representative material for the Early Classic remains scant. No satisfactory explanation for a weak representation is posited at this time.

Two ceramic complexes, Motmot Complex and Pauraque Complex, represent the Chan Chich Late Classic (Tepeu Sphere). Excavations continue to produce ceramics of the Late Classic phase usually with Tepeu 3 material near or at the surface level. Chan Chich was a very active member of the Peten and northern Belize trade and exchange networks as represented in the ceramic inventories. Chan Chich's abandonment at the end of the Classic period seems clear. There are, however, later Postclassic visitations with special offerings (censers), but no permanent Maya occupation of Chan Chich is known after the Tepeu 3 period.

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The Chan Chich Archaeological Project's Digital Data Collection System

Brett A. Houk

INTRODUCTION

Prior to the 2012 season of the Chan Chich Archaeological Project (CCAP), I was awarded a small grant through Texas Tech University's Office of the Vice President for Research to develop a digital data collection system to be implemented during the field season. The grant was part of the "FY12 Internal Competitive Funding Opportunity to Advance Scholarship in the Creative Arts, Humanities and Social Sciences" and it allowed me to purchase three iPads, software, and other supplies. Anthropology graduate student Matthew Harris and I developed the database system over the course of three months, and the CCAP used it in the field for the first time during the 2012 season.

FROM PAPER TO iPADS

The traditional system employed in the Maya area uses a hierarchy of paper forms to describe overall excavation areas (Operations), individual excavation units (Suboperations), and specific excavation contexts (Lots). Other forms (cache, burial, and sample forms) and photologs, as well as daily field journals, are also part of the recording system. Information on these forms is supplemented by profile drawings and plan maps, which are drawn on metric graph paper to scale. Once the fieldwork is finished, the data from paper forms are ideally entered into spreadsheets, and the field maps are scanned and drafted on a computer. The data entry and drafting of plan maps and profiles are time consuming tasks and usually are not done until several months after the field season has ended. As an example, the excavations I directed at La Milpa in 2011 generated 210 field forms (excluding photologs) and 40 profile and plan map drawings. At a conservative estimate of 3 minutes per form to enter the data into a database and 2–3 hours per drawing to scan and draft publication quality illustrations, it would take 90.5–130.5 hours to enter the data and clean up the illustrations from one excavation season. As a result, field forms commonly never progress beyond their paper state and are never compiled into a searchable, sortable database, and only the most crucial drawings are cleaned up in a computer drawing program.

As I argued in my grant proposal, moving to a digital data collection system would be worth the effort and expense. Such a system can greatly reduce the amount of time spent entering data from paper forms into computer databases. Additionally, a relational database is much more powerful than a simple spreadsheet. If designed correctly, the database links information from multiple forms (including field and lab forms) together, allowing excavators to access information much more quickly. In theory, it also can allow for greater integration of field and lab data, so that the results of artifact analyses are available to the excavators in the field as soon as they are completed.

Houk, Brett A.
2012 The Chan Chich Archaeological Project's Digital Data Collection System. In *The 2012 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 73–82. Papers of the Chan Chich Archaeological Project, Number 6. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

The genesis of the idea to develop the database came from a rather informal experiment with an iPad in the field during the summer of 2011. I field tested an iPad 1 at La Milpa, Belize to explore the feasibility of using iPads to collect data in the field. My use of the iPad was limited to four specific tasks: (1) using the iPad as a field library with PDFs of previous field reports and relevant journal articles, (2) storing copies of digital photographs for quick reference in the field, (3) using Numbers, an Excel like spreadsheet app, to record my photolog (over 750 photos were taken in the field on my camera alone), and (4) using iDraw, a technical drawing app, to draw three archaeological profiles in the field instead of on graph paper. The iPad performed exceptionally well. It was lightweight, had phenomenal battery life, and could even be used in light rain, much to my surprise. It rains frequently in the summers in Belize, and even a drizzle makes it impossible to use paper field forms. By placing the iPad in a waterproof plastic bag, it was possible to draw profile drawings and enter photolog data while all paper-based note taking was halted. Coincidentally, while in Belize in 2011, I learned that a colleague at the University of New Hampshire, Dr. Eleanor Harrison-Buck, was testing iPads on her project, as well. Her crews were using FileMaker Pro, a relational database, and its iPad counterpart in the field and reported generally positive reviews.

THE DATA COLLECTION SYSTEM AS PROPOSED

The following is taken from the original grant proposal. As is often the case, the final product differed somewhat from the envisioned system:

> As currently envisioned, the data collection system will replace the hierarchy of field forms typically used in Maya archaeology. The backbone of the system will be a Filemaker Pro 11 relational database, which will be stored on a MacBook Pro in the field laboratory. The laptop will be connected to an external hard drive to allow continuous backups. The database forms will be exported to three iPads, and data will be entered on the digital forms in the field using Filemaker Go for iPad. Wireless keyboards will facilitate entering long text descriptions. Each evening, the iPads will be synced with the laptop. In addition to excavation forms, the database will include photologs (running list of photographs taken on each camera) and laboratory analysis forms.
>
> Other data (profile and plan map drawings of excavations) will be entered using iDraw on the iPads. These drawings will be uploaded to the laptop each evening, and they will be finalized using a desktop version of the software. Photographs and videos will be uploaded and managed in iPhoto on the laptop. Copies of photos and videos will then be synced to the iPads as a reference source for use during the excavations. Similarly, data from the Total Data Station (a surveying instrument) will be uploaded to the laptop. Photographs and finalized drawings will be linked to the relevant field forms in the Filemaker Pro relational database, as will the results of laboratory analysis.

THE DATA COLLECTION SYSTEM AS BUILT AND IMPLEMENTED

Over the course of several months in the spring of 2012, the FileMaker Pro 11 database evolved through multiple “alpha” and “beta” versions. Because neither Matthew Harris nor I had used FileMaker before, the learning curve

was steep. However, the field-ready version of the FileMaker Pro database did everything that I wanted it to do. Unfortunately, there were things that I needed it to do better, things that I did not think about during development, and limitations in the system that I did not understand until we began to use it in the field. Although this chapter focuses primarily on the Filemaker Pro component of the database, the system involved a variety of hardware and software (Table 7.1).

The Design of the FileMaker Pro Database

At its most basic level, the relational database is built around the way the CCAP records provenience data in the field and analyzes artifacts in the lab. Therefore, forms are grouped into two broad categories of field forms and lab forms.

Field Forms

In the field, the top level of provenience information is the site. Below that are operations (excavation areas). Below operations are suboperations (individual excavation units). Below suboperations are lots (the smallest level of provenience we record). The FileMaker Pro system was designed around this hierarchy of information. To begin using the database, the supervising archaeologist working at a particular site first creates a Site Summary

Table 7.1. Software, Hardware, and Supplies in the CCAP Data Collection System

	Item	#	Uses
Hardware	MacBook Pro	1	Lab computer; database storage
	iPad (Field)	4	Field version of database; library of relevant reports and articles; limited use for field drawings
	iPad (Lab)	1	Used to enter artifact catalog and analysis data via wifi connection to MacBook Pro
	Total Data Station	1	Collected spatial data on units and datums in the field
	Digital Cameras	4	Field and lab photography
	External Hard Drive	1	Hourly backup of MacBook Pro
	Wireless Keyboard	3	Bluetooth connections to iPads; used to enter long descriptions
Mac Software	FileMaker Pro 11	1	Installed on MacBook Pro; relational database
	iDraw for Mac	1	Installed on MacBook Pro; used to modify iPad field drawings and redraw scanned paper field drawings
	iPhoto	1	Used to store and organize field and lab photographs
	iTunes	1	Used to transfer files to and from the iPads via the MacBook Pro
	Time Machine	1	Automatic backup software on MacBook Pro used to backup of contents of hard drive
iPad Apps	FileMaker Go	5	iPad version of relational database used to record field and lab data
	iDraw for iPad	5	Intended for field drawings, but not fully implemented in 2012
	iBooks	5	Used to store library of PDFs on iPads
	Photos	5	iPad app for storing photos
	Camera	4	iPad app for taking photos
Misc.	Otterbox Defender case	5	Used to protect the iPads in the field; does not protect the screen if the cover is not used
	Stylus	4	Facilitated data entry on FileMaker Go
	Apple Battery Recharger	1	Used to recharge six AA batteries in wireless keyboards

form. This form requires very little information, but it brings in data from lower level forms as the database is expanded. Before excavations began, the supervisor then creates an Operation Definition form. This form requires the user to select from a list of previously designated sites, which is based on the Site Summary forms. For each excavation unit then opened at a particular operation, the supervisor creates a Subop Definition form, which requires the user to select from a list of previously designated operations. Finally, each lot in a suboperation gets a Lot Form, again requiring the user to first select from a list of previously established subops (Figure 7.1). In all cases, when the user selects the next higher level of provenience from a drop down list (i.e., subop for each Lot form), the database automatically fills in the remaining information on provenience. For example, to create a new lot, the user selects from an existing list of subops, and the database automatically supplies the appropriate operation designation and site name.

As lower level forms are created in the system, they supply information to the higher level forms. For example, when a new Lot form is created, certain information from that form appears on the related Subop Definition form. Each new Suboperation Definition form, similarly, supplies information to the appropriate Operation Definition form, which in turn populates information on the Site Summary form. This is the benefit and the power of a relational database.

Other field forms provide either operation-specific information (List of Datums form and Field Drawings form) or lot-specific information (Sample form, Burial form, Individual-Burial form, and Cache form). By setting up a series of relationships, it is possible for these various forms to interact with each other (Figure 7.2).

Another crucial field form is the Photolog. While a Photolog form was created in FileMaker Pro, excavators entered their photo information on a Numbers (an Excel like app) spreadsheet on the iPad. Numbers allows copy, paste, and fill actions that speed up data entry. The Numbers spreadsheets then were exported as Excel files and imported into FileMaker Pro (see From Theory to Reality below). While this

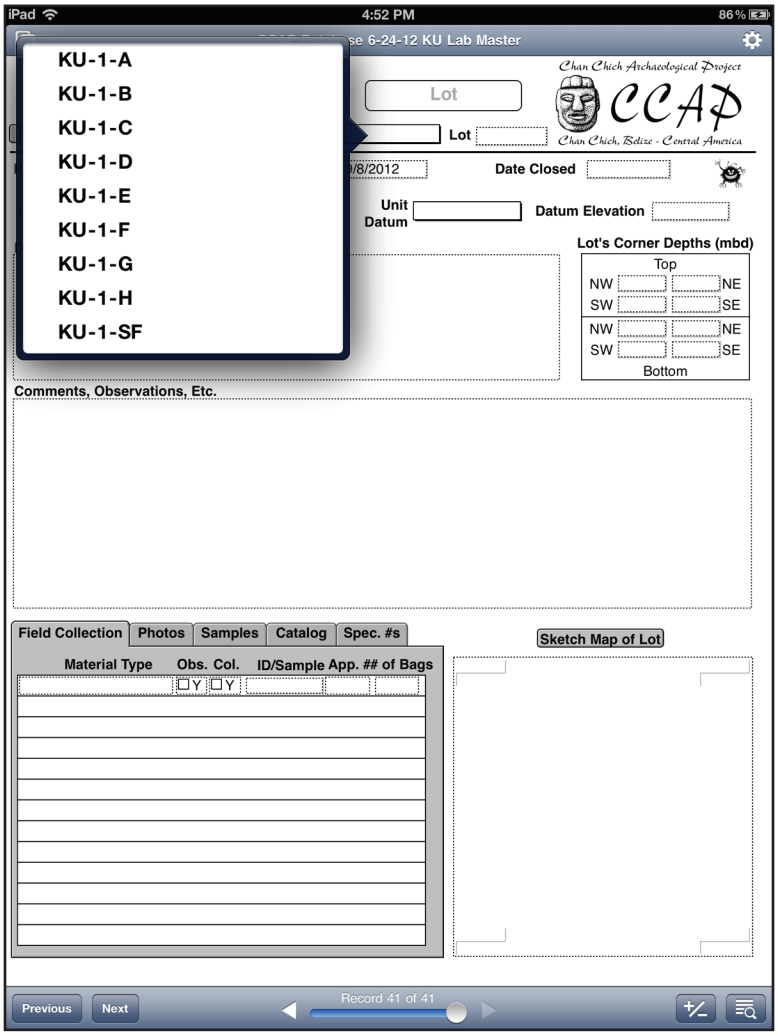


Figure 7.1. Blank iPad version of a Lot form for Kaxil Uinic, with pull-down menu listing all the subops that had been created previously.

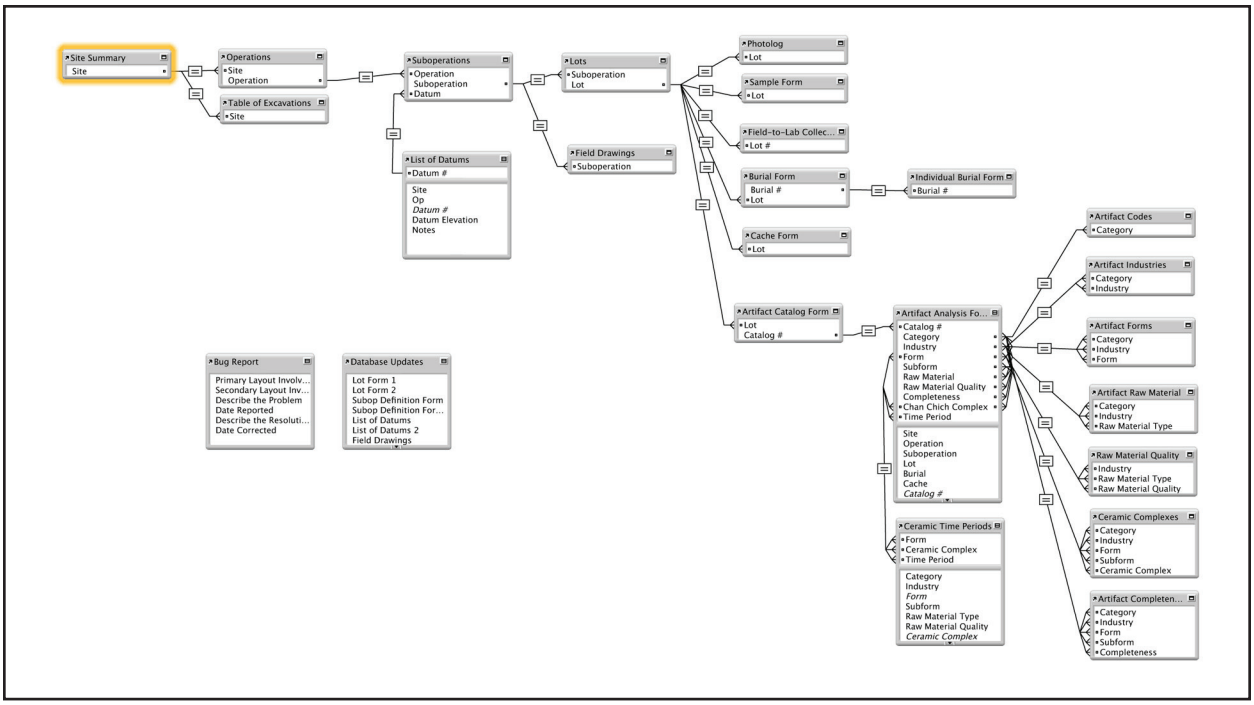


Figure 7.2. Diagram of the relationships between tables (forms) in the CCAP Filemaker Pro database.

created extra steps, the time saved entering the hundreds of photos per camera into Numbers versus FileMaker Go justified the added complexity.

Lab Forms

The initial interface between the field and lab in the database was a table called Field-to-Lab Bag Check In. The excavation system used by the CCAP was such that artifacts were collected by lot and by type. This means that all the ceramic sherds from one lot would be bagged together, and all the lithic tools from the same lot would go in a different bag together. Each time a new class of artifact was collected from a lot, the excavators would enter this information on the Lot form via a portal called "Field Collection." For example, if they had collected approximately 300 pieces of ceramics, filling two bags, they would enter "Ceramic Sherd" as the "Material Type," check off the box to indicate they were collected as opposed to observed but not collected, enter the approximate number of sherds, and finally enter the number of bags. When a lot was closed in the field, excavators would bring the artifacts and samples into the lab and place them in trunk with all the bags waiting to be checked into the lab system. They would also enter a "Date Closed" on the Lot form. The next time the databases were synced (see below), the Field-to-Lab Bag Check In table would be updated with the number of bags collected in the field, and the lab crew would know to look for the appropriate number of bags from each closed lot (indicated by having a closed date in the table). The purpose of this was to ensure that everything that was reported as collected in the field actually made it to the lab.

Once a bag of artifacts was checked into the lab, it was placed in another trunk until the lab crew washed the artifacts. Once artifacts had been washed and dried, the lab crew cataloged them by type using the Artifact Catalog form. Each type of artifact from each lot was assigned a unique catalog number, which Filemaker Pro generated automatically as a serial number once a form was created. In this system, all the ceramic sherds from a given lot would have the

same catalog number; all the lithic tools from that lot would have another number.

The crown jewel of the lab forms is the Artifact Analysis form, and it worked very well considering its complexity. The form was set up to handle a wide range of artifact classes and allow some data to be collected for groups of artifacts (multiple primary flakes, for example, or several sherds of the same ceramic type) and specific attribute data for individual artifacts (like a biface, for example).

Perhaps the best way to describe the function of the Artifact Analysis form is to use an actual example. Lot CC-10-E-1 yielded three lithic tools, which were assigned the Catalog # CC0039. When analyzing the first tool from the group, the analyst created a new Artifact Analysis form and selected "CC0039" from a pull-down menu of all existing catalog numbers. The database pulled the "Category" from the Artifact Catalog form and automatically entered it on the Artifact Analysis form. This serves as a check for the analyst. If, for example, he is holding a biface in his hand, but the data field pulls in "Ceramic Sherds," then he knows there is an error in the database that must be corrected before he analyzes the tool. The form also auto-populated other information such as lot, subop, op, and site. The analyst then assigned the tool a unique specimen number, which was appended to the Catalog #. This rather cumbersome step ensures that each specimen will have a unique number. Thus, the first biface from our example was assigned the Spec # CC0039-01.

At that point, the analyst faced a series of choices as he classified the artifact from its general Category (stone, shell, bone, or clay), to its Industry (chipped stone, ground stone, polished stone, or unmodified stone), to its Form (biface, blade, core, debitage, uniface), and to its Subform (one of 13 choices for bifaces), which in this case was GUB (general utility biface). The power of the database comes from the fact that each analytical level is predicated on the one above it through a series of conditional values. For example, chipped stone is not an Industry choice if the Category selected is clay.

The analyst then entered data on raw material type and quality, completeness, dimensions, and evidence for burning. Comments were also entered, and finally a photograph was taken directly into the database using the iPad's camera (Figure 7.3).

From the Field, to the Lab, and Back Again

As originally envisioned, by syncing the databases each evening, the archaeologists in the field would have the results of the latest lab analyses on their iPads the next morning. Each Lot form, for example, has a portal field that pulls in information from the Artifact Catalog and Artifact Analysis forms, giving the excavator the ability to view their excavation data right alongside the lab data. In theory, they would also have access on their Lot forms to a list of photographs of each lot.

That was the theory. In practice, that turned out to be much more difficult than originally believed. Basically, the problems stem from the way FileMaker Pro syncs data. Although our database structure had progressed beyond what we called beta testing before we began excavations, we had never tested the full system in action with multiple iPads operating at two different archaeological sites each day (see below).

Other Practical Matters

The four field iPads were named CCAP iPad 1, CCAP iPad 2, etc., and numbered "1" through "4" with stickers on their cases. When a copy of the database was installed on an iPad using iTunes to transfer files, the database was named "CCAP Database 5-27-12 iPad 1," for example. During syncing with the lab's MacBook Pro,

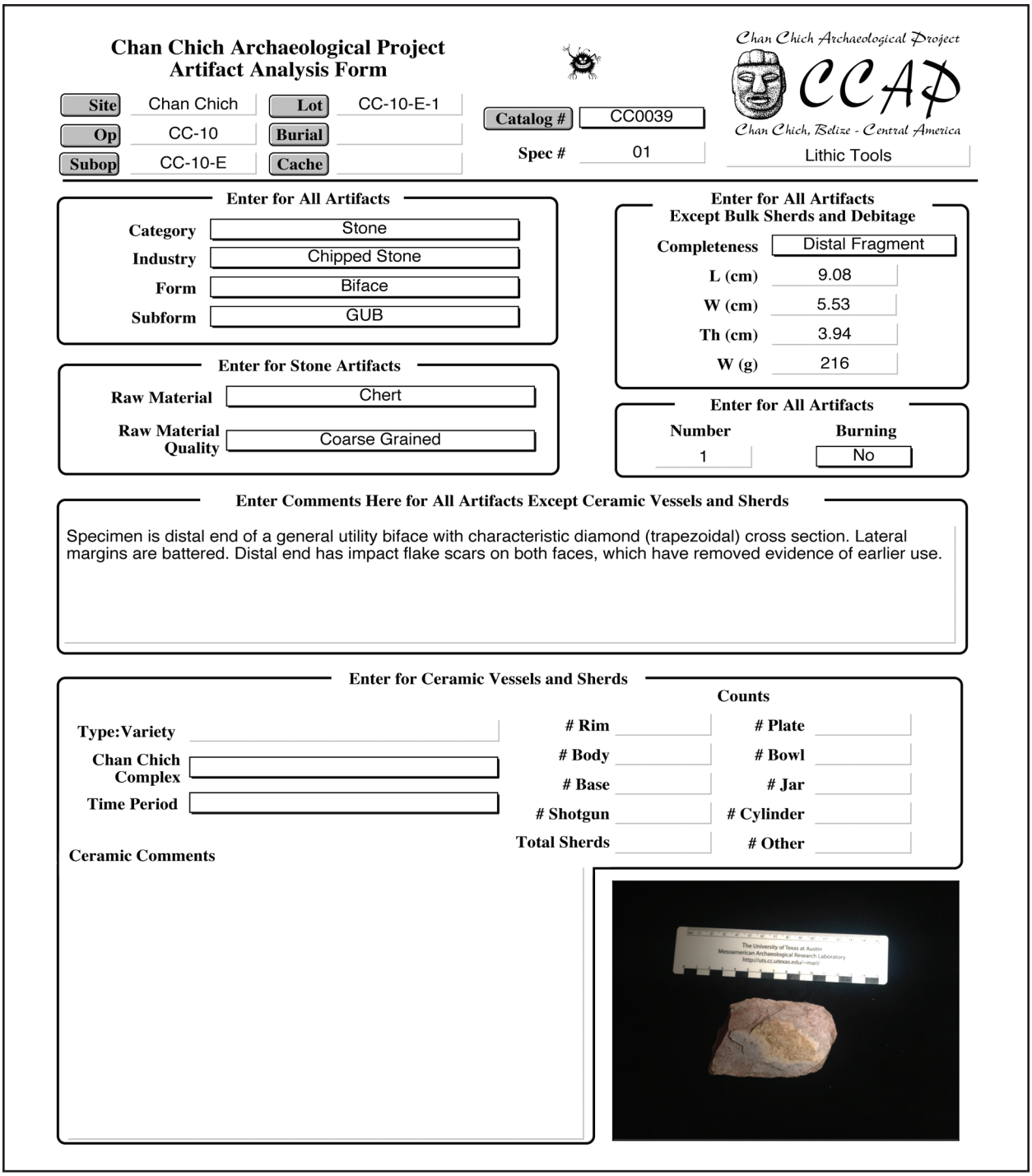


Figure 7.3. The Artifact Analysis form for Specimen #CC0039-01. The smiling and waving germ drawing near the top of the form is a link to the Bug Report form, which was used to identify and correct problems with the database.

the most recent version of the database on each iPad would be renamed ("CCAP Database 5-27-12 iPad 1 field to lab," for example) and then copied to the laptop through iTunes. During syncing, the databases were merged into a new "master" database ("CCAP Dabase 5-29-12 CC Lab Master"). After the databases had been synced (see below), a new version

of the database would be copied to each laptop ("CCAP Database 5-29-12 iPad 1," for example). By using this system, each version of the database was preserved as a backup each time the information was downloaded from the field.

From Theory to Practice

Question: *What's the difference between the Titanic and the CCAP FileMaker database?*

Answer: *The Titanic was easier to sync*.

FileMaker Pro and FileMaker Go: The "Syncing" Problem

The problems with the database became apparent on the first attempt to sync the iPads. On the first day of field work, four iPads, each loaded with a blank version of the FileMaker Pro database were sent out into the field: two to Kaxil Uinic and two to Chan Chich. Once one of the project staff members entered a form on a given iPad, a new version of the database existed. When it came time to sync the four iPads, four different versions of the database were brought in from "the wild," each full of unique information sharing the same database structure. As we learned, the process to combine the databases was not really syncing, but was rather importing into FileMaker Pro and exporting back to FileMaker Go. True syncing would merge the various databases together. Syncing was what we planned to do; importing and exporting were what we could do.

Problems immediately arose with higher-order forms like the Site Summary and Operation Definition forms. For example, because each level of form required the next highest level to be created first (i.e., you could not complete a Suboperation Definition form until an Operation Definition form had been first created), each supervisor created a Site Summary form followed by an Operation Definition form on their respective iPads. This meant that there were two Site Summary forms for Chan Chich and two Operation Definition forms for Op CC-10, for example. During importing, the form on the second file of the two Chan Chich field databases to be imported into the master version on the MacBook Pro would trump the first and overwrite it, simply by virtue of its having imported last.

Once this problem was realized, a number of steps were taken to facilitate the importing process. First, the original master database, which had included both Kaxil Uinic and Chan Chich, was saved as two separate files, one for each site. Second, each operation director was instructed to only make changes to high order forms and those that applied to multiple suboperations on only one iPad. These included the Site Summary form, the Operation Definition form, the Sample form, and the List of Datums form. Those forms would be imported from the operation director's iPad and exported to both iPads at each site during database updating. Third, each iPad was assigned to specific suboperations so that the Suboperation Definition forms and Lot forms for each unit would only be modified on one of the field iPads.

These steps eliminated most problems with duplicate forms, but not all problems during importing. FileMaker Pro's import function from one file to another is done one form at a time. This meant that for each field form (Suboperation Definition form, Lot form, etc.), a separate import had to be done for each of the four iPads. This proved to be a time-consuming and unexpected task.

Another unexpected problem with the database was that when Lot forms were imported the rather critical information entered in the "Field Collection" portal was not brought into the master database (Figure 7.4). Because the "Field Collection" information was used to generate the Field-to-Lab Bag Check In form,

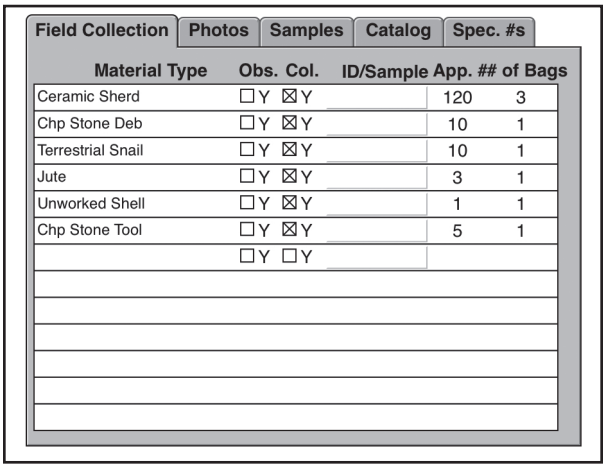


Figure 7.4. Example of a "Field Collection" portal on a Lot form.

the information for each newly imported Lot form had to be reentered in the lab computer before artifacts could be checked in and processed. This problem can be corrected in a future version of the database but will require an extensive re-design of the Lot form layout.

The greatest compromise, however, between design and implementation was in the maintenance of a separate "lab master" version of the database for each site. Rather than actually syncing the databases, the procedure that developed was one that imported new data from the field iPads into the lab master, but did not export all the new data back to the iPads. This approach prevented duplicate forms from existing on the two field iPads, and that was one of the greatest problems with having multiple versions of the database operating in the field at the same time, but it meant that imported photolog entries and lab data (artifact catalog and analysis data) were not sent back into the field on the iPads. However, the greatest benefit of having all of that information integrated into the database is realized at the end of the season when the data are being reviewed to prepare excavation reports. Therefore, even though not having the lab data available in the field is seen as a weakness in the database, it is not a major issue.

iDraw and the Learning Curve

In the original grant proposal, drawing plan maps and profiles directly on iPads was identified as the greatest time saving part of the digital database. Unfortunately, the learning curve on iDraw is steep, and none of the graduate students attempted to use the program extensively prior to being in the field. Furthermore, because the project is a field school, using the iPads would require that each field school student be trained enough in iDraw to understand the process. Therefore, I decided that drawing plan maps and profiles on graph paper would be quicker in the field and allow the students to participate and learn important skills (Figure 7.5). I still believe, however, that with practice it is possible to create near publication-ready field drawings directly on the iPad.

iPads and Filemaker Go

Once the system for maintaining separate versions of the database on each iPad had been established, the system worked extremely well in the field. All of the field forms seemed to function as designed, and small bugs were noted and corrected back in the lab (see Figure 7.3). One field on the Lot and Subop Definition forms that gave us the most trouble was a container in the lower right corner that was designed to hold a sketch map of lot or unit. Once we abandoned iDraw, as noted above, we resorted to snapping pictures of either the unit itself or the field drawing made on graph paper. It was not until after excavations had been completed that one of the graduate students, Vince Sisneros, realized that the "Get Signature" option, which appeared next to "Choose from Library" and "Take Photo" when you clicked on the container field, would actually allow you to quickly and easily make a sketch map. This wonderful surprise came too late for the 2012 season, but will be useful in the feature.

Figure 7.5. Second year field school student Ashley Booher (right), iPad in hand, watches as first year students Kelsey Herndon (left) and Rachel Wall draw a profile on graph paper.

THE OVERALL ASSESSMENT

Overall, the CCAP digital data collection system was a success. At the end of the field season, two lab master databases existed, one for Kaxil Uinic and one for Chan Chich. Each database was complete with photologs, scanned maps and profiles, field forms, and lab forms all integrated together through the complex relationships set up in FileMaker Pro. As noted above, the greatest benefit of this system is realized after the fieldwork is finished and the reporting and analysis begin. The author of a chapter is able to open a Suboperation Definition form, for example, and quickly link to each Lot form, easily determine how many samples were collected from the unit, review the field drawings and profiles associated with the suboperation, etc. The lab data are also available via the individual Lot forms; that is perhaps the greatest contribution of this system over the paper system—the reconnection of artifact to context.

THE FUTURE

Going forward, some changes to the database and how it is used are in order. First, the data on the forms are only as accurate and detailed as what is put there by the excavators. Everyone on the project needs to be more diligent about filling in descriptive data. Second, the "Field Collection" portal needs to be fixed so that the information transfers when files are imported from the iPad to the lab computer. Third, the ceramic data need to be incorporated into the Artifact Analysis forms; our ceramicist was operating outside the system on old paper forms, and his data did not easily mesh with the way our forms were structured.

Dear Dr. Thompson

Matthew C. Harris

Sometime last year I was searching a certain website for a used copy of J. Eric S. Thompson's Maya Archaeologist. I ended up finding a pretty good deal on a copy that was in good condition, only about $7.00 with shipping.

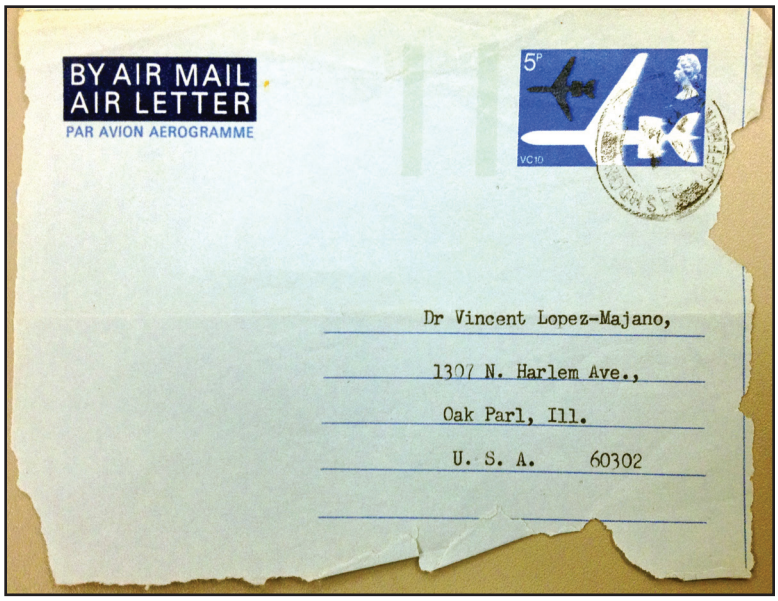


Figure 8.1. Air mail letter addressed to Dr. Vincent Lopez-Majano. Unfortunately, the postage cancellation stamp is illegible.

I had the book for maybe a week before I took off the jacket so that it would not get messed up any further in my book bag. Inside the back flap of the book jacket I discovered a few pieces of paper with sketches of what look like Maya imagery, an article from *The New York Times* entitled "How Man Came to the Americas" dating to April 23, 1967, an air mail letter, and a postcard. After further inspection I noticed that the author of the air mail letter and postcard was Sir J. Eric S. Thompson, himself.

The air mail correspondence is addressed to a Dr. Vincent Lopez-Majano of Oak Park, Illinois (Figure 8.1). The letter is typed, with one word crossed out and corrected by hand. The text is as follows (Figure 8.2):

Ashdon, S. Walden Essex May 13

Dear Dr. Lopez Majano,

Very many thanks for your reprints. My reply must be very brief as I returned from Guatemala only a week ago and leave again for U.S.A. in five days.

I doubt very much that your tripod vessel was of Maya manufacture; it doesn't fit in any Maya ceramic conference I know.

Oak Park; When I was a young fellow at Field Museum I had a girl in Oak Park, but taxi fares took such a bite out of my very small salary of those days that my Scotch

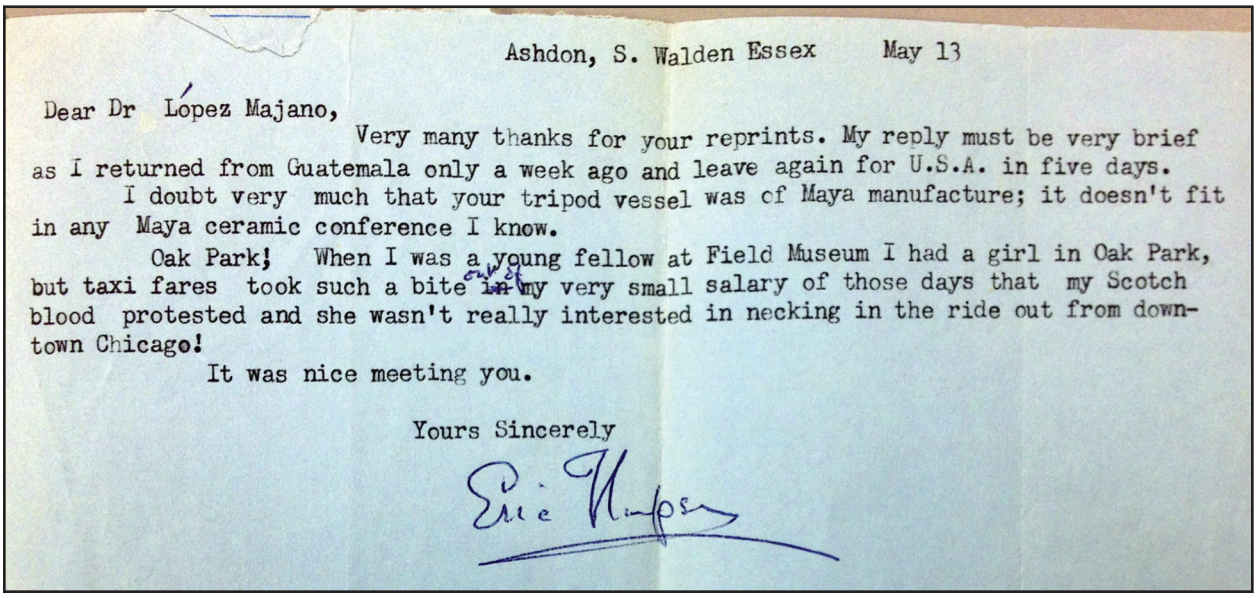
Harris, Matthew C.
2012 Dear Dr. Thompson. In *The 2012 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 83–86. Papers of the Chan Chich Archaeological Project, Number 6. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

blood protested and she wasn't really interested in necking in the ride out from down-town Chicago!

It was nice meeting you.

Yours Sincerely

[signed Eric Thompson]



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It was nice meeting you.

Yours Sincerely

Eric Thompson

Figure 8.2. The text of the air mail letter, signed "Eric Thompson."

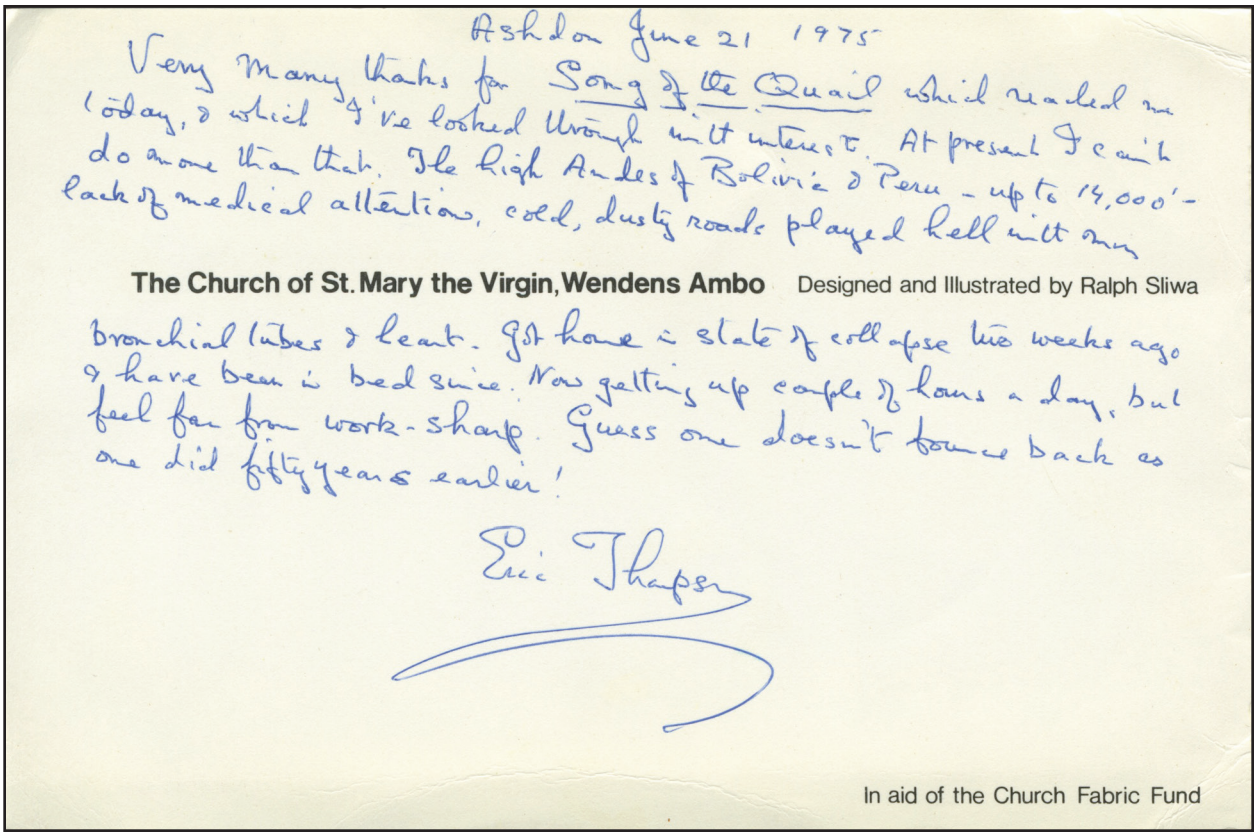
The postcard's text is as follows:

Ashdon June 21 1975

Very many thanks for Song of the Quail which reached me today, & which I've look through [*illegible*] interest. At present I can't do more than that. The high Andes of Bolivia and Peru – up to 14,000' – lack of medical attention, cold, dusty roads played hell with my bronchial tubes and heart. Got home in state of collapse two weeks ago & have been in bed since. Now getting up couple of hours a day, but feel far from work-sharp. Guess one doesn't bounce back as one did fifty years earlier!

[signed Eric Thompson]

Thompson died later that year. The postcard looks as though it was written with a shaky hand (Figure 8.3), and some words are illegible. The picture on the front of the postcard is of the Church of St. Mary the Virgin in Wendons Ambo, Essex. The postcard is in no way post-marked or addressed to anyone, which possibly means it was sent along with something else. I assume the recipient of the postcard is the same as the air mail correspondence, Dr. Lopez-Majano.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The Church of St. Mary the Virgin, Wendens Ambo Designed and Illustrated by Ralph Sliwa

bronchial tubes & heart. Got home in state of collapse two weeks ago & have been in bed since. Now getting up couple of hours a day, but feel far from work-sharp. Guess one doesn't bounce back as one did fifty years earlier!

Eric Thapar

In aid of the Church Fabric Fund

Figure 8.3. Scan of the postcard found in the book jacket of the copy of *Maya Archaeologist* purchased by the author.

I acquired the book from a used book seller based out of a city in Indiana that is fairly close to Chicago. After a little research I found out that Dr. Lopez-Majano was a radiologist and a pioneer in the field of nuclear medicine. I planned on contacting him to ask him more about my find, but, unfortunately, I stumbled upon his obituary published in *The Chicago Tribune* in 2008.

I came upon this long before I knew I would be doing research at a site that was described by Thompson in this book. Once I found out I would be working there, I realized the significance of my find. After reading the correspondence from Thompson, I realized that he was not just a famous archaeologist I had read about in textbooks; he was regular guy like me trying to make a living while having fun doing it.