Preliminary Report of the 2017 Field Season at the San Pedro site, Ambergris Caye, Belize

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Abstract

The following report presents a summary of the preliminary findings of 2017 archaeological investigations of the San Pedro site, located in the southern portion of Ambergris Caye, Belize. Four trenches were excavated on the Hostel la Vista (now Parham Plaza Hotel) property in June 2017 as part of an archaeological field school offered by the University of North Carolina Wilmington in advance of landscape modifications on the grounds of the hotel. Portions of the San Pedro site had been excavated previously in the early 1990s by Drs. David Pendergast and Elizabeth Graham, who found both Maya and early Spanish and British colonial domestic material. Archaeological investigations in 2017 confirmed the presence of a Late Postclassic Maya community focused heavily on marine resource exploitation as well as early Spanish and British colonial occupations. Probable Maya flooring remains as well as a single Maya burial were encountered, and British-era and later features were identified as well. Investigations in 2017 at the San Pedro site added substantially to the body of Late Postclassic Period Maya material remains available for study. Preliminary analyses of both artifacts and ecofacts reveal that the Late Postclassic San Pedro Maya enjoyed strong economic and social relationships with other Maya communities on Ambergris Caye, the mainland of northern Belize, and beyond.

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Introduction

Archaeological investigations of the San Pedro site, located in San Pedro Town on Ambergris Caye, took place in the summer of 2017 at the Hostel la Vista, formerly the Sands Hotel. San Pedro Town lies near the southern end of Ambergris Caye, Belize's northernmost and largest barrier island (Figure 1). The work was conducted under Belize Institute of Archaeology permit number IA/H/2/1/17(13) issued to Dr. Scott E. Simmons. Archaeological work was carried out between May 26 and June 28, 2017 as part of a University of North Carolina Wilmington archaeological field school. Summer 2017 archaeological investigations of the San Pedro site were co-directed by Dr. Scott Simmons, Principal Investigator of the Ambergris Caye Archaeological Project II, and Dr. Tracie Mayfield, who also served as Lab Director and zooarchaeologist. Drs. James Aimers and W. James Stemp conducted on-site preliminary analyses of ceramic and lithic finds, respectively.

Twelve UNC Wilmington students participated in the archaeology field school. They were: Breanne Bradshaw, Jeffery Canaday, Caylea Flanagan, Katherine Gutierrez-Soto, Kaitlyn Lowrance, Katie Menaugh, Rachel Miller, Elizabeth Montgomery, Alex Rasmussen, Jason Stolfer, John Valente, and Kelly Williams. Loubeants Celestin, an undergraduate anthropology student at the University of North Carolina Charlotte, and Cassidy Putnam, a North Carolina State University undergraduate anthropology major, also participated in the four-week field school.

Investigations in 2017 were undertaken as part of the second phase of the Ambergris Caye Archaeological Project (ACAP II), which is described in more detail below. Although Thomas Gann surveyed parts of Ambergris Caye in 1926, the first systematic archaeological investigations of Ambergris Caye took place between 1983 and 1990 under the direction of Dr. Tom Guderjan (Gann 1926; Guderjan 1988, 1995; Guderjan and Garber 1995). This work was followed closely by Elizabeth Graham and David Pendergast's work near the southern tip of the caye at the Marco Gonzalez site (Graham and Pendergast 1987, 1989). Graham and Pendergast also conducted limited work at several sites in downtown San Pedro (Graham and Pendergast 1994; Pendergast and Graham 1991; Weinberg et al. 2003). Despite the tremendous amount of growth that's taken place in San Pedro over the past several decades, prior to our work in 2017 no substantial archaeological investigations had been conducted in San Pedro Town since the work undertaken by Graham and Pendergast over twenty-five years ago.

Archaeological work conducted during the 2017 field season was focused on two principal goals or objectives: to a) continue our studies of ancient Maya life on Ambergris Caye, particularly how mainland and island communities were integrated, and how and why their relationships remained stable for periods of time then eventually changed (Simmons and Graham 2016; Simmons et al. 2018), and b) to record and recover archaeological materials that would be impacted by landscape renovations associated with the transformation of the Sands Hotel into the Hostel la Vista, and now into the Parham Plaza Hotel.

The Parham Plaza Hotel property is located on San Pedro Town blocks 991 and 992. Three trenches were excavated in the northern of these two blocks, Lot 991, and one trench was excavated in Lot 992 (Figure 2). As mentioned above, the boundaries or limits of the San



Figure 1. Map of northern Belize and Ambergris Caye archaeological sites. Drawing by Jonathan Begue.

Pedro Maya site are not known at present, despite the salvage work conducted in various parts of the downtown area during the early 1990s by Elizabeth Graham and David Pendergast. The main focus of their work on the caye during this time was at the Marco Gonzalez site, located roughly six miles (10 km.) south of downtown San Pedro (Graham and Pendergast 1989, 1994).



Figure 2. 2012 overhead photograph of the central part of San Pedro Town with Parham town lots 991 and 992 highlighted in yellow. The Parham Plaza Hotel building is in lot 997. Trenches 5, 6 and 7 were located roughly below the boat and the number 991. Trench 8 was situated roughly below the smaller of the two boats just northwest of number 992. Previous excavations were conducted on lots 993, 994, 995 and 999. Image courtesy of Gabriel Chan and Alexis Ramirez of the San Pedro Town Council, Building Unit, Judith Azueta at the San Pedro Town Council, Property Tax Department, and Dianne Lawrence.

The following preliminary report summarizes the methods used in and the results of archaeological work conducted on the Parham property in San Pedro Town lots 991 and 992 during the summer of 2017. First, the environmental setting in which the site is located is summarized. This is followed by a summary history of archaeological research that has been conducted on the island thus far, and our current state of understanding the nature of ancient Maya life on the island. These sections of the report are followed by a discussion of the goals of the Ambergris Caye Archaeological Project II (ACAP II), and the specific objectives of the 2017 field season. Next, the results of excavations are presented with an initial reporting of findings in each of the trenches followed by a discussion of site stratigraphy, material culture, food remains, and archaeological features. Recommendations for protection and preservation of the site are also offered.

Individual technical reports follow the discussion of the goals, methods, and results of 2017 archaeological investigations, with Dr. James Aimers summarizing the Maya ceramic artifacts recovered (Appendix 2), Dr. W. James Stemp discussing the 2017 lithic assemblage (Appendix 3), and Dr. Tracie Mayfield reporting on the faunal and historic materials (Appendices 4&5). Their reports form separate appendices at the end of this preliminary report.

Environmental Setting

Ambergris Caye is located on the central part of east coast of the Yucatan Peninsula. The island is 40 km long and no wider than 7.5 km at any point (Figure 1). It is made up in large part by mangrove swamps, lagoons (12), a small plateau in the north-central portion of the caye called Basil Jones (where a precolumbian Maya site is located), and a series of low sand ridges (CZMAI 2016,16). At its northern end the island is only 1.5 km wide, but generally is 4-5 km wide along most of its length. The Caribbean Sea extends along the length of the east coast of the caye, while the waters of Chetumal Bay lie to the north and west of the island. Along the windward side of Ambergris Caye a narrow strip of white biogenic coral sands is found, while on the leeward side a series of mangrove-lined shallow lagoons extend along the island's length.

The limestone bedrock underlying the caye rises to a maximum elevation of ca 2.4 m above sea level. An elevated sandy ridge measuring almost 3 m. thick and between 40-90 m. in width extends from north to south along the east side of Ambergris Caye (Green Reef Environmental Institute 2004,20). Surface elevations above sea level generally decline from north to south, with the central and southern portions of the caye slightly lower in elevation. A complex system of human processes has resulted in the creation of anthropogenic deposits, in ancient and modern times, and natural processes have caused the accretion of sediments on the leeward side of the island, and the erosion and depletion of coral sands on the windward side of the island.

The 12 mixed salt and freshwater lagoons found on Ambergris Caye (Figure 1) are surrounded by mangroves. Four different species have been identified on Ambergris Caye: red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), white mangrove (*Laguncalaria racemosa*), and buttonwood (*Conocarpus erectus*). The habitat in which these highly adaptable coastal plants live has been shown to be an important nursery for a wide variety of marine and coastal fishes, as well as a barrier against coastal erosion during flood and storm events (Monacci et al. 2011). Mangrove habitats also function as important feeding grounds for the West Indian manatee (*Trichechus manatus*), the spiny lobster (*Panulirus argus*) and a wide variety of fish species (Acosta and Butler 1997; Auil 1998; Vaslet et al. 2012).

Unfortunately, mangrove ecosystem fragmentation and outright clearing of entire mangrove communities in Belize "has been greatest near Belize City and San Pedro Town" (Cherrington et al. 2010, 21). Ironically, the ancient Maya may have established their community at San Pedro because just the opposite was taking place 500-700 years ago at the southern tip of the island - dense colonization of mangroves around the community at Marco Gonzalez. A roughly 60 cm. rise in sea level over the past two millennia resulted in rapid infilling of sediments in the shallow waters around the site, located near the southern tip of the caye (Figure 1). Subsequent mangrove encroachment cut the community off from the sea, making it unsuitable as a port, by AD 1400 (Dunn and Mazzullo 1993,129). It is possible that the Maya community at San Pedro was colonized by migrants from Marco Gonzalez (Graham et al. 2015).

Belize's offshore cayes are underlain by Pleistocene limestone, often called 'reefstone' by locals, that ranges from below sea level in some parts of the caye to roughly 2.4 m above sea level in northern parts of the island. This material, made of compressed small marine shells and shell fragments, coral sand, and limestone was used by the ancient Maya of Ambergris Caye for building construction (Graham and Pendergast 1989,4; Simmons et al. 2018). The reef was a vitally important natural resource, as it afforded Maya residents of the caye protection from strong storms and large waves, and also provided an ample supply of marine foods. Of course, the shallow water mangrove bays, the reef itself, and the deep sea were all used by the ancient Maya for a variety of purposes through time. Today Belize's coastal zone is made up of dynamic and interconnected terrestrial and marine ecosystems that support a vast array of plant and animal species and their habitats.

Ambergris Caye is the northernmost of Belize's barrier islands or cayes, all of which are part of the Belize Barrier Reef (BBR) complex. This is the longest barrier reef system in the Western Hemisphere and the second longest in the world, after Australia's Great Barrier Reef. Belize's barrier reef forms the edge or rim of a carbonate platform or shelf that extends south beyond Belize, stretching roughly 280 km from the Gulf of Honduras in the south to the northern tip of the Yucatan Peninsula in the north (Gischler and Hudson 2004,223). The Caribbean Sea is connected to the brackish lagoons found on the leeward sides of the cayes by surface tidal flow.

Toward the northern end of the island the barrier reef and the landmass meet at Rocky Point. Roughly 7.5 km. north of Rocky Point lies the northern tip of the island at Bacalar Chico Canal, which separates Ambergris Caye from the Xcalak Peninsula of Mexico. The canal stretches roughly E-W for roughly 1.6 km. Grant Jones (1989,65) notes that on the 1726 Spanish map "Plano de Salamanca de Vacalar" the Bacalar Chico canal was referred to as Toxecacao. It is possible that the canal was created by the ancient Maya (see Guderjan 1988, 1995) to facilitate canoe travel. Maya mariners and traders travelling from the north would almost certainly have utilized the Bacalar Chico canal to travel to the leeward side of this long island so they could take advantage of the calmer, more shallow waters found there.

Sites such as Chac Balam and San Juan were undoubtedly situated very close to this narrow waterway for easy interaction with Maya traders whose canoes had passed through the Bacalar Chico Canal (Guderjan 1985,19). Once they were on the leeward side of the caye Maya trade canoes could have turned north, entering Chetumal Bay to gain access to inland Maya sites in northern Belize and the Petén by way of the New and Hondo Rivers (Figure 1). Alternatively, Maya trade canoes could have proceeded south, following the western shoreline of Ambergris Caye and beyond. Continuing south in the shallow bay waters they could gain access to inland Maya centers in Belize and Guatemala via the Belize and Sibun Rivers, and to those centers as far south as the Rio Grande and the Sarstoon River. MacKinnon's (1989a, 1989b, 1990) survey and testing work along the central and southern Belizean cayes has shown that Maya traders extended their reach south beyond Belize to the coasts of Guatemala and Honduras. Today the Bacalar Chico National Park and Marine Reserve is a mixed terrestrial and marine reserve encompassing a 28,169 acre area that is co-managed by the Fisheries Department and Forestry Department under Belize's Ministry of Agriculture, Fisheries, Forestry, the Environment and Sustainable Development (Government of Belize 2019). It is one of seven sites in Belize that make up the Belize Barrier Reef System, a UNESCO World Heritage site.

San Pedro Town is located approximately 11 km. north of the southern end of Ambergris Caye, and is the only town on the island. For much of its history San Pedro was a small fishing village, and human impacts on the littoral environment and buried cultural resources in the town were fairly minimal. The resident population of San Pedro was 1,125 in 1980 (MNRA 2012,10). Today, however, the town is quite urban in character, with an estimated resident population of over 17,000 residents. Cardona and Cardona (2009,9) note that "what was originally untouched stretches of white sandy beaches, is now a congregation of hotels, bars, piers and dive shops for almost the entire windward stretch of San Pedro Town." Along the leeward side of the town residential structures and commercial businesses stretch for miles, and include small restaurants, tourist-oriented gift shops, vegetable and fruit stands, golf cart rental shops, and much more.

Presently the San Pedro site lies beneath the modern town of San Pedro, although at present the full limits of the site are unknown. Since Graham and Pendergast first excavated the San Pedro site in the early 1990s, the town has experienced tremendous growth, both in terms of areal extent and population. But the Parham family property, where the Hostel la Vista (now Parham Plaza Hotel) is located, has remained in the family's hands since sometime in the 19th Century, possibly as early as the middle part of the century (Tim Hagerty, personal communication 2019). While our work in 2017 indicates that some 20th and probably 19th Century disturbance of the site occurred, at the same time largely intact Maya cultural deposits were found to exist between roughly 90-140 cms below ground surface (bgs).

The Parham Plaza Hotel, located at 17° 55' 10.04" N and 87° 57' 43.66" W, is situated immediately west of the town park in the central part of San Pedro Town (Figure 2). Geomorphological studies by Dunn & Mazzulo (1993,129-130) found that south of the Hostel la Vista property in the area of the Paradise Hotel and the Rosalita Site a layer of anthrosols with abundant Maya artifacts was overlain by approximately one meter of modern beach ridge sediments. It is possible then that the San Pedro site extends along the beach ridge to the south, but it is also possible that these finds represent part of a separate archaeological site or possibly several discrete sites.

Graham and Pendergast conducted salvage excavations at six different locations spread throughout San Pedro, and Maya cultural materials and human remains were recovered at each. So, it is possible that either the San Pedro site is quite expansive in terms of its areal extent, or more likely that multiple Maya sites lie beneath San Pedro Town. Future archaeological studies will be necessary to confirm this.

Summary History of Archaeological Research on Ambergris Caye

Over the course of nearly a century, various researchers have recovered evidence for Maya and later colonial and historic period occupation of Ambergris Caye that spans most of the chronology of human occupation in Belize (Table 1). The earliest of these, who more properly can be described as an avocational archaeologist rather than a researcher, was Thomas Gann. An "archaeological dilettante," Thomas William Francis Gann was the first to survey and excavate 'mounds' on Ambergris Caye almost one hundred years ago (Gann 1926; Walker 2016,13). He was a "well connected member of the medical and intellectual societies of London," and served first a District Medical Officer, then later the Principal Medical Officer of British Honduras from 1894 to 1923 (Wallace 2011,24). Thomas Gann excavated a number of sites in Belize, most of which were on the mainland (Santa Rita Corozal, Sarteneja, and Kendal among them), except for his work at Wild Cane Caye and the Ambergris Caye site(s) (Gann 1918, 1926).

Period	Approximate Calendar Dates
Belize Independence	1981 to present
Self-governing British Crown Colony	1964-1981
British Crown Colony	1862-1964
British colonial settlement	1660s-1862
Spanish colonial	1544-1648/1708 (Spanish sovereignty claimed to 1798)
Terminal Postclassic/Contact	1450/1492-1544
Late Postclassic	1350-1450/1492
Middle Postclassic	1200/1250-1350
Early Postclassic	1000 to 1200/1250
Terminal Classic (Maya Collapse)	800-1000
Late Classic	600-800
Middle Classic	450-600
Early Classic	250-450
Terminal Preclassic	100 BC-AD 250
Late Preclassic	400-100 BC
Middle Preclassic	900-400 BC
Early Preclassic	1500-900 BC
Archaic	pre-1500 BC

Table 1. Belize Maya Chronology*

* from Graham et al. 2013

Unfortunately, Gann did not record how many 'mounds' or sites he excavated, where on the island these mounds were located, nor anything of their stratigraphy. Gann's legacy of work

in Belize has received mixed reviews by modern researchers. Pendergast (1993,4) notes that "despite advances in stratigraphic excavation elsewhere, Gann's methods...remained more destructive than protective of evidence from beginning to end." But Walker (2016,13) correctly points out that Gann also produced some of the earliest photographs and illustrations of artifacts he collected on the island.

Thomas Gann's expedition to Ambergris Caye began in Kingston, Jamaica in November 1925. Near the end of that year Gann disembarked in Belize City, simply referred to as 'Belize,' then the capital of British Honduras. After visits to St. George's and Moho Caye, Gann travelled north to the site of Ichpaatun, located on the west bank of Chetumal Bay in the Mexican state of Quintana Roo. From there he moved on to Ambergris Caye, where he excavated an unknown number of mounds. He described these as "for the most part kitchen middens, composed of enormous numbers of conch, cockle, whelk and oyster shells, turtle carapaces, crab and crayfish shells, and vast quantities of the bones of such fish as inhabit the surrounding waters" (Gann 1926,59). He did, however, note that "the mounds are usually situated" on "patches of higher land," which suggests that he may have excavated in the north-central part of the island where the site of Basil Jones is located (Gann 1926,61; Guderjan 1995,21).

Roughly half a century later, Peter Schmidt, the second archaeological commissioner of Belize, conducted a brief survey of parts of Ambergris Caye in the early 1970s as part of a larger investigation of reported illegal exportation of Maya artifacts (Guderjan 1988,63). Schmidt identified the sites of San Juan and Guerrero, located in the northern and southern parts of the island, respectively. But no other archaeological investigations were undertaken on the caye until the mid-1980s, when two separate research projects were conducted.

The Ambergris Caye Archaeological Project I (1983-1990)

In 1983 Tom Guderjan and the other members of the Ambergris Caye Archaeological Project I (ACAP I) began the first truly comprehensive archaeological survey of the island (Guderjan 1995). They identified 22 separate sites and 2 canal complexes, but it is uncertain (although likely) that the canals were created by the ancient Maya. More recently two additional sites have been documented by Simmons (see Belize Institute of Archaeology site files), bringing the total of known sites on the island to 24, although the actual number of Maya settlements is certainly higher. The great majority of the 24 known sites on the island were occupied most intensively during Late and Terminal Classic times. Only one of these, Marco Gonzalez, shows definitive evidence of occupation from Late Preclassic through Classic and Middle Postclassic times (Graham and Pendergast 1989,13-14). There is also evidence of some intermittent Late Postclassic activity at Marco Gonzalez. Two other sites, Los Renegados and San Juan, appear to have been occupied into the early part of the Postclassic Period, and Los Renegados may have persisted into the Middle Postclassic Period (Guderjan 1995,155).

While the locations of sites such as Marco Gonzalez, Tres Cocos, Santa Cruz, San Pedro and others had been known by locals for some time, Guderjan and his team began surveying mainly coastal and some inland parts of the island in 1983. Much of this work was done by boat, with terrestrial survey and site mapping and recording taking place at many of the sites they identified (Figure 1). One of the features the ACAP I team surveyed is the Bacalar Chico Canal, a tidal passage separating the Xcalac Peninsula of Mexico's Yucatan from Belize and Ambergris Caye. As mentioned above, Guderjan has speculated that the ancient Maya dug this canal, in part to facilitate coastal Maya canoe trade (Guderjan 1995,9; Guderjan and Williams-Beck 2001,123). Between 1986 and 1988 the ACAP I team archaeologically tested the leeward sites of San Juan and Chac Balam, as well as the windward site of Ek Luum, all located near the northern end of the island (Figure 1). They also visited and took surface collections at a number of other sites, including Burning Water, which has some of the most prominent but archaeologically unexplored sets of structures on the north end of the island.

The ACAP I project identified a real dichotomy in settlement and site structure between sites on the windward versus the leeward sides of the island. All but one of the sites on the leeward side of the island are classified as large in size (large relative to others on the island), whereas all of the sites on the windward side were found to be either small or medium in size. All leeward sites were also found to have harbor features of some kind, formal architecture, and quantities of exotic materials such as obsidian, jade and ceramics obtained through coastal trade (Guderjan 1995,29). In terms of formal architecture this included structures several meters in height surrounding small plazas, such as those found at Laguna de Cayo Francesa, Chac Balam, and Marco Gonzalez. It appears that the larger sites with access to the leeward side of the caye, including Marco Gonzalez, were active participants in coastal trade, while the smaller sites on the windward side of the island focused primarily on marine resource acquisition (Guderjan et al. 1989). Guderjan and his team found that these sites on the leeward side of the island were linked to trade networks that operated regionally and operated as important transshipment points for finished goods, commodities, and raw materials.

Archaeological Research at Marco Gonzalez (1989-present)

At the same time the ACAP I project was nearing the end of its fieldwork on the northern portion of the caye, David Pendergast and Elizabeth Graham initiated work at Marco Gonzalez, located at the southern end of the island (Graham and Pendergast 1987, 1989). Named after a local San Pedrano boy who first brought Graham and Pendergast to the site, Marco Gonzalez appears to be the largest site on the caye, measuring approximately 6.6 ha. in size. The first excavations conducted at Marco Gonzalez in 1986 revealed a community of 49 structures and six separate plaza groups. More intensive excavations were carried out in 1990, and limited work was conducted in 1992 and 1993 (Pendergast and Graham 1990).

These investigations revealed that the site had been both a busy and prosperous trading port, beginning in the Early Classic Period, but especially in the Terminal Classic and Early Postclassic periods. Abundant quantities of exotic materials, including ceramics from the Petén as well as northern Yucatan and the Pacific coast of Guatemala, were found during excavations and also littering the ground surface of the site. Similarities of pre-Terminal Classic deposits to strata encountered at the Colson Point sites in Stann Creek (Graham 1994), as well as to other sites on the caye and the mainland, led Graham to conclude that salt production was an important economic activity at the site in Late Classic times.

In 2010 archaeological research resumed at Marco Gonzalez, in part because of imminent threats to the site posed by proposed development in the immediate vicinity of the site (Graham and Simmons 2012a, 2012b). Excavations that year were focused on two important structures, 12 and 14, that yielded additional information on the transition from Classic to Postclassic times, and the relationships the Maya at that community shared with other Maya groups elsewhere on the caye, in northern Belize, and beyond (Simmons and Graham 2016; Simmons et al. 2018). Additional information came from excavations of human burials in both structures, and obsidian analyses, which revealed that the volcanic glass found at the site came from at least six different sources in the highlands of central Mexico, Guatemala, and Honduras (Simmons and Graham 2016).

More recently, Elizabeth Graham and her colleagues have been engaged in geoarchaeological research at the site, specifically examining soil micromorphology and chemistry as well as the formation of Maya anthropogenic deposits or "Dark Earth" (Graham et al. 2015, 2017; Macphail et al. 2017). The results of soils analyses have strengthened the hypothesis that salt production was an intensive economic activity at Marco Gonzalez in the Late Classic Period.

Archaeological Salvage Investigations in San Pedro Town (1990-1993)

During their 1990 field season at Marco Gonzalez, Graham and Pendergast were notified of Maya cultural materials being unearthed at several construction sites in San Pedro Town (Pendergast and Graham 1991). Salvage recovery of Maya cultural materials and human burials was done at these locations, including on the Parham family property at the Sands Hotel (recently the Hostel la Vista now the Parham Plaza Hotel). The six properties investigated by Pendergast and Graham were all threatened and/or had already been adversely impacted by continuing construction and development projects taking place during the early 1990s in San Pedro Town (Graham and Pendergast 1994; Weinberg et al. 2003). The construction and development of the town have not only continued but have been accelerated in the last three decades (Ministry of Natural Resources and Agriculture 2012; Coastal Zone Management Authority and Institute 2016).

Four of the six properties investigated by Graham and Pendergast between 1990 and 1993 are located in the central part of San Pedro Town. Salvage work in advance of construction took place at several locations around the Parham Plaza Hotel, including at the Alamilla/Gomez property immediately south of and adjacent to the hotel in town blocks 993 and 994; the Nuñez properties immediately adjacent to the hotel to the west in town blocks 995 and 996; and Elvira (Elvi) Staines's property, located to the northwest of the Parham Plaza Hotel in town block 999 (Figure 2). Salvage work was also conducted at the Emiliano Rivero property, located northwest of Elvira Staines's, on town block 1012.

The other two properties investigated by Graham and Pendergast in the early 1990s were located approximately .5 km. north of the Parham Plaza Hotel near Castillo's Hardware store and the roundabout in the northern part of San Pedro Town. These were the Eddie

Halliday, Sr. property on town block 1729 and the property owned by Dr. Dan Gonzalez (Rosalita's) on town block 3926 (Elizabeth Graham, personal communication 2019).

The Ambergris Caye Archaeological Project II (2017-present)

The Ambergris Caye Archaeological Project II aims to further the work undertaken by the first island-wide archaeological project that was conducted in the 1980s (see above). The project builds on the earlier archaeological, materials science, and soil micromorpholgical studies that have previously been conducted on the Ambergris Caye, mainly by Drs. Tom Guderjan, Elizabeth Graham and David Pendergast (Graham and Pendergast 1994; Graham and Simmons 2012a; Graham et al. 2015, 2017; Guderjan 1995; Macphail et al. 2017; Pendergast and Graham 1991; Simmons and Graham 2016; Simmons et al. 2018). In very broad terms the goals of the second Ambergris Caye Archaeological Project are to provide additional information on Maya settlement patterning, salt and other commodities production, coastalmainland trade connections, and Maya adaptive responses to changing political and social realities on the mainland during precolumbian times.

A more specific goal of the ACAP II project is to gain a more thorough, comprehensive understanding of intra- and inter-island social dynamics as well as island-mainland social dynamics. We want to better understand how relationships between island and mainland Maya communities were structured, and how and why these relationships subsequently changed over time (Simmons and Graham 2016; Simmons et al. 2018). We are also interested in learning more about changes Maya island communities experienced in settlement patterning and economic activities at critical junctures in time, such as during the Classic to Postclassic Period transition, and from the Postclassic into Spanish and later British colonial times.

Investigations on Ambergris Caye can help to provide answers to questions related to ancient Maya and later population movements on the island and beyond, as well as adaptations to changing environmental conditions, specifically sea level rise. We are also interested in exploring the various dimensions of coastal trade during the Terminal Classic and Early Postclassic Periods, particularly the role of some Maya communities on Belize's offshore cayes as coastal transshipment ports. Specifically, the idea put forth by Cobos (2016,329) that the Ambergris Caye sites functioned as "trans-shipment stations that were managed or controlled by Chichen Itzá" should be evaluated in much more detail. Were the economic activities of the Maya traders of Ambergris Caye directed, governed, or mediated in some way by the Maya at Chichen Itzá? Or did Maya traders and associated craft specialists work in a more independent or autonomous manner? In what ways did the Maya of Ambergris Caye adjust their social and economic relationships with each other and with Maya communities on the mainland of Belize as well as those living along the coast and in the interior of the Yucatan Peninsula?

Research on the caye can also help address questions about the nature of the critical transitions that took place in Maya society from the Classic to Postclassic Period, and in late precolumbian times through the Spanish Colonial Period. The relative sizes of the Ambergris Caye sites, along with their correspondingly small population sizes, favorable locations in a

resource-rich maritime environment, and enduring connections to local as well as more distant Maya centers suggests that the Maya living at these coastal sites may have enjoyed a greater degree of stability during periods of transition than their mainland counterparts. But this assumption also needs to be assessed.

If we are ever to fully understand settlement and social dynamics over time on the island, it is necessary to determine exactly how many ancient Maya sites exist on Ambergris Caye. This is another main goal of ACAP II. At present, one of the best ways to identify the locations of ancient settlements in tropical or sub-tropical forest settings is to use LiDAR, and thus far the use of this remote sensing method has met with great success in Belize (Chase et al. 2011a, 2011b, 2014; Prufer et al. 2015; Thompson and Prufer 2015). No LiDAR survey has been conducted of the island, however, it is clear that such work would greatly benefit coastal communities past, present and future in dealing with sea level rise as a result of climate change. Work is now being done to ensure that sometime in the near future it is.

As climate changes continue to impact island communities across the globe, both ancient and modern coastal settlements are particularly vulnerable to inundation caused by sea level rise (IPCC 2014). It is therefore imperative that these sites be documented while it is still possible to do so. Some ancient Maya sites on Ambergris Caye, including Yalamha (meaning 'place under water' in Mopan Maya), are already completely submerged, and a number of other documented sites, such as Marco Gonzalez and Santa Cruz, are either partially submerged or at risk of inundation (Guderjan 1995,22,186). A LiDAR survey of the entire island would establish the locations of coastal as well as inland sites not identified during the 1980s ACAP I survey. Likewise, sites with architectural features that were only partially recorded during the ACAP I work, such as the extensive field wall system at the inland site of Basil Jones, can be fully recorded and assessed using LiDAR. Once the entire island is surveyed and all sites are identified a comprehensive management plan can be created that includes input from all relevant stakeholders, including the Government of Belize, archaeologists and other researchers, private developers, and other interested parties.

Life on Ambergris Caye in Precolumbian and Historic Times - A Synthesis

The earliest evidence for human occupation on Ambergris Caye is from the Terminal Preclassic Period (100 BC - AD 250), and it comes from the site of Marco Gonzalez (Graham et al. 2017). It is reasonable to conclude, however, that earlier Maya groups at least visited, if not settled, on the island. This scenario seems very likely given the emergence of important Maya communities in northern Belize such as Lamanai and Santa Rita Corozal in Middle Preclassic times (Chase and Chase 2006; Pendergast 1981; Walker 2016). Growing communities such as these, along with others on the mainland, were consumers of the kinds of marine products that were available on and immediately around Ambergris Caye. These included marine shells, such as conchs and spondylus, fish (including stingrays for their spines), manatees, sea turtles, and salt. Mainland Maya communities found more distant from the island, such as Pacbitun, Blackman Eddy, and Cahal Pech in the Belize River Valley of western Belize, were importing marine resources and products from the coast at least by Middle Preclassic times (Cochran

2005; Healy 2006; Hohmann 2002). It seems very likely, therefore, that the Maya of Ambergris Caye played a role in the distribution of resources and products from the sea to these and other mainland sites by Middle Preclassic times, if not earlier. Hopefully, in the not too distant future the question of when the earliest settlers came to Ambergris Caye will be resolved.

Settlement on the caye appears at present to have been very light in the early part of the succeeding Classic Period. Only two sites, Marco Gonzalez and an unnamed submerged site recorded by Guderjan in the central area of the caye on its leeward side, have Early Classic Period components. By Late Classic times (AD 600-800) around half of the sites that have been recorded thus far on the island were occupied, and most of these had Terminal Classic Period (AD 800-1000) components as well (Guderjan 1995,Table 1). Increased settlement density on the caye corresponds to the period in which population sizes at mainland Maya centers were peaking, and the demand for marine resources, particularly salt, was likewise very high.

It is unclear at this point how many of the known sites on Ambergris Caye were involved in salt production. But the presence of high densities of ceramics associated with salt making, called Coconut Walk Unslipped by Graham (1994), suggests that salt production was an important economic activity on the island during Late Classic times. Coconut Walk Unslipped vessels are thought to have been used as receptacles for boiling saltwater brine to create salt cakes, and many thousands of sherds from this ceramic type have been recovered at Marco Gonzalez, San Juan, Ek Luum, Chac Balam, and the recently recorded site of Taab Ha (Aimers et al. 2016; Graham 1994; Guderjan 1995; Simmons et al. 2018). It appears that the production and shipment of salt from Ambergris Caye to the mainland was most intense during Late Classic times, but by the end of the 8th century it declined just prior to the Maya collapse (Graham et al. 2017).

After the great need for salt at inland centers had diminished to virtually nothing by AD 900, coastal trade became a prominent part of economic life in northern Belize once more. While maritime trade had its origins in Preclassic times, when similar polychrome ceramic types appear along the Belizean coast, it was in the Late Classic and then throughout the Terminal Classic and Postclassic Periods that coastal trade in goods and commodities increased exponentially. The earlier part of this sequence, particularly the end of Classic Period, coincides with Chichen Itzá's hegemony over much of Yucatan.

As mentioned earlier, Cobos (2016,329) has recently argued that the main function of the Ambergris Caye sites was as "trans-shipment stations that were managed or controlled by Chichen Itzá." The larger, leeward sites on Ambergris Caye, including Marco Gonzalez, Chac Balam and San Juan, almost certainly were coastal transshipment ports, where cargo was transferred both onto and from the kinds of large, sea-going canoes reported by Cristobal Columbus (Colón 1959 [1502],231-232). These sites also served as stop-over points where merchants and crew could rest, share news from both local and distant places, and conduct business. But the idea that these coastal sites were 'controlled' by Chichen Itzá is certainly worth discussing further. The similarities in artifact types, and the round structure reported by Guderjan (1988) at San Juan that is Yucatecan in style, provide some level of support for at least the influence of Chichen Itzá on these and other coastal sites (Driver et al. 1995). But it is equally likely that the Maya of Ambergris Caye enjoyed some degree of autonomy in managing their own economic affairs during Classic times and beyond.

By Middle and Late Postclassic times only a small number of sites identified thus far on Ambergris Caye were occupied, and the level of activity, including waterborne trade, appears to have diminished. The only site occupied through the Postclassic and into early Spanish Colonial was San Pedro, where investigations in 2017 revealed at least two separate domiciles identified by thin marl and sand packed floors punctuated by numerous post and pit features and subfloor burials (see below discussion). Earlier work at the site yielded evidence of other house floors and sub-floor burials, almost all of which were found in the unusual prone position of legs drawn back over the pelvis, or dorsally placed with legs flexed and crossed at the feet (Pendergast and Graham 1991; Simmons et al. 2018). The persistence of this particular burial pattern could reflect some kind of shared worldview among the Maya of Ambergris Caye, as well as some Maya residing on the mainland of northern Belize, that endured for at least five centuries. Clearly, the investigation of other cultural behaviors that were shared between the island and mainland Maya of northern Belize and beyond is warranted, and hopefully forthcoming.

Ambergris Caye appears to have been very lightly occupied at the end of the Postclassic Period and into the Spanish Colonial Period, but the sixteenth century history of the island is very poorly documented. Several Spanish *entradas* (armed incursions) were made into Belize during this time (Chamberlain 1948, Clenndinen 1987). But Nigel Bolland (1988,14) notes that "the Spaniards, who had such a devastating effect on the population and social organization of Mesoamerican societies, showed little interest in the area now known as Belize and never seemed to have considered it suitable for settlement." By the last quarter of the seventeenth century British logwood and later mahogany cutters began to extract these valuable woods from the forests of Belize (Camille and Espejo-Saavedra 1996; Dobson 1973). English pirates and privateers plied the coast of Belize during this time attacking Spanish vessels. Coastal Maya settlements, including the one at San Pedro, would have been visible to mariners on ships sailing outside the reef, and therefore vulnerable to raiding. It appears the Maya abandoned the San Pedro site sometime in the sixteenth century, which would explain why very little Spanish Colonial Period cultural material has been found at the San Pedro site (see below for further discussion).

As prices declined for logwood, which was used to make different colored dyes, mahogany wood became the principal export for the British, many of whom resided on St. George's Caye, located just northeast of the mouth of the Belize River (Bolland 1988; Dobson 1973). By the early eighteenth century African slaves were brought to Belize to serve as laborers, and St. George's Caye was established as the first capital of Belize by this time (Sullivan et al. 2011). Settlers in this part of the Bay of Honduras became known as 'Baymen,' and were afforded protection as British subjects (Dobson 1973,60). But Britain and Spain were both vying for power and influence in the region at this time, and the Spanish captured St. George's Caye on September 15, 1779. Nearly two decades later, on September 10, 1798, the British re-captured the island, effectively ending Spain's quest to control the area now known as Belize (Dobson 1973; Sullivan et al. 2012).

Both the historical and archaeological records suggest that resettlement of Ambergris Caye did not begin again in earnest until the middle of the nineteenth century, when refugees from the Caste War (1847-1901) began to occupy what became British Honduras in 1862. San Pedro is first mentioned in historical documents in 1869, when James Hume Blake bought Ambergris Caye for \$625.00 (Parham n.d.). One of the Blake's daughters, Maria Exaltacion, distributed the land amongst the eighty-three refugee families that had settled the island with the Blakes. According to George Parham, the former owner of the Sands Hotel who gave Liz Graham and David Pendergast permission to excavate on his property, these first families began to cultivate land on the island and plant coconut trees (Parham n.d.). A great many of the descendants of these original eighty-three families still reside on Ambergris Caye, most in San Pedro Town. This can be seen in the surnames of many San Pedranos today, such as Alamilla, Guerrero, Heredia, Parham, Paz, and Rivero.

Throughout the twentieth and into the twenty-first century the town of San Pedro has continued to grow. Commercial fishing had been the primary economic activity of a great many San Pedranos until the 1970 and 1980s, when tourism began to surpass fishing as the primary economic engine for the community. Indeed, San Pedro was one of the pioneering municipalities in the country's tourism industry (CZMAI 2016, 29).

Goals of the 2017 Field Season at San Pedro

The main goal of the 2017 field season was to recover as much information as possible about the ancient Maya and historic San Pedro community that lies below the modern Parham Plaza Hotel. San Pedro is the only sizeable community, and the only designated town, on any of country's hundreds of offshore islands, so it occupies a unique place in the country of Belize. The town and the island's history reflect the country's precolumbian Maya past, its tumultuous era of European conquest and colonization, and the early genesis and later growth of Belizean culture. Also, San Pedro is the only archaeological site of the 24 recorded thus far on the island that was occupied in the Late Postclassic Period, into Spanish Colonial times, and then through the development of San Pedrano Belizean culture in the 19th Century and beyond. Thus, the site has great potential to provide information on cultural adaptations to dynamic social and physical environments, the process and characteristics of ethnogenesis, and the ways in which Belize's only island town has grown and developed over time.

In terms of cultural studies, the Late Postclassic-Spanish Colonial period community at San Pedro is worth examining archaeologically because it connects the 'San Pedro' of the more distant past to the San Pedro of today. Because of this we felt it was important to share our findings with the general public so that local San Pedranos, visitors to the island, government officials, and others could tour and learn about the archaeological site in their town (Mayfield and Simmons 2018). The public dates were a success, overall. On one such day that a local San Pedrano, Mr. Cesario Rivero, was given a site tour, and during that time he informed Simmons of an unregistered Maya site on the leeward side of the caye. Simmons visited the site in June 2017 and has since had it registered with the Belize Institute of Archaeology.

Connecting members of the community to their past history was an important goal of the 2017 field season, and clearly had benefits for both San Pedranos and archaeologists (Mayfield and Simmons 2018). Public outreach also involved notifying the community of our work at the site through mass media. Interviews were given and press reports appeared in the *San Pedro Sun*, and the online web site *Ambergris Today*. Simmons and Mayfield also made radio and television appearances on San Pedro's *Reef Radio and Reef TV*. If San Pedranos are to learn more about their island's past, and their shared cultural heritage is to be illuminated and preserved, then it is essential that public outreach efforts continue into the future.

Field and Laboratory Methods

Field Methods

The field methods used in 2017 followed those that have been in use by Graham and Pendergast earlier at the San Pedro site, mainly for the sake of consistency. These are the same methods of excavation and reporting that both Simmons and Mayfield, the project co-directors, as well as our colleagues Elizabeth Graham and David Pendergast, have used at the sites of Lamanai and Marco Gonzalez over the last two decades (Graham and Simmons 2012b; Mayfield 2015; Simmons and Howard 2003, Simmons 1999, 2004, 2005, 2006, 2009; Simmons and Graham 2012; Simmons and Howard 2003).

During the 2017 field season four separate areas were excavated at the Hostel la Vista/Parham Plaza Hotel property (Figure 3). These were designated as trenches, following the nomenclature used previously by Graham and Pendergast during their early 1990s project, and they were given the next numbers in the sequence of trench numbers that were assigned then, beginning with Trench 5. The trenches varied slightly in size, with Trenches 5 and 6 measuring 3.5 m², Trench 7 measuring 3.5 x 3.0 m, and Trench 8 measuring 3.0 x 2.5 m (Table 2).

	Horizontal Area	Depth Excavated below ground	Total Volume
Trench Number	Excavated	surface	Excavated (in m ³)
5	3.5m x 3.5m	1.65m	20.21
6*	3.5m x 3.5m	.60m	7.35
6*	1m x 1m	.90m	0.9
7	3.5m x 3.0m	1.25m	11.81
8	3.0 x 2.5m	1.20m	9.0

Table 2. Dimensions of Total Excavated Areas at the San Pedro Site, Ambergris Caye, Belize 2017

Total = 49.27 m^3

* excavations revealed a concrete slab extending across much of the area of the trench, except in the approximate center, where a 1m² test pit was excavated

The trenches excavated in 2017 were situated in areas that had not been previously excavated by Graham and Pendergast in the early 1990s (Figure 3). They were also situated to avoid new concrete sidewalks that had been created earlier in the spring, as well as a gravel driveway situated in lot 992 behind (immediately west of) the rear of the Island Torch Restaurant. Because the hotel was undergoing renovation work it was also necessary to avoid areas in which building materials were kept in temporary storage on the grounds of the property. These last areas are ones we hope to explore in future years.



Figure 3. 2017 Schematic Site Plan.

Two datum points were established immediately north of Trenches 5 and 6 to collect vertical provenience information for those trenches as well as Trench 7, and a single datum point was established immediately east of Trench 8 for the same purpose (Figure 3). The depths of datum points 1 & 2 below the top of the concrete wall separating the Parham property on the south side of the wall from the Martha's Guest House property on the north side of the wall are as follows: Datum 1 = 1.7m. and Datum 2 = 1.67 m. Datum 3, located immediately east of Trench 8, was situated 15 cms. above the present ground surface. Opening and closing

elevations at the surface and at the base of each excavated lot were taken using one of these three datum points. All lots were flat shoveled and/or troweled and any visible cultural material was hand collected in zinc "sherd trays." All soil excavated in undisturbed lots excavated during the 2017 field season was screened through ¼" metal mesh, and soil color descriptions were based on standard designations provided by the Munsell Soil Color Chart.

Excavations followed natural stratigraphic deposits in 2017. If discrete soil deposits exceeded 10 cm in depth then arbitrary 10 cm. levels were excavated within those deposits in order to maintain some horizontal control over the locations of cultural material present within those strata. All excavated cultural material, including modern refuse, was collected in the field for processing at the on-site field lab, located just west of Trench 7. Lot numbers were assigned sequentially following the final lot number given in 1993, lot 225. A lot is a distinct area under investigation that can include, but is not limited to, an architectural feature, a 10-20 cm. (or other) deposit of soil, a burial (the skeletal remains themselves), or any other significant deposit. A lot form is filled out for each distinct area under investigation and provides information such as thickness of deposit, date of deposit, and relationship to datum and/or surface. A master lot list was maintained for reference and to aid in the assignment of open lot numbers. A total of 66 separate lots were excavated at the San Pedro site during the 2017 field season (Appendix 1).

Documentation of finds, including *in situ* cultural material, features, and burials identified in excavations, entailed using a variety of methods. These included digital photography, plan and section drawings, observations written as informal field notes, and information entered on standardized forms for lots and burials. These standardized forms have been used by the Marco Gonzalez and Lamanai archaeological projects over the past several decades of research at those sites. Two features were identified in 2017, and they were given numbers three and four in the sequence begun by Graham and Pendergast.

The material that may represent Maya flooring or some kind of prepared surface was not given feature numbers as it was initially unclear that these are actually cultural in nature. In addition, discontinuous sections or lenses of this material, at least in Trench 7, made it impractical to assign any feature number. It seems almost certain these areas, which are described in some detail below, represent some kind of Maya cultural material, but further analysis and consideration of the nature of these is definitely needed. Plan view drawings were made of Feature 4, as well as other cultural materials *in situ*, such as the ceramic vessels found intact or largely intact in Trenches 7 and 8 (see below). Two profile drawings were completed for each of the four trench walls, and photographs were taken of all side walls of trenches, as well as *in situ* artifacts, features, burials, and artifacts and ecofacts.

Laboratory Methods

All excavated cultural material was transported in zinc trays from the field to the on-site laboratory on the grounds of the Parham Plaza Hotel. All artifacts and faunal specimens were accessioned into the field laboratory by lot. These materials stayed grouped by lot during all laboratory protocols, and all were initially organized by lot for permanent storage. All artifacts were washed and dried overnight (other than osseous materials and metal) before being field identified by Tracie Mayfield (zooarchaeological remains, and modern and colonial materials), W. James Stemp (lithics), and Jim Aimers (Maya pottery) and photographed using a Canon Powershot G10 14.7MP digital camera.

Faunal specimens and metal objects were dry brushed to remove excess organics before being identified and photographed. No chemical analyses were performed. All data on recovered cultural materials were entered into a Microsoft Excel database. All of the materials excavated in 2017 have remained in Belize; only digital information (written record, numerical data, drawings and photographs) accompanied researchers back to the United States.

Once artifacts and specimens had been processed through the laboratory (identified and photographed), recovered materials were moved to labeled (by lot and material) heavy duty zip lock storage bags, and put into permanent storage (in numbered zinc boxes) in the bodega at the Marco Gonzalez Archaeological Site, located approximately six miles south of the San Pedro site. While all excavated artifacts and faunal materials were processed and moved to storage at the Marco Gonzalez Archaeological Site, certain modern artifacts (non-diagnostic ceramic, glass, plastic, styrofoam, and metal materials) located in upper, disturbed strata were processed (identified and photographed) and reburied during trench backfilling.

Artifacts

Artifacts were coded first by general use category: architecture (e.g. brick, concrete, window glass, nails, etc.), foodways (e.g., European ceramics, glass, and faunal remains), foodways/Maya (e.g., locally/regionally produced ceramics, household (e.g., imported tools, barrel stays, charcoal), household/Maya (e.g. lithics and worked flint, stone, and chert), personal (e.g., imported ceramic pipes, glass beads, bullets, lead caste-off), and personal/Maya (e.g., stone beads and fishing weights). The differentiation between Maya (local) and European (imported) materials was needed in order to compare and contrast foodways and consumerist practices. However, the distinction between locally made and imported goods represents producer, but not necessarily the end user.

After top-tier artifact classification by probable primary use, the recovered materials were further coded by material class (e.g., ceramic, stone, glass, wood, bone, etc.), form, color, and decoration in order to understand more about practices and behaviors associated within discrete contexts. Multiple reference materials were used to identify and date materials whenever possible: imported ceramics and metal tools (DAACS 2017), nails (Wells 1998), ceramic pipes (Deetz 1996:28), metal cans (Can Central 2017), and glass (Society for Historical Archaeology 2017).

Faunal Specimens

Vertebrate remains were identified using standard zooarchaeological methods (Reitz and Wing 2008). Species identified are summarized in faunal categories based on vertebrate class to facilitate comparisons of relative dietary contribution. A number of primary data classes are recorded, including taxonomic identification, skeletal element, element portion, and fusion. The Number of Identified Specimens (NISP), or bone count, was determined for each taxonomic identification. Specimens that cross-mended with other specimens in the same minimum analytical unit (lot) were counted as single specimens. No attempt was made to cross-mend specimens from separate lots within individual trenches. All specimens were weighed to provide additional information about the relative abundance of identified taxa. Indicators for sex, age at death, and modifications such as rodent/carnivore gnawed, burned/calcined, cut, hacked, crushed/impacted, twisted, drilled, or worked bone were noted where observed.

Biomass, an estimate of the amount of meat tissue contributed by different taxa, is used in an attempt to compensate for some of the problems encountered with NISP. Predictions of biomass are based on the allometric principle that the proportions of body mass, skeletal mass, and skeletal dimensions change with increasing body size. The relationship between body weight and skeletal weight is described by the allometric equation (Simpson et al. 1960): Y = aXb. In this equation, X is specimen weight, Y is the biomass, b is the constant of allometry (the slope of the line), and a is the Y intercept for a log plot using the method of least squares regression and the best-fit line (Casteel 1978,71-77; Reitz and Cordier 1983,237-252; Reitz et al. 1987,304-317; Wing and Brown 1979). Values for a and b are derived from calculations based on data at the Florida Museum of Natural History, University of Florida, and the University of Georgia Museum of Natural History. Allometric formulae for biomass estimates are not currently available for amphibians or lizards so biomass was not estimated for these groups, but it was for all other groups.

Summary of Excavation Results

The following section presents the results of archaeological field investigations on the Parham Plaza Hotel (formerly the Hostel la Vista and Sands Hotel) property in May and June 2017. The discussion is organized by trench number, with three of the four (Trenches 5, 6 & 7) excavated in the northern half of the property in town lot 991, and the fourth (Trench 8) in the southern part of the Parham property in town lot 992 (Figure 2). A summary of temporally diagnostic artifacts recovered in lots excavated in each trench is also presented, along with preliminary interpretations of stratigraphy, and discussions of the depositional integrity of cultural deposits observed at various depths in different areas of the site.

Trenches excavated at the San Pedro site varied in their horizontal areas and in their maximum depths below surface (Table 2). In one of these, Trench 6, excavations encountered a poured concrete slab. Clearing of the surface of the slab revealed it had been broken, and a portion of the concrete had been removed at some point in the past. This permitted deeper excavation in a 1 m² test pit below the concrete layer (see below).

Trench 5

Trench 5 is located in the approximate center of San Pedro Town Lot 991 (Figure 2). Excavations began in Trench 5 on 27 May 2017 and continued until 21 June 2017. This trench measured $3.5m^2$ and extended to a maximum depth of 1.65m. below ground surface (bgs). A total of 20.21m³ of soil was excavated in this trench, comprising the most soil excavated in any

trench during the 2017 field season. Both modern Belizean features and much older Maya features were identified during excavations in Trench 5. These included part of an historic-modern rubbish pit, identified in the northeast corner of the trench, as well as possible Maya house floor remains and midden deposits. The trench also contained the only human burial encountered during the 2017 season.

The uppermost 45-50 cms. of soil, consisting mainly of several discrete layers of coarse silty sand, contained modern (late 20th-early 21st Century) material, including styrofoam, bottle glass, plastic, aluminum foil, and pieces of concrete. In lot SP235, a relatively thick (15-35 cm.) deposit of grayish brown (10YR 5/2) coarse sand, a 1966 British Honduras one cent piece was found (Figures 4 & 5). This suggests that the uppermost +/- .5 m. of soil in this particular area of the site post-dates 1966.

Below lot SP235 a 5-20 cm deposit of dark gray (7.5YR 4/1) coarse sand with pieces of broken concrete and mortar (SP238) was found overlying a comparatively thicker (20-35 cm.) layer of compacted gray-dark gray (7.5YR 4/1 & 7.5YR 5/1) sand. This layer, excavated as lots SP242 and SP250, was much more densely packed compared to the relatively loose sand layers above. Based on the mean ceramic dates for historic ceramic artifacts found in these lots (1888 for SP242 and 1885 for SP250) it is likely that this deposit represents refuse from the late-19th Century occupation of San Pedro Town.

Both Maya cultural material, as well as historic ceramic, glassware, and metals were recovered in lots SP242 and SP250. Older wares, such as the sponged and flow blue pearlware pieces, were found with more recent vessel fragments of variously decorated whitewares. Two kaolin clay pipestem fragments were recovered, one from each lot, and both with bore diameters of 1/16" indicative of production between 1800-1900. A ceramic marble and bisque porcelain doll hand were found as well in lots SP242 and SP250, reflecting the late 19th Century character of San Pedro as a town of resident families with children.

Mixing of pre- and post-Columbian materials continued to roughly 110-115 cmbgs. In the northeast quadrant of the trench an irregularly-shaped feature appeared at roughly 95-100 cm. bgs. during excavation of the base of SP257, the lot underlying SP250 (Figure 6). This area was discovered to be an historic-modern rubbish pit that was not assigned a feature number but was excavated in its entirety as lot SP262. The rubbish pit's soil was a reddish gray (5YR 5/2) coarse sand that consisted of a mixture of soils below it (lots SP260, SP266, and SP281), as evidently the pit had been dug through these lower soil deposits.

The pit appears to have been dug and used several times (Figure 7). 19th Century case bottles were mixed with modern artifacts such as a paint can filled with two Belikin beer bottles, and a Pine Sol cleaner plastic bottle that was not completely empty of its contents. We encountered the base of this feature at approximately 1.13 m. bgs.; it extended deep into Late Postclassic Maya deposits in lots SP260, SP266, and SP281 (Figure 4).



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Figure 4. Trench 5 East Wall Profile





- Mixed 19th century-modern material -Mixed 19th century and Maya material -Maya midden

23



Figure 6. Plan of modern rubbish pit in northeast corner of Trench 5 under excavation. Dashed line represents other (earlier?) excavation for rubbish disposal. Belikin and Pine Sol bottles found in lot SP262, the pit fill. Deposit of charcoal in approximate right center of image.



Figure 7. Modern Rubbish Pit in northeast corner of Trench 5 under excavation.

Lots encountered below lot SP260 yielded only Maya artifacts and other Maya cultural material (Table 3). Lot SP260 probably represents the upper portion of Maya occupation debris, as only three pieces of whiteware and one piece of bottle glass was recovered, all in the upper few centimeters of that lot. Maya artifact densities were highest in lots SP260 and SP266, where Hubelna system sherds from deep bowls and griddles, among other ceramic types, were recovered (Appendix 2).

Chert bifaces (Figures 8 & 9) as well as pieces of debitage (Figure 10) were also recovered, along with approximately one dozen obsidian prismatic blades in each of lots SP260 and SP266. In terms of faunal remains, in lot SP260 36/46 (78.3%) of the faunal remains found were turtle bone (unidentified species), turtle carapace, or turtle plastron pieces. Bones from various unidentified fish species and barracuda (*Sphyraena barracuda*), along with unidentified small-medium sized mammals, dog (*Canis lupus famililaris*) and peccary (*Pecari tajacu*) were among the 60 total pieces of faunal material from lot SP266 (Table 3).

Maya cultural material extended from lot SP260, beginning at roughly 90-95 cm. bgs. to the base of the trench, at approximately 165 cm. bgs.; culturally sterile beach sand was encountered at this depth, and appeared in lot SP288 (Figures 4 & 5). Maya artifact densities increased in the lot below SP260, SP266. A total of 374 artifacts were recovered in this lot, which was a dark gray (10YR 4/2) coarse loamy sand. Most of these artifacts (n=343) were Maya pot sherds, and these included Palmul Incised bowl fragments along with Hubelna system bowl and griddle pieces (Figure 11). Two oval and two lenticular bifaces were recovered in this lot (Figure 9), including one very finely made laurel leaf biface (Figure 8). One of the lenticular bifaces was chalcedony while the remaining four were chert.

Directly below lot SP266 a deposit of light brown (7.5YR 4/2) coarse silty sand, excavated as lots SP276 and SP281, was found (Figures 4 & 5). The numbers of Maya artifacts and ecofacts found in these two lots (n=208 for lot SP276; n=57 for lot SP281) were lower than the number (n=434) found in the lot immediately above, SP266. But the presence of Payil Red and Palmul Incised ceramic artifacts from these lots suggests that this deposit is Late Postclassic in date, as is the lot immediately below SP281, SP283 (see below).

Lot SP283 was made up of several non-contiguous areas of a unique kind of sandy claylike material found in the southern half of Trench 5. These areas measured approximately 10-25 cm² in horizontal extent and between 2-10 cms. in depth and were light gray (2.5Y7/1), white (7.5R8/1), pink (5YR7/3), and reddish yellow (5YR7/6) in color (Figures 4 & 5). The material excavated as lot SP283 can be characterized as a very fine silty clay with very fine sand that had a 'greasy' sort of smooth kind of texture that 'ribbons' when pressed between the fingers. Across it's horizontal area it was variable in thickness, but it's upper surface was flat and fairly smooth in texture, while its bottom surface was irregular. This material had not been encountered in previous excavations at the site (David Pendergast, personal communication 2017), but in 2017 it was recorded in Trenches 7 and 8 (see discussion below).

												shell			stone	stone			
			ceramic								shell	(artifact/			(non-	(artifact/			
		ceramic	(non-			coral					(artifact-	non-	shell		obsidian	non-	stone	faunal	Grand
Lot #	brick	(Maya)	Maya)	charcoal	concrete	(ecofact)	glass	metal	mortar	plastic	Maya)	Maya)	(ecofact)	Obsidian	Maya)	Maya)	(ecofact)	material	Total
226	5	61	90	7		2	137	130		19			32			2		93	578
229		1	5		8	1	14	6										13	48
230		1	6				29	20		2								3	61
235		9	60	6	1		119	59			1					2		8	265
238		44	110				109	53								1	1	34	352
242		57	178	1	2		160	53				5					3	64	523
250	1	69	210	2			133	38	2			5		4	4	3		80	551
253			5				31	26											62
257		222	23				26	6	2					4	2	1		6	292
260		255	3				1							10	17			46	332
262		249	46				263	155		2					7	1		42	765
266		343												15	16			60	434
276		160												7	5			36	208
277		10												2	3			17	32
281		45												6	1			5	57
283		270												13	5			82	370
286		105												4	1			73	183
288		121												7	8			11	147
Total	6	2,022	736	16	11	3	1,022	546	4	23	1	10	32	72	69	10	4	673	5,260

Table 3. Summar	v of Artifacts and Ecofacts from	Trench 5.
Tuble 3. Summar		including.



Figure 8. Laurel leaf lenticular biface, lot SP266, Trench 5. Drawing by Alex Rasmussen.



Figure 9. Chert biface and biface fragments from Lot SP266, Trench 5.



Figure 10. Chert debitage from Lot SP260, Trench 5. Note characteristically banded NBCBZ chert.


Figure 11. Palmul Incised rim sherds from Lot SP266, Trench 5.

This material may represent Maya flooring or some other kind of prepared surface, and it was associated stratigraphically with occupational refuse and Burial A. Although none of this material was found in the immediate vicinity of Burial A, it was found at approximately the same elevation as the burial. Its patchy nature and distribution suggests that if it does represent some kind of flooring or prepared surface then it had been disturbed at some point or points in time in the past. Aside from the clear evidence of disturbance in the form of a modern trash pit in the northeast corner of the trench (see Figures 5-7), other evidence of disturbance in the form of probable land crab (*Cardisoma guanhumi*) holes and other episodes of digging in the past was noted. Nearly 300 (n=288) Maya artifacts were recovered in lot SP283 along with 82 animal bones, including those from dog (*Canis lupus famililaris*), peccary (*Pecari tajacu*), manatee (*Trichechus manatus*), other medium-sized as well as small-medium and large mammals, various reef and mangrove fish species, and turtle.

Ceramics from lot SP283, the possible Maya flooring/surface and associated refuse material, include a censer pedestal fragment that might be from a Late Postclassic Chen Mul Modeled System effigy censer (see Appendix 2). Among the other ceramic artifacts was also a hollow bird (owl?) head effigy support from a Payil Red group vessel (Figure 12). Thirteen obsidian blade and blade fragments were found along with a thin chert biface, three chert flakes and a chert flake core.

Excavations in the southeast quadrant of Trench 5 in lot SP283 revealed the only human burial encountered during the 2017 field season, designated Burial A. Removal of the coarse





loamy sand of SP281 revealed the occipital portion of the flattened skull of a prone burial. Further excavations in the lot below SP 281, lot SP283, revealed that the small individual had been placed face down with their legs drawn up so that their feet were found resting on the hips (Figure 13). The burial was oriented generally north-south, with the cranium to the north. Burial A (skeletal material) was designated lot SP291, and all cultural material surrounding the burial was excavated as lot SP286 (see Appendix 1).

A poorly discernable 'cut' or outline of an excavated area was detected in the mixed dark and light-colored sandy soil surrounding the skeletal material. It was most evident on the west side of the burial (Figure 13). Here, a moderately well-defined line was noted extending from the area just a few centimeters north of the skull to an area approximately 15-17 cms. west of the pelvis. This mixed dark grey and black soil was found east of the burial as well, and may represent decomposed organic materials around which other pockets of charcoal were found. These were immediately to the east and southeast, where two other very dark colored (7.5YR 2.5/1) areas of sandy soil were present; these may represent places were burning had taken place or some organic material had decomposed and stained the sand at the same level of the interred individual (Figure 14). All of this area was designated as lot SP286, which encompassed an area in the southeast corner of the trench measuring approximately 1m² (N-S & E-W) x 20 cms. in depth.

PLAN OF BURIAL A, TRENCH 5



Figure 13. Plan of Burial A, Trench 5. Mixed dark grey and black soil likely represents organic remains, some of which may have been burial accompaniments.

No grave goods, or artifacts clearly associated with the burial, were found. The skeletal material was fully exposed and recorded on June 19 and on June 20 it was removed as lot SP291. Although no objects that had obviously been interred with Burial A were identified, in the mixed light and dark colored sandy soil immediately around the subadult's remains 110 Maya artifacts were recovered. Most of these (n=105) were ceramic sherds, but four obsidian blade fragments and one piece of chert were also found. A total of 73 animal bones and bone fragments were also found in lot SP286. Nearly 30% (n=21) of the bones were peccary (*Pecari tajacu*), while 60% (n=46) were of various species of medium sized bony fish, including barracuda (*Sphyraena barracuda*).

The skeletal remains (Burial A) were found to be in a fairly good state of preservation, overall. Based on the stage of vertebral/sacral fusion and lack of fusion in all the other



Figure 14. Burial A, Trench 5. Note charcoal lenses and area of dark grey-black soil surrounding the burial. Burial cut can be seen to the left and below and to the right of the modified cranium. Burial (skeletal remains) Lot SP291; burial cut fill material Lot SP286.

epiphyses, along with the dentition, it appears that the burial is of a juvenile between five to nine years of age (Sandra Wheeler, personal communication 2019). The occipital portion of the juvenile's skull showed clear evidence for cranial modeling of a form consistent with tabular erect types described by Tiesler (2012, Figure 4) and Tiesler and Ortega (2013, Figure 2). Specifically, Burial A's skull is of the tabular erect paralelepiped variety. Tiesler (personal communication 2019) commented that this is the typical head shape during the Postclassic Period, "but was in use since the Classic Period, presumably by traderfolk, and is seen mostly on the coastline in the Maya area."

The individual, of indeterminate sex, was placed face down with their arms to the sides. The left shoulder was raised somewhat so that the left clavicle was found just below (south of) the left side of the mandible. The left arm was bent at the elbow, and the hand of the individual was found beneath the left portion of the pelvis. The right arm was hand resting atop the pelvis. The legs were bent back at the knees so that the individual's feet were also found resting atop the pelvis (Figure 14). Presumably the lower legs were tied back over the individual's thighs. This burial position was noted by Graham and Pendergast during their earlier investigations in San Pedro (Graham and Pendergast 1987, 1994; Pendergast and Graham 1991; Weinberg et al. 2003). Of the 49 burials that have been recovered thus far from both rescue and other excavations in the town of San Pedro, the majority for which position could be determined (n=46; 93.8%) were face down with the legs bent back (Graham et al. 2013,175).

Maya cultural material was found beneath Burial A and lot SP283 in lot SP288, which was the deepest lot excavated in Trench 5 (Figures 4 & 5). This was a mixed, mottled sand cultural deposit in which very pale colored (7.5YR 7/2) beach sand was mottled with brown (7.5YR 4/2). Some of the brown sand may represent anthropogenic soil, specifically decomposed organic material. But until proper soils analyses can be undertaken this point will remain speculative. A total of 121 ceramic sherds, seven obsidian blade fragments, and eight pieces of chert were found (Table 3). The chert artifacts included a lenticular biface fragment, a flake core, two blocky fragments, as well as two bifacial thinning flakes and two flakes. In addition to these 11 animal bones were recovered in lot SP288, and these were identified as barracuda (*Sphyraena barracuda*), turtle (unidentified species), and medium and large sized mammal bones.

Unfortunately, due to time limitations only some of lot SP288 could be excavated, so it is unclear how deeply cultural materials extend below the existing ground surface in this particular area of the site. Excavations and recording in Trench 5 were completed on 22 June 2017, and the trench was backfilled the same day.

Trench 6

Trench 6 was located in the approximate center of San Pedro Town lot 991 and was the easternmost area excavated in 2017 at the San Pedro site (Figures 2 and 3). Excavations began in Trench 6 on 27 May 2017 and continued until 12 June 2017. The trench measured $3.5m^2$ in horizontal area, but was only excavated across that $3.5m^2$ area to a depth of 40-60 cms. below ground surface (bgs). due to the presence of a poured concrete slab feature (see below). Because the concrete was missing in the center part of the trench, however, it was possible to continue excavations in a $1m^2$ area there. The maximum depth reached in the trench was 2.45 m. bgs; here culturally sterile beach sands were encountered along with the water table.

The first four lots excavated in the trench contained mixed modern, 19th Century, and precolumbian Maya cultural material, with a substantial number of Maya ceramic sherds (n=586) found in the uppermost lot, SP227 (Table 4). It seems very likely that this lot, which included both the surface sod layer and the dark grayish-brown (10YR 4/2) silty sand layer directly beneath it, represents redeposited soil from elsewhere, possibly from some other location on town lot 991. Directly beneath the sod and topsoil layer was a relatively thick (34-45cms.) deposit of very pale gray (10YR 7/1) coarse sand that was excavated as lots SP228, SP231, and SP232 (Figures 15 & 16). Only one Maya ceramic sherd was recovered in these three lots; the remaining 173 artifacts consisted of mixed modern and early-mid 20th Century artifacts, many of which (n=108) were pieces of bottle glass (Table 4).

											shell					
		ceramic									(artifact/			stone		
	ceramic	(non-									non-	shell		(artifact-	faunal	Grand
Lot #	(Maya)	Maya)	charcoal	concrete	fabric	glass	leather	metal	mortar	plastic	Maya)	(ecofact)	Obsidian	Maya)	material	Total
227	586	2						2						1	132	723
228		3		4		24		9		3					7	50
231				1	1	22		9								33
232	1	9	9			62	1	14		2					4	102
234	6	39				35		9		1				3	19	112
237	11	18				4		2						1	1	37
239	2		1			8		6			2				1	20
241	10	5				3									2	20
244	3	2				1		2						2		10
246	24	4				5		2						1	5	41
247	4	3						1							5	13
248	9															9
251	2							1				1		3	13	20
252	14													2	31	47
254	70												6	6	20	102
255													4	7	55	66
258	80												3	5	5	93
261	14													1	3	18
264	1														1	2
272									2							2
Total	837	85	10	5	1	164	1	57	2	6	2	1	13	32	304	1,520

Table 4. Summary of Artifacts and Ecofacts from Trench 6.

Between 45-60 cms. below ground surface a 3-5 cm. thick layer of concrete was found extending across a substantial part of the 3.5 m² trench (Figure 17). Designated Feature 3, it appeared to be a smoothed, prepared surface that resembled a floor or platform of some kind. It extended from the north wall of the trench into its center approximately 70 cm, and along the west wall it extended into the trench almost 110 cm (Figure 18). The concrete surface was not found in the southeast quadrant or along most of the east wall of the trench. It also did not extend to the west wall of the trench. Instead, a linear concentration of queen conch (*Lobatus gigas*) and horse conch (*Triplofusus papillosus*) shells were found hugging the west face of the concrete surface (Figure 18). The concentration of conch shells extended from the south to the north wall of the trench, and between 30-40 cms west of the west edge of the concrete surface. The shells were found between 15-25 cms below the surface of the concrete surface. Exposure of the shells (lot SP239) produced Maya ceramic sherds (two) and modern bottle glass (n=8) and metal pieces (n=6).

Along its western edge the concrete had rectangular-shaped, shallow indentations which measured +/-6 cms N-S and +/-10 cms. E-W. These are identical to the kinds of impressions that would be left of upright or vertical 2"x4" wooden studs. This possibility seems fairly reasonable given that the concrete surface appears to be the remains of a floor. It is not clear why the floor, if that is what it represents, was broken and altogether missing in the center portion of the trench. But, as mentioned above, its absence afforded us the opportunity to excavate a $1m^2$ test pit so that we could identify the depth as well as explore the nature of more deeply buried Maya deposits.



Figure 15. East wall profile of Trench 6.



Figure 16. North wall profile of Trench 6.



Figure 17. Concrete flooring (Feature 3) and associated conch shells along western edge of floor.

Excavation in the 1m² test pit revealed the same general stratigraphic sequence as seen in Trench 5, located just 4.55 m. to the west. Upper deposits were comprised of mixed modern and colonial materials. These were identified in lots SP227, SP228, SP231, SP232, SP234, SP237, SP239, SP241, SP244, SP246, SP247, SP248, and SP251, although only one small piece of metal was recovered in the last of these, SP251 (Table 4). These colonial to modern era materials were found up to approximately 1.55 m. bgs., and they include three pieces of what likely represent Spanish olive jar sherds recovered between 80-85 cms. bgs. in lot SP237.

Below these lots (with the exception of the single small piece of metal from lot SP251) only Maya cultural material was found. The greatest concentration of this came from lots SP254, SP 255 and SP258, all part of a dark brown (7.5YR 4/2 and 7.5YR 4/3) earth containing Late Postclassic Period Maya ceramic and lithic artifacts, as well as 80 pieces of animal bone (Figure 19). Small to large sized fish (unidentified species) bones were found in these midden lots, along with iguana, peccary (*Pecari tajacu*), other large as well as small mammals (unidentified species), land crab (*Cardisoma guanhumi*), sea turtle (unidentified species), and crocodile (*Crocodylus acutus*) (five pieces from lot SP255). The midden began at 160 cm. bgs. (NE corner of test pit) and extended to 2.03 m. bgs. (SE corner of test pit). The maximum thickness of the midden was 32 cm. (in NE corner of test pit) (Figures 15 & 16).



Figure 18. Concrete flooring (Feature 3) and associated conch shells along western edge of floor.

Among the ceramic artifacts (n=150) recovered from these three midden lots in Trench 6, Aimers notes the presence of "very coarse tempered horizontal rims that look like the form of Late Postclassic Zalal Gouged-incised chalices from Lamanai, but the paste is coarser and seems to grade into the Hubelna paste" (see Appendix 2). Red Payil group sherds were also recovered. Lithic artifacts in these three midden lots included 13 obsidian blade fragments and 18 chert artifacts, including a lenticular biface fragment from lot SP255.

The uppermost few centimeters of lot SP261 likely represents the base of the Late Postclassic Period midden. Beginning at approximately 1.7m. bgs no cultural material was encountered; the remaining +/- 70 cms. excavated were sterile coarse beach sands (Figures 16 & 19). Only one artifact, an eroded Maya sherd, was recovered in lot SP264, and no cultural material was found in the deepest three lots excavated, SP269, SP271, and SP272. Profile drawings were completed on 11 June 2017 and Trench 6 was backfilled on 12 June 2017.



Figure 19. Base of Late Postclassic Period midden deposit, surface of Lot SP261, Trench 6.

Trench 7

Trench 7 is located 1.57 m. west of the west wall of Trench 5 in the approximate center of San Pedro Town lot 991 (Figures 2 & 3). It measured 3.5 m. N-S and 3 m. E-W. Excavations began in Trench 7 on 30 May 2017 and were completed on 20 June 2017. The maximum depth reached in the trench was 1.25 m. bgs. (Figures 20 & 21). Due to time limitations, it was not possible to excavate to culturally sterile soil, but dense accumulations of both historic and precolumbian Maya materials, as well as historic and Maya cultural features, were encountered in this trench. Unfortunately, evidence for mixing of historic and precolumbian deposits in this trench was found along with lenses of the same pale colored (white, orange and gray) clay-like material encountered in Trench 5.



Figure 20. South Wall profile of Trench 7.



Figure 21. West Wall profile of Trench 7.

Below the 7-15 cm. thick layer of sod and underlying dark brown (7.5YR 3/2) silty humic sand, excavated as lot SP 233, two layers coarse sand were encountered. The uppermost of these, excavated as lot SP236, was a coarse coral sand with abundant very small shells that was whitish-pink (7.5YR 7/3) in color and contained pieces of modern glass (n=46) as well as a piece of concrete, two pieces of metal and five historic ceramic sherds. This deposit ranged between 6-16 cms. in thickness (Figures 20 & 21). The layer of coarse sand below this was excavated as lots SP240 and SP243, and was characterized as a light grayish brown (10YR 6/2) deposit that yielded 81 and 250 artifacts and ecofacts, respectively (Table 5). Cultural materials in both lots included pieces of modern and historic glass along with historic and Maya ceramic sherds, pieces of metal, and five pieces of plastic. In addition to these materials a total of 20 animal bones were recovered in both lots, including pig (*Sus scrofa*). This deposit likely represents either a 20th Century fill episode in which mixed Maya and historic-modern materials were present, or perhaps this stratum represents a mixed/disturbed earlier (mid-19th and mid-20th Century) occupation accumulation. It is at the base of lot SP243 that a linear feature comprised of some kind of tabby-like cement, and reefstone fragments were identified (Figure 22).

At the base of the light grayish brown (10YR 6/2) coarse sand deposit we encountered this linear feature at approximately 50 cm. bgs. It measured roughly cms. in width and extended from roughly 12 cms. south of the north wall of the trench into the south wall of the trench. Although this agglomeration of reefstone pieces, mortar and cement was not a particularly well-defined feature, especially the southern 80 cms. or so. It was not terribly thick, either, ranging from roughly 10-20 cms. (Figure 20). The function of this enigmatic feature, which resembles a wall stub, is unclear.

Artifacts associated with the remnant wall stub feature, if that is what it represents, are from lots SP263 and SP268. These were excavated on either side of and immediately around the feature, and were comprised of almost equal numbers of Maya and historic ceramic sherds. The Mean Ceramic Date (MCD) for lot SP 263 is 1867, while the MCD for lot SP268 is 1861. Substantial numbers of glass (n=216) and metal (n=97) were also recovered from these two lots, as were several pieces of brick and 358 pieces of faunal material. Medium to large bird and sea turtle bones (from unidentified species), a brocket deer bone (*Mazama sp.*), various unidentified species of small to large fish, bones of unidentified species of small to large mammals, and West Indian manatee (*Trichechus manatus*) bones were recovered from lots SP263 and SP268. Domesticated animal bones from these two lots included those identified by Mayfield as pig (*Sus scrofa*), chicken (*Gallus gallus domesticus*), cow (*Bos taurus*), and dog (*Canis lupus famililaris*). Turkey (*Meleagris sp.*) bones were also recovered, but it is not clear if these represent historic or precolumbian food remains.

No Maya lithic artifacts were recovered from lot SP263, but 10 total pieces of chert and eight pieces of obsidian were found in the lot below it, lot SP268 (Table 5). Chert artifacts included two chert bifaces, two blocky fragments, one chert blade, and three tertiary flakes. One tertiary flake was identified as limestone. This lot also yielded one of only two small side-notched projectile points recovered during the 2017 field season. Eleven obsidian blade fragments were also recovered from these two lots.

				ceramic							shell (artifact/		stone	stone (artifact/					
	bone		ceramic	(non-							non-		(artifact-	non-	stone		wood	faunal	Grand
Lot #	(artifact)	brick	(Maya)	Maya)	charcoal	concrete	glass	metal	mortar	plastic	Maya)	Obsidian	Maya)	Maya)	(ecofact)	UNID	(artifact)	material	Total
236				5		1	46	2		1									55
240			3	8	2		34	29		1								4	81
243			33	24	4		104	52	9	4		4						16	250
249			125	113		1	85	167			2	2			2			40	537
263	1	3	51	90			114	28	2		1	3						88	381
268	1	2	190	138	10		102	69				8	10	1		1		270	802
274			223	4			2	5				5	6				1	35	281
275			24	8			6	3				1						217	259
279			51	6			8	8				3	2					1	79
280			21									1	1						23
282			353	14			11	3			2	13	10					158	564
287			669	2			10	6				60	32					228	1,007
292													2						2
Total	2	5	1,743	412	16	2	522	372	11	6	5	100	63	1	2	1	1	1,057	4,321

Table 5. Summary of Artifacts and Ecofacts from Trench 7.



Figure 22. Overview of Feature 4, a possible remnant wall stub composed of broken tabby-like cement and reefstone fragments.

It was in lot SP268 that a whole, largely intact (*in situ*) Maya ceramic vessel was found roughly 18 cms. west of the east wall of the trench (Figure 23). It was described by Aimers (see Appendix 2) as an "unslipped incurving bowl with striations and an upper everted pointed lip. Surfaces vary from buff to gray. Medium gray paste is very consistent and fully oxidized." It measured 33 cm. in diameter to the outside of the lip, and 10.3 cm. in height. Unfortunately, upon excavation the vessel separated into a number of fragments along existing fracture lines noted at the time of its exposure. The inner surface of the base of the vessel was measured at 99 cms bgs. which is at the level of disturbed Maya deposits, specifically lot SP282, discussed below. Red Payil group ceramic artifacts, including pieces of hollow vented feet from sag bottom bowls, were also recovered in lot SP268.

Beginning at roughly 105 cms. bgs., in the lot below SP268, designated SP274, the number of British historic artifacts declined to generally no more than 20 per lot. Only four historic ceramic sherds, two pieces of bottle glass, and five metal objects were recovered in lot SP274. In comparison, 223 Maya sherds and 11 lithic artifacts were recovered in lot SP274. Still, the presence of historic British artifacts intermixed with precolumbian Maya materials indicates that there still had been some degree of mixing of stratigraphic deposits in the past, probably in historic times. The relative amounts of Maya cultural material increased, however (see Table 5) as excavations continued to a maximum depth of 1.25 m. below ground surface.

After examining, describing and recording Feature 4, the agglomeration of reefstone fragments, concrete-like material, and sand that had at least the vague resemblance to the base of a stub of a wall of some kind, we removed it as lots SP275 and SP279. Again, mixed Maya and historic British materials were recovered in these lots, but most of the artifacts were Maya. A small lens of charcoal was identified along the western wall of the trench; this was excavated as lot SP280. Although this was a relatively small area excavated (ca. 20x15x5 cms.) twenty-one sherds, some from Tulum Red jars, and two lithic artifacts were found.

The deepest two lots excavated in Trench 7 were lots SP282 and SP287 (Figures 20 & 21). The same kind of material described above in Trench 5, and later in the discussion of Trench 8, was encountered at roughly 57-65 cms. below ground surface in the southwest quadrant of Trench 7. This material was very light in color and appeared in patches in this part of the trench, but was best seen in largely intact condition along the south wall and in the western half of the trench (Figure 20). It had a very fine silty clay-like texture, with almost a 'greasy' feel whereby the material 'ribboned' between the fingers when it was pressed. Munsell colors for lots SP282 and SP287 were 7.5YR 8/1, 5YR 7/6, and 2.5Y 7/1. Intermixed with remnants of this material was very dark grayish brown (10YR 3/2) coarse sand. The humic composition of the soil, along with its dark color and location (depth) below historic strata suggest that this material represents some kind of Maya anthropogenic deposit.

Lots SP282 and SP287 produced the greatest numbers of artifacts found in Trench 7 (Table 5). In lot SP282, the possible flooring material, just over 350 ceramic artifacts were recovered. These included Red Payil group pottery and Navula system pottery. But unlike the possible flooring/prepared surface or anthropogenic deposit seen in Trenches 5 and



Figure 23. Nearly intact unslipped incurving Maya ceramic bowl of unidentified type *in situ* during excavation of Lot SP268. The eastern edge of Feature 4 is shown at the bottom of the photo. Trench 7.

8, its equivalent in Trench 7 had clearly been disturbed, as small numbers of historic ceramics (n=14) and bottle glass (n=11) were recovered along with three pieces of metal from this lot. In addition, 13 obsidian blade fragments and ten pieces of chert, including an oval biface, three lenticular bifaces, and two retouched macroblades were found in this lot. It is likely that nearly all of the animal bones (n=158 total) recovered in lot SP282 represent Maya food refuse, as only one cow (*Bos taurus*) and one chicken (*Gallus gallus domesticus*) bone was found. Various fish bones from unidentified species were recovered along with barracuda (*Sphyraena barracuda*) bones, medium-large mammal bones (unidentified species), West Indian manatee (*Trichechus manatus*), and either domestic pig (*Sus scrofa*) or peccary (*Pecari tajacu*) bones.

Lot SP287, the second lot excavated in the pink-white-orange colored anthropogenic deposit remnants in Trench 7, yielded the greatest number of artifacts and ecofacts found in the trench (Table 5). Just over 1,000 (n=1,007) artifacts and ecofacts came from lot SP287, the third highest total of any of the lots excavated in the 2017 field season. Only lots SP270 (n=1,445) and SP278 (n=1,302) in Trench 8 produced more artifacts and ecofacts; both of these lots were 'floor feature' lots as well.

Ceramic artifacts from lot SP287 included Late Postclassic Red Payil group sherds, one of which was a hollow human face effigy that was a foot or support for a sag bottom tripod dish (Figure 24). Fragments of possible Red Payil group chili grater bowls (*molcajetes*) were also recovered along with notched ceramic sherds a molded ceramic date seed net sinkers.



Figure 24. Red Payil Group hollow human face effigy from Lot SP287, Trench 7. Drawing by Alex Rasmussen.

In addition to the substantial number (n=669) of ceramic artifacts recovered from lot SP287 a total of 32 chert and chalcedony artifacts and 60 obsidian blade fragments were found (Table 5). In fact, lot SP287 produced the greatest numbers of chert and obsidian artifacts of any lot excavated in 2017. Bifaces and biface fragments (n=6) were recovered (Figure 25) along with nearly two dozen (n=21) flakes, most of which were secondary and tertiary piece of chert or chalcedony. No whole obsidian blades were found in this lot, and indeed, only 11 whole blades were recovered during the entire 2017 field season, almost half of which (n=5) came from lot SP270 in Trench 8. But of 60 pieces of obsidian blades found in lot SP287, most were



Figure 25. Bifaces and biface fragment from Lot SP287, Trench 7. Note the distinctive honey-brown banded NBCBZ chert.

either medial (n=35) or proximal (n=18) segments. This is the greatest number of pieces of obsidian found in any lot during the 2017 field season.

The faunal assemblage from lot SP287 was quite varied. Of the 228 total animal bones recovered over two-thirds (n=158; 69.2%) were from various species of fish, most of which have not yet been identified. But barracuda (*Sphyraena barracuda*) and drum or croaker (family *Sciaenidae*) bones were identified, as were iguana (family *Iguanidae*) and other small but unidentified reptile bones. Faunal elements from mammals included those from turkey (*Meleagris sp.*), pig (*Sus scrofa*) or peccary (*Pecari tajacu*), deer (*Odocoileus* or *Mazama* sp.),

gibnut (*Agouti paca*), and as yet unidentified species of medium-large mammals. Along with bones of unidentified species of birds, stingray (family *Dasyatidae*, *Urolophidae* or *Myliobatidae*) elements and unidentified turtle remains were found in lot SP287. Some of the disturbance seen in this lot, which may represent Late Postclassic Period Maya midden that's lots its depositional integrity, was likely caused by generations of burrowing land crabs (*Cardisoma guanhumi*), as remains of these were also found in lot SP287.

Excavations in Trench 7 concluded on 20 June 2017. The maximum depth reached in the trench was 1.25 m. bgs (Figures 20 & 21). Due to time limitations, it was not possible to excavate to culturally sterile soil. But based on the maximum depths at which Maya cultural material was found in other trenches excavated at the site it is likely that culturally sterile soil lies within 10-20 cms. below 1.25 m. below ground surface.

Trench 8

Trench 8 was the southernmost of the four trenches excavated during the 2017 field season (Figure 3). It is the only one of the four trenches excavated in 2017 that is situated in San Pedro Town Lot 992 (Figure 2). Measuring 3 m. (N-S) x 2.5 m. (E-W), this trench produced evidence of human occupation and use extending in date from the Middle-Late Postclassic Period to modern times. Unfortunately, a portion of the trench measuring roughly 2 m. (N-S) along the west wall and extending into the trench approximately 40-50 cms. was composed of modern construction material and domestic waste from very recent construction activities on site (Figure 26). This area was not excavated, but concrete, mortar, a variety of metal pieces, glass bottles, plastic containers, and other modern materials were observed.

Trench 8 lies roughly 2-3 m. east of Trench 3, excavated in 1991 by David Pendergast and Elizabeth Graham (Pendergast and Graham 1991). It is also situated just west of a gravel driveway that lies to the rear (immediately west) of the Island Torch Restaurant (Figure 3). With the exception of the 1 m² test pit in Trench 6, Trench 8 made up the smallest excavated area of all four trenches in 2017. Yet it yielded an impressive number of artifacts and faunal material associated with what appear to be the best preserved Maya floors or surfaces of any of those identified in the other three trenches (Figure 26).

Excavations in Trench 8 began on 2 June 2017, seven days after opening the first trenches of the season (Trenches 5 and 6). Although Trench 8 was smaller in area (3m. N-S x 2.5m. E-W) than the other trenches (except the 1 m² test pit in Trench 6), it yielded over 5,200 (n=5,213) Maya, British, and later Belizean artifacts and ecofacts (Table 6). Because of time limitations it was not possible, however, to complete excavations in Trench 8 to the point where culturally sterile soil was encountered. Our excavations ended at approximately 1.3 cm. below ground surface, with the deepest area excavated located along the south wall of the trench (Figures 27 & 28).



Figure 26. Overview of Trench 8. Shown is the unexcavated modern rubbish-filled area extending from the west wall of the trench (bottom of image). Lot SP267, composed of midden material and discontinuous sections of possible Maya flooring (in white), is shown in the process of excavation.

	have		ceramic				shell (artifact/		stone	stone (artifact/	formal	Grand
Lot #	(artifact)	(Maya)	(non- Maya)	glass	metal	plastic	Maya)	Obsidian	(artmact- Maya)	Maya)	material	Total
245		60	117	114	5	1	2		3	6	14	322
256		107	84	148				3	8		0	350
259	4	321	11	30	19		2	4	17		163	571
265		230	4	18	2			5	5	1	47	312
267		234		2	1			11	9		65	322
270	1	789						57	21		520	1,388
273		343						7			68	418
278		608						29	13		623	1,273
284		81						7	6		125	219
285		17							1		19	37
290		1									0	1
Total	5	2,791	216	312	27	1	4	123	83	7	1,644	5,213

Table 6. Summary of Artifacts and Ecofacts from Trench 8.



Figure 27. East wall profile of Trench 8.



Figure 28. South wall profile of Trench 8.

The uppermost 60-70 cms. of the trench consisted of disturbed, dark silty sands that were fairly consistent in color (7.5YR3/1-3/2) throughout. As excavations progressed through the first two arbitrary 15 cm lots (SP245 and SP256) modern and twentieth century materials, such as concrete, metal, and glass dominated the kinds of material remains found, although Maya material, mainly pot sherds, were found mixed in as well. A number of historic ceramic sherds (n=117 in SP245; n=84 in SP256) and pieces of Victorian era and earlier glassware were found in the first two 15 cm. lots of the trench (see Table 6). One of these was a small (9.7 cm. length) patent medicine bottle with the embossed German words "DIE KAISSERLICHE PRIVILEGIRT ATTONATICHE W. KRONESSENTS" spiraling around the bottle from just below the shoulder to the base (Figure 29). This can be translated in English as "The Royal Kaiser Privileged Altona Essence." Another whole patent medicine bottle, measuring 9.5 cm. in length, was embossed with the words "VERMIFUGE" and "B.A. FAHNESTOCKS" was recovered in lot SP256 (Figure 29). Martelle (2018,44) notes that this was one of several 'deworming' medicines that likely would have been "administered in sweetened water and used to combat common parasitic infections that affected both children and adults from all sectors of nineteenth-century society."

As Mayfield notes in Appendix 5, Mean Ceramic Dates for lots SP245 and SP256 were 1894 and 1888, and the MCD for all historic sherds from Trench 8 was 1906. She does note, however, that because of the large number of whitewares produced circa 1820 to the present day, it is likely that the mean dates for Trench 8 as well as the other trenches are skewed slightly forward in time. It may be that other historic temporal markers, such as glassware and nails, are more accurate reflectors of the period in which this area of the site was used for rubbish disposal. The mean glass date for Trench 8 was 1879 and the mean nail date is 1891, for a mean of both of 1885. Some of the glassware included two small, but intact clear and light green tinted bottles, both of which are patent medicine bottles dating to the second half of the nineteenth century (Figure 29).

In the third 15 cm. arbitrary level excavated in this trench (lot SP259) Maya sherds and lithic artifacts greatly outnumbered 20th and 19th Century ceramics, glass, and metal artifacts, the latter of which comprised only about 15% of the total artifacts recovered from the lot. Subsequent, deeper lots (SP267, SP270, SP278, SP284 and SP285) were excavated in undisturbed Maya cultural deposits, two of which, SP270 and SP278, may represent Maya flooring or some sort of prepared surface (lot SP270) and associated occupation debris (see below).

As mentioned earlier, evidence of disturbed deposits in the form of mixed 19th Century and Maya cultural materials extended through the first four 10-15 cm deep lots (SP245, SP256, SP259 and SP265) but mixed cultural deposits disappeared in the last +/-10-15 cms of the lot immediately below SP245, lot SP267 (see Table 6). All of lots below SP267 - SP270, SP278, SP284, SP285 and SP290 (the deepest/final lot in Trench 8) - consisted of entirely Maya cultural material. In order to ensure the recovery of small artifacts and ecofacts excavated in these five particular lots all of the material (soil and possible flooring/surface material and midden material) was sifted using 1/4" hardware mesh.



Figure 29. Die Kaisserliche Privilegirt Attonatiche W. Kronessents patent medicine bottle, lot SP245 (left) and Vermifuge patent medicine bottle, lot SP256 (right), Trench 8. Drawings by Alex Rasmussen.

The mixed 19th Century refuse material found in the upper portion of lot SP267 gave way to what appeared to be largely undisturbed Maya midden dating to the later part of the Postclassic Period. The last or deepest +/-10 cms. of lot SP267 was a dark colored (7.5YR3/1 and 7.5YR3/2) silty sand with abundant, well-preserved faunal remains and impressive amounts of ceramic sherds, obsidian blades, chert tools and debitage. It probably represents a diffuse spread of Maya midden on what is presumed to be Maya flooring or some sort of surface feature found in the lot immediately below, SP270 (Figures 27 & 28). It was the sudden appearance of this pale colored and uniquely textured material below what had been a relatively thick deposit of very dark gray and dark brown silty sand that resulted in the designation of this new lot, SP270.

Some of this possible flooring material, described below, was found in small patches throughout the depth of lot SP267. Only three small, historic (probably 19th Century) artifacts consisting of two small pieces of bottle glass and a small fragment of metal, were found in lot SP267. This lot appears to represent an occupation deposit, probably part of a diffuse but moderately well developed midden, overlying what may represent earlier Maya flooring or at least a surface of some kind not seen in previous excavations at the site (David M. Pendergast, personal communication 2017). In addition to these artifacts over 230 Maya ceramic sherds as well as 20 lithic artifacts, 11 of which were obsidian blade fragments, were recovered in the lot. One of the ceramic artifacts recovered from lot SP267 was a miniature flaring neck jar with two perforated, horizontal strap handles (Figure 30). The slip was not preserved well on the vessel, but its paste surfaces suggest that it had been red slipped, and is therefore most likely a small Payil Red vessel.

In the southeast quadrant of the 3 m. x 2.5 m trench the dark brown coarse sand of Lot SP267 was found overlying a 10-15 cm. deposit of mixed light gray (2.5Y7/1), white (7.5R8/1), pink (5YR7/3), and reddish yellow (5YR7/6) compacted material that was interpreted in the field as possible Maya flooring (Figure 27). The material itself was generally very light in color, with white, off-white, pale gray, pink, and light yellow colors dominating (Figure 31). It was composed of very fine silty clay with very fine sand, and had a 'greasy' kind of texture; when pressed between the thumb and forefinger it 'ribboned' in the same manner as clay does when pressed between one's fingers. In Trench 8 this material, along with the thin deposits of very dark brown (7.5YR3/1 and 7.5YR3/2) soil found between each of these possible floors, was excavated as lot SP270 (Figure 27). This lot ranged in thickness between 10-25 cms. in depth.

Lot SP270 yielded the greatest number of artifacts (n=925) of any of the 11 lots excavated in Trench 8 (see Table 6). A total of 520 pieces of animal bone were found in this lot as well. Nearly 800 (n=789) Maya ceramic artifacts were recovered, including fragments of cream and orange-brown colored griddles with everted rims that Aimers identifies as possible Hubelna system sherds (Appendix 2). Two whole and two partial ceramic spindle whorls were recovered in this lot, along with 84 ceramic fishnet or fishing line sinkers; 33 of these were notched sherds and the remaining 51 were date seed net/line sinkers or *pesas* (Figure 32). Aimers notes that some of the notched sinkers appear to be made of Late Classic Period Belize Group ash-tempered sherds (Appendix 2). Ash tempered sherds have been found throughout the Maya Lowland area, including at Colha and Cuello in northern Belize, and at a variety of sites in the Belize River Valley (Sunahara 2003,132). The presence of these ash tempered sherds provides further evidence of the close economic and possibly political connections that appear to have existed between island and mainland Maya groups in Classic and Postclassic times (Simmons et al. 2018).

In addition to the ceramic artifacts mentioned, lot SP270 yielded 78 lithic artifacts, 57 (73.0%) of which were obsidian. Almost half (46.3%) of all of the obsidian found in Trench 8 came from lot SP270. All of the obsidian pieces found in SP270 were either whole prismatic blades (n=5) or blade fragments (n=52). Seventy percent (69.9%; n=86) of all of the 123



Figure 30. Small flaring neck jar with two perforated, horizontal strap handles. Probably a Payil Red vessel, from lot SP267, Trench 8. Drawing by Alex Rasmussen.

obsidian artifacts found in Trench 8 came from lots SP270 and SP278. Again, these lots may both represent the remains of Maya floors (lot SP270) and their associated midden materials (lots SP270 & SP278).

Thirteen pieces of chert were recovered in lot SP270, including flakes, finished formal tools, and chert tools used for production activities tools. Formal tools include two lenticular bifaces. An oval biface as well as a flake core fragment, both of which had been recycled into hammerstones, were also recovered in lot SP270 along with seven bifacial thinning flakes. Secondary, tertiary and bifacial thinning flakes (n=13) were also found in lot SP270 along with a blocky fragment of chert and a tertiary retouched chert flake. Stemp notes in Appendix 3 that



Figure 31. Sample of sascab-like material that may represent flooring or a prepared surface of some kind from lot SP270, Trench 8.



Figure 32. Date seed and notched net sinkers (*pesas*) from lot SP270, Trench 8. Ceramic spindle whorls, rattles, a lug handle from a large jar, and lithic artifacts are also shown on the left side of the image.

the majority of the chert artifacts recovered during the 2017 field season originated from the Northern Belize Chert Bearing Zone (NBCBZ), and this is true for the chert artifacts recovered in lots SP270 and SP278 as well.

Preservation of organic materials, particularly bone, was very good in lot SP270 as well as in the lot immediately below it, SP278. In fact, together these two lots accounted for nearly one-third (31%) of all of the animal bone recovered at the San Pedro site in 2017. This is partly due to the recovery method used, which entailed sifting all material excavated in lots SP270 and SP278 through 1/4" wire mesh. A total of 520 pieces of bone were recovered in lot SP270, roughly 82% (n=425) of which were from various species of fish, including barracuda (*Sphyraena barracuda*), shark, and stingray (Figure 33). In addition, other fauna preliminarily identified in this lot include various species of turtle, bird, deer, and peccary (*Pecari tajacu*) as well as unidentified rodents and small and small-medium sized mammals (Appendix 4). A total of 623 faunal remains were recovered in lot SP278, most of which were from various species of fish. But pieces of land crab (*Cardisoma guanhumi*) were found, along with small-medium and large mammal bones (including deer) were found, as well as mouse, shark (unidentified species), and barracuda (*Sphyraena barracuda*) bones.

In addition to the impressive numbers of ceramic sherds, lithic debitage and tools, as well as faunal material recovered from lots SP270 and SP278, other artifacts reflecting domestic kinds of activities were found in these lots. These included ceramic spindle whorls, notched and date seed net/line ceramic sinkers, and a scalloped bone object with a straight shaft, possibly a hair pin, which was found in lot SP270 (Figure 34).

If our interpretation is correct that the material excavated as lot SP270 represents Maya house flooring sandwiched between thin, dark layers of occupational refuse (Figure 35), then it is clear that this flooring had been disturbed in at least ten small areas within the trench (Figures 36 & 37). The thin layers of compacted, light colored, 'greasy' feeling material in lot SP270 were interrupted in places by circular or oblong-shaped lenses of sandy soil ranging from very dark brown (7.5YR 3/1) to grayish brown (10YR 5/2) and pale brown (10YR 6/3) in color. Some of these areas may be the result of burrowing land crabs (*Cardisoma guanhumi*) over time, but others, particularly those larger in diameter, may represent places in which the Postclassic Period Maya dug into and below their house floor. In most cases these circular and oblong-shaped lenses of soil extended into the lot directly beneath lot SP 270, lot SP278 (Figures 36 & 37).

In one of these areas, only 32 cms north of the south wall of the trench, was a largely intact, yet fragile, thin-walled Maya ceramic vessel (Figures 36-38). *In situ*, the vessel measured 38 cms. in maximum diameter and +/- 15 cms. in height (its upper edges were broken). The coarse, buff paste vessel was assigned lot SP290 but it's type, unfortunately, could not be identified. All material inside and immediately surrounding the pot was assigned lot number SP273; the lot extended to roughly 10 cms outside the broken rim of the vessel, and from the rim to the vessel's base, or approximately 14 cms. in depth. Underlying the vessel were



Figure 33. Assorted fish and other bones from lot SP270, Trench 8.



Figure 34. Bone hairpin or possible weaving instrument, lot SP270, Trench 8.



Figure 35. East wall profile of Trench 8. Mixed 19th Century and Maya cultural material in the upper dark brown portion of the soil profile. Below that note alternating layers of possible sascab-like floor and dark brown midden deposits near the base of the profile. Also note vertical cut through sandwiched light and dark layers in the approximate center of the image that might represent a posthole. Alternating light colored 'floor' and dark midden layers are SP270 and SP278. Pale tan-white sand below is lot SP284.

alternating lenses of dark brown, black and very pale tan colored sand, into which sets of thin walled ceramic sherds were layered on the east and southeast sides (Figure 36). There were 343 ceramic sherds of varying sizes found in lot SP273, including those that appeared to have been intentionally layered or stacked atop one another around the east and southeast sides of the vessel (Figure 38). Small pockets of what appeared to be charcoal were also noted around the sides, below the base, and inside of the vessel.

Directly beneath what may be Maya flooring or some kind of prepared surface, excavated as lot SP270 (see above), was lot SP278, a coarse light brown (7.5YR 6/4) sand that was found in the southern half of Trench 8. A total of 650 Maya artifacts were recovered in this lot, more than any other lot in Trench 8 except for the lot directly above it, SP270. Over 93% (n=608) of these artifacts were ceramic sherds, including Tulum Plain and Navula system



Figure 36. Plan of base of Lot SP278/surface of underlying lot SP284. Sandy soil directly below probable *sascab*-like flooring in lower right was punctuated by small pits that had been dug through the flooring and subsequently filled with dark colored soils.



Figure 37. Lot SP284 in progress, with unidentified ceramic vessel and vessel fragment shown in lower right corner of the image. Note dark colored pockets of soil likely representing pits dug through the floor by the Maya on the right of the image, and dense cluster of conch shells slightly behind and to the lest of the menu board.



Figure 38. Largely intact ceramic vessel (unidentified type) *in situ* with stacked sherds to the side and below the vessel. Lot SP290, Trench 8.

sherds, several from a frying pan censer. Two small, thick-walled perforated censer bowl fragments were also found in this lot (Figure 39). Obsidian blades and blade fragments (n=29) were recovered in lot SP278 along with chert biface thinning flakes, tertiary flakes, several (n=3) blocky chert fragments, and a very finely crafted lenticular biface (Figure 40). This lot produced the greatest number of animal bones (n=623) found in Trench 8, exceeding even the amount (n=520) recovered in the lot above it, SP270 (Table 7). Various (but not yet unidentified) species of bony fish, as well as shark, deer, iguana, mouse, sea turtle, and a variety of small, medium and large mammal species (also not yet identified) were represented in this lot. Small chunks as well as scattered flecks of charcoal were also encountered throughout this lot.

Below lot SP278 a coarse, light gray (7.5YR 7/2 and 10YR 7/2) sand deposit was excavated in the southeast quadrant of the trench as lot SP284. This was the deepest lot excavated in Trench 8 (Figure 28). Maya artifact densities declined in this lot in comparison with those found in the two lots immediately above SP284 (lots SP270 and SP278). Ceramic sherds (n=81), obsidian blade fragments (n=7), chert flakes (n=6), and 125 pieces of bone (120 of which were fish) were recovered from this lot, which extended to between 100-120 cms. below the existing ground surface.



Figure 39. Perforated incensario fragments from Lot SP278, Trench 8.



Figure 40. Lenticular chert biface from Lot SP278, Trench 8. Drawing by Alex Rasmussen.

	Trench 8 Lot Numbers												
Common name of Fauna	245	259	265	267	270	273	278	284	285				
anteater		1								1			
barracuda		34	5		5		3			47			
bird/large					2					2			
bird/medium					3					3			
bird/medium-large					1					1			
bird/small				3						3			
bird/small-medium					3					3			
cow	5	6	1							12			
crab					45	11	39	2		97			
crocodile													
deer		9			10		9			28			
dog													
Drums and Croakers (fish)		3			11		12			26			
fish/bony (large)					2					2			
fish/bony (medium-large)				37		24				61			
fish/bony (medium)		4		3						7			
fish/bony (small-medium)						31		120	18	169			
fish/bony (small)													
fish/bony (UNID)	4	29	19							52			
fish/bony (var.)					402		527			929			
Gibnut (Paca)													
iguana							4			4			
mammal/large	1	25	17		7		14			64			
mammal/medium					2				1	3			
mammal/medium-large		7		2						9			
mammal/small		1		1	7	1		3		13			
mammal/small-medium		2		5	4		8			19			
mammal/UNID		5								5			
manatee (W. Indian)		1								1			
mouse (New World)							5			5			
pig/peccary		8	2		2					12			
rat (New World)		1								1			
rodent/medium					2					2			
shark					1		1			2			
sting ray					4					4			
turkey	4	4	2	1						11			
turtle		23	1	13	7	1	1			46			
Grand Total	14	163	47	65	520	68	623	125	19	1644			

Table 7. Summary of Faunal Material from Trench 8 lots.

At this time, it remains unclear how deeply buried the earliest Maya occupation debris are found in this particular area of the San Pedro site. Time constraints did not permit us to excavate the trench to culturally sterile soil. It seems very likely that these soils would have been encountered, however, within perhaps as little as 20-30 cms below the level at which were forced to conclude our work in Trench 8. Allowing for some variation in subsurface topography, it is likely that Maya cultural materials extend to no more than between 2.0-2.25 m. below the existing ground surface at the San Pedro site as a whole, including in Trench 8.

Summary and Conclusions

Investigations at the San Pedro site in 2017 were focused on obtaining as much information as possible about this late Maya island community within the parameters of a fourweek long archaeology field school season. Each of the four trenches excavated on the Parham Plaza Hotel property yielded additional information on coastal Maya life on the eve of Spanish contact. Work at the site substantially expanded the corpus of Maya material culture from the last centuries of the Postclassic period. This alone is significant because the San Pedro site is the only known site on Ambergris Caye that was occupied by the Maya during the Late Postclassic Period and into at least the early part of the Spanish Colonial Period. As a result, the site holds tremendous potential for illuminating aspects of coastal Maya life in northern Belize during the final centuries prior to and after Spanish contact. In addition, we recovered over 4,000 historic (colonial and later) artifacts, many of which date to the last quarter of the nineteenth century. Further examination of the glassware, ceramics, nails, and other historic objects that were found will allow us to gain a better understanding of how San Pedro developed and grew from a small settlement of Caste War refugees from Yucatan to a prosperous community in what would later become British Honduras and eventually Belize.

In terms of its approximate length of Maya occupation, it appears that the San Pedro site existed as a small fishing community for no more than around two to two and a half centuries, or several generations, at best. Based on the near-absence of Early and Middle Postclassic Period (and earlier) ceramic and lithic artifacts, the San Pedro site was probably first settled by around AD 1400. The earliest settlers may have been migrants from the Maya community at Marco Gonzalez, where elevated sea level rise and siltation led to mangrove encroachment and eventual abandonment of the community (Dunn and Mazzullo 1993; Graham et al. 2016). San Pedro has yielded only a very small amount of Spanish Colonial cultural material, mainly olive jar sherds, suggesting that Maya occupation of the site may have extended into the first decades of the seventeenth century, but not much beyond. This was likely due to the raiding and privateering that took place along the coast of Belize by the mid-1600s, making the Maya residents of San Pedro vulnerable to attacks by both the English and Spanish (Camille and Espejo-Saavedra 1996,77).

Our work in 2017 in many ways strengthens interpretations made by Pendergast and Graham about the site in the 1990s. In discussing San Pedro, they note that the site was "originally a village of thatched structures strung along the beach ridge on the windward side of

Ambergris Caye, it now consists of a metre or so of dark brown soil, the product of many years of living by a good many families" (Pendergast and Graham 1991,1). The idea that it was primarily a Maya domestic site occupied by fisherfolk was based in large part on the presence of dense midden accumulations of household refuse, human burials, and some areas that were interpreted as compacted sand surfaces, possibly flooring (David Pendergast, personal communication 2017). Compacted sand surfaces that may have served as flooring were identified in Trenches 5 and 7 (see above) and in the area just west of Trench 8 excavated in the 1990s. But the results of ACAP II investigations in 2017 suggest that at least some of these thatched structures were floored or surfaced with a clay-like marl or lime-rich mud or mudstone containing varying amounts of both fine clays and silt. Relatively thin (+/- 5 cms.) deposits of this pale white/reddish yellow/light gray material, which had relatively flat upper and lower surfaces, were found in several areas of the site (see above discussion). Most of these were separated from each other by thin bands of very dark soil containing dense accumulations of Maya cultural material and ecofacts.

In his study of Maya floor features Littmann (1967,523) found that "the use of burned earth or clay as an element of a floor was rather widespread and appeared to be deliberate rather than the result of the burning of flammable super structures." The greasy-textured claylike material that may represent some kind of prepared surface, possibly flooring, in some ways resembles moist *sascab*. Wernecke (2008,203) notes that "*sascab* is a naturally occurring saprolitic limestone that, when wet, forms a white clay-like paste that dries to a cement-like hardness." Before the onset of the rainy season in summer 2017 this material was described in excavators' field notes as being extremely hard and compact, making it somewhat of a challenge to excavate. Once it became moist from rainfall and increased humidity, however, this material had the same characteristics as the *sascab* Wernecke (2008) described above. We identified at least two separate domiciles, one in Trench 7 and the other in Trench 8, that had these thin *sascab*-like and sand packed floors punctuated by numerous post and pit features and sub-floor burials. Collected samples of this material await detailed compositional analysis, and future excavations will hopefully provide additional information on its function(s) and areal distribution.

In all cases, this light colored, clay-like material was closely associated with what were typically dense deposits of Maya artifacts, ecofacts, and charcoal in very dark grayish brown silty soil. These deposits most likely represent household refuse or occupation debris. In one case (Trench 8), several of these thin, pale-colored layers of possible flooring were found sandwiched between thin layers of this very dark gray brown soil that contained abundant artifacts and ecofacts. Faunal material was particularly well preserved in these dark brown deposits. It is possible that the *sascab*-like deposits we encountered represent re-flooring episodes separated by accumulations of Maya occupation debris. The very dark gray brown soil is quite similar to the "dark earth" Elizabeth Graham and her colleagues have reported from Marco Gonzalez (Graham et al. 2015; Macphail et al. 2017), and the anthrosols that Dunn & Mazzulo (1993:129-130) found at the Paradise Hotel and the Rosalita site in San Pedro Town. In the eastern portion of the site none of this possible flooring or prepared surface material was

encountered, however a +/- 35 cm. thick dark midden deposit containing abundant Late Postclassic Period ceramic and lithic artifacts and ecofacts was encountered in Trench 6.

In the southern part of the site in Trench 8 the floor-like surfaces were punctuated by a number of what appear to be sub-floor pits, most of which were filled with dark colored sandy soils. Some of these may simply represent land crab burrows, and the presence of crab shells in these particular lots supports this idea. Yet other pits were most likely created by the Maya inhabitants of the site. Into two of these pits were placed utilitarian ceramic vessels of unidentified type(s). In addition, at least two of these floor disturbances likely represent post features (see Figures 35-37). Unfortunately, although this probable flooring/prepared surface material was identified in other parts of the site, specifically in Trenches 5 and 7, the only intact/undisturbed Maya flooring was found in Trench 8, the southernmost excavation in 2017. Future work should be focused on further exploration of this area, as intact Maya features, abundant cultural material, and very good faunal preservation warrant additional work there.

Ceramic artifacts made up a substantial part of the full assemblage of Maya cultural material recovered in 2017, where they were especially dense in these dark midden deposits. Of the 12,620 total artifacts recovered in 2017 excavations, 6,334 (50.2%) were pieces of Maya pottery or, in several cases, whole Maya vessels. Aimers (Appendix 2) reports that 98% of the 1052 sherds found in 2017 that could be assigned to a chronological period with some confidence date to the Late Postclassic Period. The main types were red-slipped Red Payil Group types (Payil Red and Palmul Incised), which Aimers and colleagues (2012,428) note are types within the Red Payil Group of Tulum Red Ware.

Along the east coast of Yucatan red-slipped Red Payil Group types are ubiquitous in very late precolumbian contexts, leading Mock (2003,431) to comment that "Payil Red is a tenacious Postclassic marker". Payil Red sherds recovered at the San Pedro site in 2017 were commonly fragments of dishes. These dishes had hollow, tripod feet that were either vented and unvented, had outflaring walls, and sag bottom bases. Most of the feet were either hollow tubular or cylindrical with two vents or scroll/slipper feet with one or two vents. Two of these ceramic feet were effigies - one of these was a hollow human head with the eyes serving as vents (Figure 24) and another was a bird (owl?) with an open mouth as a vent (Figure 12). Other Payil Red vessel pieces were from ollas and bowls. The red-slipped dishes were likely food serving vessels, while the ollas were likely used for cooking and storage or water and/or dry foods.

Red Payil Group types have been reported from a number of sites situated on the coast or along navigable waterways in northern Belize, including Caye Coco, Laguna de On, Cerros (Cerro Maya), Santa Rita Corozal, Lamanai, Patchchacan, and Sarteneja, as well as at Ek Luum, Marco Gonzalez, and Los Renegados on Ambergris Caye (Aimers 2009; Boxt 2005; Chase 1982; Masson 2000; Masson and Rosenswig 2005; Sidrys 1983; Rosenswig and Masson 2002; Valdez et al. 1995; Walker 1990). Red Payil group ceramics are abundant along the coast of Quintana Roo as well (see Smith 1971 and Sanders 1960), which suggests northern and coastal trade connections for the Maya of San Pedro. Other ceramics encountered in these deposits include unslipped bowl and jar styles in the Unslipped Navula Group, and Hubelna Unslipped, which is a thick, soft, vesicular pottery thought to have been used for griddles (Appendix 2).

In addition to the 6,300 + sherds and the three whole or nearly whole ceramic vessels recovered at the San Pedro site in 2017, ceramic censer bowl and handle fragments as well as notched sherds and molded ceramic "date seed" net or line sinkers for fishing were recovered (Figure 32). Notched sherds and molded net/line sinkers are collectively called *pesas*, while the latter have also been called pellet weights, bead weights, and *perlas* (Rice et al. 2017,22-24). Both notched sherds as well as date seed net sinkers or *perlas* are ubiquitous at Lowland Maya sites, however it appears that in some parts of the Lowlands, including the Petén Lakes region, date seed net sinkers are unique to the Postclassic Period (Garber 1989,77, 87; Rice et al. 2017,24). Excavations in the Spanish Church Zone at Lamanai have yielded a preponderance of date seed net sinkers or *perlas* in Late Postclassic and Spanish Colonial period deposits (Simmons 1999, 2004, 2005, 2006, 2009; Simmons and Howard 2003). Both notched sherds and molded *perlas* were recovered together in lots with Late Postclassic sherds, such as in the well-preserved Maya midden and possible floor deposits of lots SP270 and SP278 in Trench 8 (see above discussion).

The majority of notched sherds recovered were made from Postclassic vessel fragments. But paste and surface treatment characteristics of some of the notched sherds recovered in 2017 suggest that the San Pedro Maya used broken pots from the Late Classic Period to make line and net sinkers in Postclassic times. Curiously, very few Classic Period ceramic sherds were recovered during the 2017 field season (see Appendix 2). Notched fishing weights and molded *perlas* of several different types and sizes were recovered in 2017 excavations at the San Pedro site (Figure 32). It is likely that variation in size (specifically weight) between these can be attributed to the different kinds of fishing gear (lines or nets) and the specific environmental settings in which they were used.

Larger, heavier *pesas* would have been necessary for Maya fisherfolk to use in settings in which rough or turbid water was found, as well as in deep waters along the Caribbean coast (Rice et al. 2017,22). These larger and heavier ceramic weights would have been ideal for cast nets as well as larger seine nets and fishing lines used both inside and beyond the reef. Smaller and lighter ceramic weights were ideal for use in shallower, calmer waters, such as those found on the leeward side of the caye and in the shallow channels and mangrove lagoons found on the island. Ancient Maya fishing activities would have taken place in the full complement of habitats in and around the caye such as the deep sea beyond the reef, the inter-reefal lagoon, the leeward lagoonal environment, and the various channels or bogues associated with waters off the southwestern and northern ends of the island. The variety and abundance of species associated with these areas include tarpon, bonefish, permit, snapper, barracuda, wahoo, and king mackerel or 'king fish' (CZMAI 2016,23).

Other ceramic artifacts recovered in 2017 include small numbers of censer fragments and spindle whorls (Figure 32). Several badly eroded censer fragments that resemble the forms of Zakpah Group censers from Lamanai and Marco Gonzalez were recovered along with a
censer pedestal fragment that may be from a Late Postclassic Chen Mul Modeled System effigy censer. In addition, two unslipped body sherds with grouped perforations were recovered along with a cup and handle fragment of a ladle or frying pan-type incensario (censer) in dark brown soil that represents Late Postclassic midden in Trench 8. The perforated sherds were evidently from small, globular, colander-like vessels with restricted orifices (+/- 6-8 cms in dia.). Based on their size (height estimated at 8-10 cms.) and comparatively sharp degree of curvature, the perforated unslipped sherds may be of a type discussed briefly by Masson and Rosenswig (2005,366) as Laguna Perforated. They describe this type as "a miniature colander bowl type that is found infrequently" at Caye Coco, located at Progresso Lagoon in northern Belize. They also might be similar to a type mentioned briefly by Masson (1999,56) as Onha Perforated, sherds of which were found at another Late Postclassic site on the mainland in northern Belize, Laguna de On. Onha Perforated is described as a colander type incensario, and the blackened condition of the interior surfaces of the two sherds recovered in Lot SP278 in Trench 8 suggests that these sherds were also parts of colander type incensarios. It is unclear, however, if they represent either the Laguna Perforated or Onha Perforated types (see Figure 39).

Ball (1985,74, 81) has noted that this perforated colander type of non-effigy censer "is still widely used in religious ceremonies by the Yucatec Maya of today". The perforations would allow smoke from burning incense to escape, and judging from their heavily blackened interior surfaces, the vessels of which these sherds were a part had been used repeatedly prior to their disposal. Small, perforated incensario bowl fragments have been reported from other coastal and riverine sites in northern Belize, including Saktunja and Laguna de On (Masson 1999,56; Mock 2003,433). Similar small, globular ceramic vessels with perforations were reported at Mayapán. Smith (1971,112-113) refers to these as "rattlelike devices" and each of the two artifacts illustrated has a handle-like remnant that appears to be hollow. So, these differ somewhat from the types of vessel fragments found in the midden deposit in Trench 8.

Like the perforated colander-types sherds, the ladle or frying pan fragments represent a second non-effigy type of incensario recovered during 2017 excavations. Rice (1999,40) believes that spiked censers, and less commonly ladle or frying pan censers with handles, appear in the southern lowland area in Late Preclassic times, but by Terminal Classic times many non-effigy incensarios were either spiked hourglass-shaped or ladle forms. The production and use of ladle incensarios extends through the Postclassic Period and into Spanish Colonial times. Hollow handled, with or without animal effigies, they were common throughout the Maya lowlands, and have been recovered from sites as far east as the Naco Valley in Honduras and the Cerén site in El Salvador, to northern Yucatan at Chichen Itzá, Mayapán, Xuenkal and Becan, to the west in the Petén Lakes region, and throughout Belize at sites such as Santa Rita Corozal, Cerros (Cerro Maya), Chan Chen, Patchchacan, and the north Stann Creek River Valley (Ball 1985,75; Ball and Ladd 1992,197; Chase 1988,96; Graham 1985,226; Olvera 2013,125; Rice 1987,176-177; Sheets 2000,224; Sidrys 1983,257; Smith 1971,54; Walker 1990,428; Wonderley 1985,261). Along with the colander type globular censers, these small, non-effigy ladle incensarios may have been a mainstay for at least some San Pedro Maya families' rituals, as they likely were in other Mesoamerican households.

A small number (n=7) of undecorated ceramic spindle whorls were recovered during 2017 excavations at the San Pedro site (Figure 32). These small, perforated weights for spinning plant fiber (most likely cotton) into thread are very similar in size, shape, and method of manufacture to those reported on by Garber (1995,134-137) from Ek Luum and Chac Balam, two sites in northern Ambergris Caye investigated during the ACAP I project. Spindle whorls have long been one of the artifacts most closely identified with the production of textiles (Chase et al. 2008,127). Although Diego de Landa (Tozzer 1941,200) commented that "cotton is gathered in wonderful quantity and grows in all parts of this land" it is not clear how much of the coastal canoe trade in cotton clothing the San Pedrano Maya were engaged in and how this engagement waxed and waned through time. Cotton was certainly one of the most widely used trade goods during the Postclassic Period (Smith 2003,Table 18.3), and there is some indication that cotton was grown on the caye in historic times (Wood et al. 2019,Plate VI).

In terms of lithic material a total of 521 pieces of flaked or chipped stone was found at the San Pedro site in 2017 (see Appendix 3). Obsidian comprised nearly 60% (n=309; 59.3%) of the flaked lithic material while chert and to a much lesser extent chalcedony and limestone made up approximately 40% (n=212; 40.7%) of the flaked stone assemblage. Most of the obsidian (n=302; 97.7%) artifacts recovered were non-cortical prismatic blade fragments. The assemblage was examined macroscopically by Stemp, who concludes that most (72.5%) likely originated from the Ixtepeque source in southeastern Guatemala (see Appendix 3). Given the Late Postclassic date of the San Pedro Maya site this is consistent with the general pattern seen at other coastal sites in the Southern Lowlands during this time period (see Braswell 2003,Table 20.3).

Most of the chert artifacts found at the site were made from stone derived from the Northern Belize Chert Bearing Zone, as would be expected given the site's proximity to that area of the northern Belize mainland. Formal tools, comprising about 20% of the entire lithic assemblage, consisted mainly of lenticular bifaces and some oval forms (Figures 8, 25 and 40). Stemp believes the majority of these bifaces were probably obtained from Early and Middle Postclassic workshops at Colha, as they are nearly identical to forms reported on from that site (see Appendix 3). They were carefully curated by the Maya, perhaps over several generations, and some were resharpened and recycled into other forms.

Finely made lenticular (laurel leaf and lozenge) bifaces would have been ideal for spear fishing both inside and outside the reef as well as in the more shallow, calmer waters on the leeward side of the caye and in mangrove lagoons throughout the island. Other chert objects, including flake tools, as well as obsidian blades, were almost certainly used for processing fish. It is likely that microscopic examination of obsidian blades would reveal use wear patterns consistent with fish scaling and cutting activities, as the density of fish bones in midden deposits supports the idea that fish made up a significant part of the diet of the San Pedrano Maya. Only two small side-notched projectile points were recovered in 2017, although this is a type that is quite common in Late Postclassic and early Spanish Colonial Period lithic assemblages (Meissner 2014; Pendergast et al. 1993,67). Informal flake tools and debitage make up the remainder of the chert sub-assemblage. Most of these were non-cortical flakes, suggesting that primary reduction activities were done elsewhere, most likely on the mainland where finished tools were exported to island communities such as San Pedro. Hence, many of the flakes were the result of re-sharpening work rather than the product of initial tool production.

Over 3,600 (n=3,680) animal bones were recovered in 2017 at the San Pedro site (Appendix 4). Over half of these (n=2,024; 55%) were from various fish species, while mammals comprised 20% (n=746; 20.2%) of the diet of the San Pedro Maya. The fish were from pelagic (deep water), near-shore (inter-reefal), and lagoonal bodies of water. In short, all types of marine environments were exploited by the San Pedro Maya. These findings are consistent with marine resource consumption patterns observed earlier by Williams and her colleagues at Marco Gonzalez and San Pedro (Williams et al. 2009,48). Mammal species are represented by the brocket and white-tailed deer (*Mazama americana* and *Odocoileus virginianus*), dog (*Canis lupus famililaris*), manatee (*Trichechus manatus*), peccary (*Pecari tajacu*), gibnut (*Agouti paca*), and an as yet unknown number of other mammal species that have not been identified. Various species of birds comprised over 3% (n=132; 3.6%) of the total faunal assemblage from San Pedro in 2017. These avian species were dominated by turkey (*Meleagris sp.*) and other as yet unidentified small to large types of birds. Domesticated animal species consumed by British colonial and later San Pedrano Belizeans include chicken (*Gallus gallus domesticus*), cow (*Bos taurus*), and pig (*sus scrofa*).

The Maya of San Pedro continued a tradition of burying their dead in a particular manner that is seen only on Ambergris Caye and a few other sites on the mainland, namely Barton Ramie, Colha and Lamanai (Simmons et al. 2018,334-335). The single burial identified in 2017 was found in a prone position with the legs bent back at the knees so the feet were resting on the back of the pelvis (see Figures 13 & 14). This follows a pattern observed at the Parham property and elsewhere in San Pedro town wherein 46 of the 48 (96%) burials identified (most during salvage excavations) were found in the prone position with the legs bent back so that the feet were on pelvis. The legs of these individuals were presumably tied back just prior to interment (Graham et al. 2013,175). A slightly different version of this burial type is seen at the site of Chac Balam, on northern Ambergris Caye, as well as at Marco Gonzalez, near the south end of the island, but these burials date to Terminal Classic times (Simmons et al. 2018). At Lamanai these types of interments date to the Early-Middle Postclassic Period. So, at present it is unclear why the Maya of San Pedro continued a tradition that began on the island five centuries or so earlier, then was continued several centuries later by the Maya at Lamanai. What is clear is that sustained contact between Maya groups living at island and mainland sites in northern Belize took place over many centuries (Simmons and Graham 2016; Simmons et al. 2018). The interactions Maya islanders enjoyed with their mainland counterparts at sites such as Colha and Lamanai undoubtedly resulted in the exchange of not only trade goods and commodities, but also ideas and certain cultural beliefs. Perhaps this unique burial practice reflects one aspect of a shared ideology or worldview that had some longevity, appealing to certain Maya groups over a roughly five century span of time. The range and quality of ceramic and lithic objects acquired by the Maya of Ambergris Caye leaves little doubt that vibrant social and economic connections existed between mainland and island Maya groups during Postclassic times. The waterborne trade in goods and commodities that was thriving along Belize's coast and beyond during the final centuries of the Postclassic Period provided the Maya of San Pedro with high quality chert from nearby mainland sources in northern Belize, and equally high-quality obsidian from more distant sources, specifically the highlands of southeastern Guatemala. They used these tools to hunt and process various species of fish from different ecozones in the marine environment, and they also consumed meat from mammal species indigenous to the island. Taken together, the various lines of evidence suggest that the San Pedro Maya lived in a community of thatched houses strung along the beach ridge overlooking the Caribbean Sea for around two centuries just prior to the arrival of Europeans. Some or most may have been migrants from Marco Gonzalez, located roughly six miles south of San Pedro, and they appear to have abandoned the site sometime shortly after the arrival of the Spanish in Yucatan.

Modern and Colonial era cultural material made up over one-third (n=4,693; 37.2%) of the artifacts recovered at the San Pedro site in 2017 (Appendix 5). The distinction between colonial and modern materials was based on a date of 1930 (see Lab Methods section). It is clear from the variety seen the ceramic and glass sub-assemblages that early San Pedrano settlers had access to global markets that connected the young colony to the rest of the Caribbean and the world beyond. Feature 4 in Trench 7 and Feature 3 in Trench 6 represent the remains of historic structures of some sort that to our knowledge have not been documented prior to now. It is unclear what function(s) these features may have had, although the concrete pad (Feature 3) found nearest to Barrier Reef Drive and the town square may have been used during the 1960s-1980s for several purposes, including (according to local legend), as the shop for a curandero or healer.

The density of historic era materials, including a number of chamber pots along with a wide variety of ceramic forms, colors, and designs suggests that a boarding house or communal dumping area may have been located on the Parham family property in the mid to latenineteenth century (see Appendix 5). Further research of historic documents, including photographs, maps and land records may reveal more about the land use history of the Parham family property over time. Much more work needs to be done to illuminate the lives of the nineteenth century residents of San Pedro Town, specifically the Caste War refugees who settled the caye sometime in the middle of the century. These are the ancestors of the families of San Pedro, and these families deserve to know as much about their past as is possible.

In conclusion, the San Pedro site is a unique and significant site in several respects. First, it is the only Maya site on Ambergris Caye that has yielded evidence of occupation during the Late Postclassic and Spanish Colonial Periods. Because of this the site can provide valuable information on the nature of Maya life on the eve of Spanish conquest. Additional archaeological research at San Pedro can also provide a more nuanced understanding of the profound cultural transformations that took place between precolumbian and Spanish Colonial times. Second, it is the only archaeological site on any of the country's offshore islands that is

found in an urban setting, below one of Belize's most rapidly growing towns. As a result, the site is particularly vulnerable to disturbance and possibly destruction caused by continued urban development, and thus it is important to take steps to minimize the impacts of development activities on this site. Indeed, since the boundaries of the San Pedro site have not yet been delineated it is important that San Pedranos living and working in the immediate vicinity of the Parham Plaza Hotel be aware that any subsurface digging may damage the site and result in the loss of important parts of their cultural heritage. Another, longer-term threat to the San Pedro site as well as all others on the island is sea level rise (IPCC 2014). If we are to learn as much as we can about the various human inhabitants of Ambergris Caye over the long span of time the island has been settled it is imperative that we address these issues as thoughtfully and yet promptly as possible.

References Cited

- Acosta, Charles A. and Mark J. Butler IV. 1997. Role of Mangrove Habitat as a Nursery for Juvenile Spiny Lobster, *Panulirus argus*, in Belize. *Marine and Freshwater Research* 48(8): 721-728.
- Aimers, James J. 2009. Bring it on: Using Ceramic Systems at Lamanai. *Research reports in Belizean Archaeology* 6:245-251.
- Aimers, James J., Elizabeth Haussner, Dori Farthing, and Satoru Murata. 2016. An Expedient Pottery Technology and Its Implications for Ancient Maya Trade and Interaction. In *Perspectives on the Ancient Maya of Chetumal Bay*, edited by Debra Walker, pp, 149-161. Gainesville: University Press of Florida.
- Aimers, James J., Dori J. Farthing, and Aaron N. Shugar. 2012. Handheld XRF Analysis of Maya Ceramics: A Pilot Study Presenting Issues Related to Quantification and Calibration. In *Handheld XRF for Art and Archaeology*, edited by Aaron N. Shugar and Jennifer L. Mass, pp. 423-448. Leuven University Press, Leuven, Belgium.
- Aimers, James J., Elizabeth Haussner, Dori Farthing, and Satoru Murata. 2016. An Expedient Pottery Technology and its Implications for Ancient Maya Trade and Interaction. In *Perspectives on the Ancient Maya of Chetumal Bay*, edited by Debra S. Walker, pp. 149-161. Gainesville: University of Florida Press.
- Auil, Nicole E. 1998. *Belize Manatee Recovery Plan*. United Nations Development Programme/Global Environmental Facility Coastal Zone Management Project, Belize. Belize City: Angelus Press.
- Ball, Joseph W. 1985. The Postclassic the Wasn't: The Thirteenth- through Seventeenth-Century Archaeology of Central Eastern Campeche, Mexico. In *The Lowland Maya Postclassic*, edited by Arlen F. Chase and Prudence M. Rice, pp. 71-84. Austin: University of Texas Press.
- Ball, Joseph W. and John M. Ladd. 1992. Ceramics. In Artifacts from the Cenote of Sacrifice, Chichen Itza, Mexico, edited by Clemency C. Coggins, pp. 191-234. Memoirs of the Peabody Museum of Archaeology and Ethnology, Volume 10, Number 3. Cambridge: Harvard University.

Bolland, O. Nigel. 1988. Colonialism and Resistance in Belize. Benque Viejo: Cubola Productions.

Boxt, Matthew A. 2005. Settlement and Chronology at Sarteneja, Belize. In *Archaeology Without Limits: Papers in Honor of Clement W. Meighan*, edited by Matthew A. Boxt and Brian D. Dillon, pp. 389-416. Labyrinthos Press, Lancaster, California.

- Braswell, Geoffrey E. 2003. Obsidian Exchange Spheres of Postclassic Mesoamerica. In *The Postclassic Mesoamerican World*, edited by Michael E. Smith and Frances F. Berdan, pp. 131-158. Salt Lake City: University of Utah Press.
- Camille, Michael A. and Rafael Espejo-Saavedra. 1996. Historical Geography of the Belizean Logwood Trade. *Yearbook, Conference of Latin Americanist Geographers* 22:77-85.
- Cardona, Malikah and Kamilah Cardona. 2009. Revised Master Development Plan for Ambergris Caye. Report prepared for the Belize Coastal Zone Management Authority and Institute.
- Chamberlain, Robert S. 1948. *The Conquest and Colonization of Yucatan, 1517-1550.* Washington: Carnegie Institution.
- Chase, Diane Z. 1982. Spatial and Temporal Variability in Postclassic Northern Belize. PhD diss., University of Pennsylvania.
- Chase, Diane Z. 1988. Caches and Censerwares: Meaning from Maya Pottery. In A Pot for All Reasons: Ceramic Ecology Revisited, edited by Charles C. Kolb and Louana M. Lackey, pp. 81-104.
- Chase, Diane Z. and Arlen F. Chase. 2006. The Dawn of Maya Civilization: Preclassic Period Archaeology from Santa Rita Corozal. *Research Reports in Belizean Archaeology* 3:85-100.
- Chase, Arlen F., Diane Z. Chase, Elayne Zorn and Wendy Teeter. 2008. Textiles and the Maya Archaeological Record. *Ancient Mesoamerica* 19:127-142.
- Chase, Arlen F., Diane Z. Chase, John F. Weishampel, Jason B. Drake, Ramesh L. Shrestha, K. Clint Slatton, Jaime J. Awe, and William E. Carter. 2011a. Airborne LiDAR, Archaeology, and the Ancient Maya Landscape of Caracol, Belize. *Journal of Archaeological Science* 38:387-398.
- Chase, Arlen F., Diane Z. Chase, Jaime J. Awe, John H. Walker, and John F. Weishampel. 2011b. Airborne LiDAR at Caracol, Belize and the Interpretation of Ancient Maya Society and Landscapes. *Research Reports in Belizean Archaeology* 8:61-73.
- Chase, Arlen F., Diane Z. Chase, Jaime J. Awe, John F. Weishampel, Gyles Iannone, Holley Moyes, Jason Yaeger, Kathryn Brown, Ramesh L. Shrestha, William E. Carter, and Juan Fernandez Diaz. 2014. Ancient Maya Regional Settlement and Inter-Site Analysis: The 2013 West-Central Belize LiDAR Survey. *Remote Sensing* 6:8671-8695. doi:10.3390/rs6098671
- Cherrington, Emil A., Betzy E. Hernandez, Noel A. Trejos, Octavio A. Smith, Eric R. Anderson, Adrica I. Flores, and Bessy C. Garcia. 2010. Technical Report: Identification of Threatened and Resilient Mangroves in the Belize Barrier Reef System. Water Center for the Humid

Tropics of Latin America and the Caribbean (CATHALAC) and World Wildlife Fund (WWF). Panama City, Panama.

- Clendinnen, Inga. 1987. *Ambivalent Conquests: Maya and Spaniard in Yucatan, 1517-1570.* Cambridge: Cambridge University Press.
- Coastal Zone Management Authority and Institute (CZMAI). 2016. *Ambergris Caye Coastal Zone Management Guidelines. Belize Integrated Coastal Zone Management Plan.* CZMAI, Belize City, Belize.
- Cobos Palma, Rafael. 2016. Belizean Trans-Shipment Maritime Ports: Their Role in Chichen Itzá's Economy. *Research Reports in Belizean Archaeology* 13:329-335.
- Cochran, Jennifer L. 2005. The Role of Marine Shell Production During the Early and Middle Preclassic at the Site of Blackman Eddy, Belize. In *The Belize Valley Archaeology Project: Results of the 2004 Field Season*, edited by James F. Garber, pp. 42-61. San Marcos, Texas: Southwest Texas State University.
- Colón, Ferdinand. 1959 [1502]. *The Life of the Admiral Christopher Columbus by his Son, Ferdinand* (trans. B. Keen). New Brunswick, New Jersey: Rutgers University Press.

Dobson, Narda. 1973. A History of Belize. London: Longman Group Limited.

- Driver, David, Thomas H. Guderjan, and Lisa Brody-Foley. 1995. Excavations and Architecture of San Juan, Chac Balam, and Ek Luum. In *Maya Maritime Trade, Settlement, and Population on Ambergris Caye, Belize*, edited by Thomas H. Guderjan and James F. Garber, pp. 9-30. Lancaster, California: Labyrinthos Press.
- Dunn, Richard K. and Sal J. Mazzullo. 1993. Holocene Paleocoastal Reconstruction and its Relationship to Marco Gonzalez, Ambergris Caye, Belize. *Journal of Field Archaeology* 20(2): 121-131.
- Gann, Thomas. 1918. The Maya Indians of Southern Yucatan and northern British Honduras. Bureau of American Ethnology Bulletins 64. Washington, D.C.: Smithsonian Institution Press.
- Gann, Thomas. 1926. Ancient Cities and Modern Tribes: Exploration and Adventure in Maya Lands. London: Duckworth Publishing.
- Garber, James F. 1995. The Artifacts. In *Maya Maritime Trade, Settlement, and Population on Ambergris Caye, Belize*, edited by Thomas H. Guderjan and James F. Garber, pp. 113-137. Culver City, California: Labyrinthos Press.
- Garber, James F. 1989. *Archaeology at Cerros, Belize, Central America. Volume II: The Artifacts.* Dallas: Southern Methodist University Press.

- Gischler, E., Hudson, H.J. 2004. Holocene development of the Belize Barrier Reef. *Sedimentary Geology* 164: 223-236.
- Government of Belize. 2019. "Bacalar Chico Marine Reserve and National Park." Accessed March 5, 2019. http://www.fisheries.gov.bz/bacalar-chico/.
- Graham, Elizabeth. 1994. The Highlands of the Lowlands: Environment and Archaeology in the Stann Creek District, Belize, Central America. Monographs in World Archaeology No. 19. Prehistory Press, Madison, Wisconsin and The Royal Ontario Museum.
- Graham, Elizabeth. 1985. Facets of Terminal to Postclassic Activity in the Stann Creek District, Belize. In *The Lowland Maya Postclassic*, edited by Arlen F. Chase and Prudence M. Rice, pp. 215-230. Austin: University of Texas Press.
- Graham, Elizabeth and David M. Pendergast. 1987. Cays to the Kingdom. *Royal Ontario Museum Archaeological Newsletter*. Series 2, Number 18. Toronto, Canada.
- Graham, Elizabeth and David M. Pendergast. 1989. Excavations at the Marco Gonzalez Site, Ambergris Caye, Belize, 1986. *Journal of Field Archaeology* 16(1): 1-16.
- Graham, Elizabeth and David M. Pendergast. 1994. The Sands of Time: San Pedro, Ambergris Caye, Belize. *Royal Ontario Museum Archaeological Newsletter*. Series 2, Number 52. Toronto, Canada.
- Graham, Elizabeth and Scott E. Simmons. 2012a. Recent Investigations on Ambergris Caye, Belize. *Archaeology International* 15: 24-28. DOI: http://dx.doi.org/10.5334/ai.1510
- Graham, Elizabeth and Scott E. Simmons. 2012b. Preliminary Report of the 2010 Archaeological Investigations at Marco Gonzalez, Ambergris Caye, Belize. Report submitted by University College London and the University of North Carolina Wilmington and the Marco Gonzalez Archaeological Project to the Belize Institute of Archaeology.
- Graham, Elizabeth, Scott E. Simmons and Christine White. 2013. The Maya Collapse and the Spanish Conquest: How 'Religious' is Change? *World Archaeology* 45(1): 1-26.
- Graham, Elizabeth, Richard MacPhail, John Crowther, Simon Turner, Julia Stegemann, Manuel Arroyo Kalin, Lindsay Duncan, Phillip Austin, Richard Whittet, and Christina Rosique. 2015.
 Past and Future Earth: Archaeology and Soil Studies on Ambergris Caye, Belize. Archaeology International 19: 97-108.
- Graham, Elizabeth, Richard Macphail, Simon Turner, John Crowther, Julia Stegemann, Manuel Arroyo-Kalin, Lindsay Duncan, Richard Whittet, Christina Rosique, and Phillip Austin. 2017. The Marco Gonzalez Maya Site, Ambergris Caye, Belize: Assessing the Impact of Human

Activities by Examining Diachronic Processes at the Local Scale. *Quaternary International* 437: 115-142.

- Green Reef Environmental Institute. 2004. *The Revised Bacalar Chico National Park and Marine Reserve Management Plan*. San Pedro, Belize.
- Guderjan, Thomas H. 1988. Maya Maritime Trade at San Juan, Ambergris Caye, Belize. PhD diss., Southern Methodist University, Dallas.
- Guderjan, Thomas H. 1995. "Settlement Patterns and Survey Data." In *Maya Maritime Trade, Settlement, and Population on Ambergris Caye, Belize*, edited by Thomas Guderjan and James Garber, pp. 9-30. Culver City: Labyrinthos Press.
- Guderjan, Thomas H., and James F. Garber. 1995. *Maya Maritime Trade, Settlement, and Population on Ambergris Caye, Belize* edited by Thomas H. Guderjan and James F. Garber. Culver City: Labyrinthos Press.
- Guderjan, Thomas H. and Lorraine A. Williams-Beck. 2001. Another Dimension of Trade and Interaction on Ambergris Caye, Belize. *Mexicon* 23: 123-125.
- Guderjan, Thomas H., James F. Garber, Herman Smith, Fred Stross, Helen V. Michel and Frank Asaro. 1989. Maya Maritime Trade and Sources of Obsidian at San Juan, Ambergris Caye, Belize. *Journal of Field Archaeology* 16: 363-369.
- Healy, Paul F. 2006. Preclassic Maya of the Belize Valley: Key Issues and Questions. *Research Reports in Belizean Archaeology* 3:13-30.
- Hohmann, Bobbi. 2002. "Preclassic Maya Shell Ornament Production in the Belize Valley, Belize." PhD diss., University of New Mexico.
- IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Jones, Grant D. 1989. *Maya Resistance to Spanish Colonial Rule.* Albuquerque: University of New Mexico Press.
- Littmann, Edwin R. 1967. Patterns in Maya Floor Construction. *American Antiquity* 32(4): 523-533.

MacKinnon, J. Jefferson. 1989a. "Spatial and Temporal Patterns of Prehistoric Maya Settlement, Procurement, and Exchange on the Coast and Cays of Southern Belize." PhD diss., University of Wisconsin, Madison.

MacKinnon, J. Jefferson. 1989b. Coastal Maya Trade Routes in Southern Belize. In *Coastal Maya Trade*, edited by Heather McKillop and Paul F. Healy, pp. 111-122. Occasional Publication in Anthropology 8. Peterborough: Department of Anthropology, Trent University.

- MacKinnon, J. Jefferson. 1990. Tobacco Range, South Water Cay, Placencia Cay, and Maya Sea Trade Routes in Belize. *Mexicon* 12(4): 75-78.
- Macphail, Richard I., Elizabeth Graham, John Crowther, Simon Turner. 2017. Marco Gonzalez, Ambergris Caye, Belize: A geoarchaeological record of ground raising associated with surface soil formation and the presence of a Dark Earth. *Journal of Archaeological Science* 77: 35-51. <u>http://dx.doi.org/10.1016/j.jas.2016.06.003</u>
- Martelle, Holly. 2018. The Privies. In *The Ward Uncovered: The Archaeology of Everyday Life*, edited by Holly Martelle, Michael McClelland, Tatum Taylor, and John Lorinc, pp. 41-45. Toronto: Coach House Books.
- Masson, Marilyn A. 1999. Postclassic Maya Ritual at Laguna de On Island, Belize. Ancient Mesoamerica 10:51-68.
- Masson, Marilyn A. 2000. *In the Realm of Nachan Kan: Postclassic Maya Archaeology at Laguna de On, Belize.* University Press of Colorado. Boulder, Colorado.
- Masson, Marilyn A. and Robert M. Rosenswig. 2005. Production Characteristics of Postclassic Maya Pottery from Caye Coco, Northern Belize. *Latin American Antiquity* 16(4):355-384.
- Mayfield, Tracie. 2015. "The Nineteenth-Century British Plantation Settlement at Lamanai, Belize (1837- 1868)." PhD diss., University of Arizona.
- Mayfield, Tracie and Scott E. Simmons. 2018. Why the Present Matters: The Importance of Community Outreach and Public Engagement in Archaeology. *Anthropology Now* 10:25-39.
- Meissner, Nathaniel J. 2014. Technological Systems of Small Point Weaponry of the Postclassic Lowland Maya (A.D. 1400-1697). Ph.D. diss., Carbondale: Southern Illinois University.
- Ministry of Natural Resources and Agriculture. 2012. *Environmental Statistics of Belize 2012*. Lands and Surveys Department, Belmopan, Belize.
- Mock, Shirley B. 2003. The Terminal Classic to Postclassic Ceramics from Saktunja, a Coastal Site in Northern Belize. *Research Reports in Belizean Archaeology* 2: 425-439.

- Monacci, Natalie M., Ursula Meier-Grünhagen, Bruce P. Finney, Hermann Behling, Matthew J. Wooler. 2011. Paleoecology of Mangroves along the Sibun River, Belize. *Quaternary Research* 76: 220-228.
- Olvera, Alejandra A. 2013. " Economic Strategies of Terminal Classic Households in the Northern Maya Lowlands: Multicrafting and Economic Diversification of a Mid-Elite Residential Compound at Xuenkal, Yucatan." PhD diss., University of Calgary.
- Parham, George H. K. n.d. Ambergris Caye, Belize History. Accessed April 20, 2019. https://ambergriscaye.com/pages/mayan/amberhistorygeorge.html.
- Pendergast, David M. 1981. Lamanai, Belize: Summary of Excavations, 1974-1980. *Journal of Field Archaeology* 8:29-53.
- Pendergast, David M. 1993. The Center and the Edge: Archaeology in Belize, 1809-1992. *Journal* of World Prehistory 7(1): 1-33.
- Pendergast, David M. and Elizabeth Graham. 1990. An Island Paradise (??): Marco Gonzalez 1990. *Royal Ontario Museum Archaeological Newsletter*, Series 2, Number 41. Toronto, Canada.
- Pendergast, David M. and Elizabeth Graham. 1991. The Town Beneath the Town: 1991 Excavations at San Pedro, Ambergris Caye, Belize. *Royal Ontario Museum Archaeological Newsletter*, Series 2, Number 45. Toronto, Canada.
- Pendergast, David M., Grant D. Jones and Elizabeth Graham. 1993. Locating Maya Lowlands Spanish Colonial Town: A Case Study from Belize. *Latin American Antiquity* 4(1):59-73.
- Prufer, Keith M., Amy E. Thompson, and Douglas J. Kennett. 2015. Evaluating Airborne LiDAR for Detecting Settlements and Modified Landscapes in Disturbed Tropical Environments at Uxbenká, Belize. *Journal of Archaeological Science* 57:1-13.
- Rice, Prudence M. 1987. Macanché Island, El Petén, Guatemala: Excavations, Pottery, and Artifacts. Gainesville: University of Florida Press.
- Rice, Prudence M. 1999. Rethinking Classic Lowland Maya Pottery Censers. Ancient Mesoamerica 10(1):25-50.
- Rice, Prudence M., Don S. Rice, and Timothy W. Pugh. 2017. *Small Things Forgotten: Artifacts of Fishing in the Petén Lakes Region, Guatemala*. Tacoma: Society of Ethnobiology.
- Rosenswig, Robert and Marilyn A. Masson. 2002. Transformation of the Terminal Classic to Postclassic Architectural Landscape at Caye Coco, Belize. *Ancient Mesoamerica* 13: 213-235.

- Sanders, William T. 1960. *Prehistoric Ceramics and Settlement Patterns in Quintana Roo, Mexico.* Contributions to American Anthropology and History, No. 60. Meriden, Connecticut: the Meriden Gravure Company.
- Sheets, Payson D. 2000. Provisioning the Cerén Household. *Ancient Mesoamerica* 11(2):217-230.
- Sidrys, Raymond V. 1983. Archaeological Excavations in Northern Belize, Central America. Monograph XVII. Los Angeles: Institute of Archaeology, University of California Los Angeles.
- Simmons, Scott E. 1999. The Maya Archaeometallurgy Project, Lamanai, Belize, 1999. Report submitted to the H. John Heinz III Fund for Latin American Archaeology and the Belize Institute of Archaeology, Belmopan, Belize.
- Simmons, Scott E. 2004. Preliminary Report of the 2004 Field Season at Lamanai, Belize: The Maya Archaeometallurgy Project. Report submitted to the Belize Institute of Archaeology. UNCW Anthropological Papers, 2. Papers of the Maya Archaeometallurgy Project, 2.
- Simmons, Scott E. 2005. Preliminary Report of the 2005 Field Season at Lamanai, Belize: The Maya Archaeometallurgy Project. Report submitted to the Belize Institute of Archaeology. UNCW Anthropological Papers, 4. Papers of the Maya Archaeometallurgy Project, 3.
- Simmons, Scott E. 2006. Preliminary Report of the 2006 Field Season at Lamanai, Belize: The Maya Archaeometallurgy Project. Report submitted to the Belize Institute of Archaeology. UNCW Anthropological Papers, 7. Papers of the Maya Archaeometallurgy Project, 4.
- Simmons, Scott E. 2009. Preliminary Report of the 2008 Field Season at Lamanai, Belize: The Maya Archaeometallurgy Project. Report submitted to the Belize Institute of Archaeology. UNCW Anthropological Papers, 10. Papers of the Maya Archaeometallurgy Project, 5.
- Simmons, Scott E. and Elizabeth Graham. 2012. Preliminary Report of the 2012 Archaeological Investigations at Marco Gonzalez, Ambergris Caye, Belize. Report submitted by the University of North Carolina Wilmington, University College London and the Marco Gonzalez Archaeological Project to the Belize Institute of Archaeology.
- Simmons, Scott E. and Elizabeth Graham. 2016. Maya Coastal Adaptations in Classic and Postclassic Times on Ambergris Caye, Belize. In *Trading Spaces: The Archaeology of Interaction, Migration and Exchange*. Proceedings of the 46th Annual Chacmool Conference, edited by Margaret Patton and Jessica Manion, pp. 167-180. Calgary, Alberta, Canada: Chacmool Archaeology Association, University of Calgary.
- Simmons, Scott E. and Laura Howard. 2003. Preliminary Report of the 2001-2002 Field Seasons at Lamanai, Belize: The Maya Archaeometallurgy Project. Report submitted to the Belize

Institute of Archaeology. UNCW Anthropological Papers, 1. Papers of the Maya Archaeometallurgy Project, 1.

- Simmons, Scott E., Tracie Mayfield, James J. Aimers, and W. James Stemp. 2018. The Maya of Ambergris Caye and their Neighbors. *Research Reports in Belizean Archaeology* 15: 329-339.
- Smith, Robert E. 1971. *The Pottery of Mayapán*. Papers of the Peabody Museum of Archaeology and Ethnology 66. Cambridge, Harvard University.
- Smith, Michael E. 2003. Key Commodities. In *The Postclassic Mesoamerican World*, edited by Michael E. Smith and Frances F. Berdan, pp. 117-125. Salt Lake City: University of Utah Press.
- Sullivan, Lauren A, James F. Garber, and Jaime J. Awe. 2012. The Archaeology of St. George's Caye: Results of the 2010 Season. *Research Reports in Belizean Archaeology* 9:297-303.
- Sunahara, Kay Sachiko. 2003. "Ancient Maya Ceramic Economy in the Belize River Valley Region: Petrographic Analysis." Ph.D. diss., McMaster University.
- Thompson, Amy E. and Keith M. Prufer. 2015. Airborne LiDAR for Detecting Ancient Settlements and Landscape Modifications at Uxbenká, Belize. *Research Reports in Belizean Archaeology* 12:251-259.
- Tiesler, Vera. 2012. Studying Cranial Vault Modifications in Ancient Mesoamerica. *Journal of Anthropological Sciences* 90: 1-26.
- Tiesler, Vera and Allan Ortega Muñoz. 2013. Formas cefálicas, etnicidad y movilidad poblacional el la costa oriental de Quintana Roo. *Arqueología* 46: 167-186.
- Tozzer, Alfred M. 1941. *Landa's Relación de las Cosas de Yucatan*. Papers of the Peabody Museum of Archaeology and Ethnology, Number 18. Cambridge: Harvard University Press.
- Valdez, Fred, Lauren A. Sullivan and Thomas H. Guderjan. 1995. Ceramics from Northern Ambergris Caye Sites. In *Maya Maritime Trade, Settlement, and Populations on Ambergris Caye, Belize*, edited by Thomas H. Guderjan and James F. Garber, pp. 95-112. Lancaster, California: Labyrinthos Press.
- Vaslet, Amandine, Donald L. Phillips, Christine A.M. France, Ilka C. Feller, and Carole C. Baldwin.
 2012. The Relative Importance of Mangroves and Seagrass Beds as Feeding Areas for
 Resident and Transient Fishes among Different Mangrove Habitats in Florida and Belize:
 Evidence from Dietary and Stable-Isotope Analyses. *Journal of Experimental Marine Biology* and Ecology 434-435: 81-93.

- Walker, Debra S. 1990. "Cerros Revisited: Ceramic Indicators of Terminal Classic and Postclassic Settlement and Pilgrimage in Northern Belize." Ph.D. diss., Southern Methodist University, Dallas.
- Walker, Debra S. 2016. "Ancient Maya Life on the Fringes of Chetumal Bay." In *Perspectives on the Ancient Maya of Chetumal Bay*, edited by Debra S. Walker, pp. 3-32. Gainesville: University Press of Florida.
- Wallace, Colin. 2011. Reconnecting Thomas Gann with British Interest in the Archaeology of Mesoamerica: An Aspect of the Development of Archaeology as a University Subject. *Bulletin of the History of Archaeology* 21(1): 23-36.
- Weinberg, Douglas M., Elizabeth Graham, and David M. Pendergast. 2003. Salvage Excavation on the Alamilla/Gomez Property, San Pedro, Ambergris Caye, Belize. Report submitted to the Foundation for the Advancement of Mesoamerican Research and the Belize Institute of Archaeology.
- Wernecke, D. Clark. 2008. A Burning Question: Maya Lime Technology and the Maya Forest. *Journal of Ethnobiology* 28(2): 200-210.
- Williams, Jocelyn S., Christine D. White and Fred J. Longstaffe. 2009. Maya Marine Subsistence: Isotopic Evidence from Marco Gonzalez and San Pedro, Belize. *Latin American Antiquity* 20(1): 37-56.
- Wonderley, Anthony W. 1985. The Land of Ulua: Postclassic Research in the Naco and Sula Valleys, Honduras. In *The Lowland Maya Postclassic*, edited by Arlen F. Chase and Diane Z. Chase, pp. 254-269. Austin: University of Texas Press.
- Wood, R.L., S.T. Reid, and A.M. Reid. 2019. *Field Guide to Ambergris Caye, Belize, C.A.* https://ambergriscaye.com/fieldguide/geo-plate6.html

Appendix 1

Summary Lot List from 2017 Investigations at the San Pedro Site

Summary Lot List for 2017 Excavations at the San Pedro Site, Ambergris Caye, Belize		
Lot Number	Trench Number	Lot Description
SP 226	5	silty sand immediately below sod layer; 7.5YR3/2 & 7.5YR3/3
SP 227	6	silty sand immediately below sod layer; 7.5YR3/2 & 7.5YR3/3
SP 228	6	lot below SP227 in Trench 6; fine silty sand; 7.5YR5/3
SP 229	5	lot below SP 226, a coarse sand with very small shells and small fragments of broken coral; 7.5YR7/3 & 10YR8/2
SP 230	5	lot below SP 228, a coarse gray-brown silty sand in eastern half of trench; 10YR5/2
SP 231	6	coarse gray-brown sand; 10YR5/2
SP 232	6	pale sand lying directly atop Feat. 3, and apparent concrete floor
SP 233	7	surface sod layer and dark gray brown powdery sand; 7.5YR3/2
SP 234	6	first deposit of 1m ² test pit in approx. center of Trench 6 in area missing concrete floor (Feat. 3); broken concrete pieces/fragments in dark silty sand matrix of 10YR3/1
SP 235	5	second lot of coarse gray-brown silty sand below lot SP 230; 10YR5/2
SP 236	7	lot below SP 233, a coarse sand with very small shells and broken coral; 7.5YR7/3
SP 237	6	lot below SP 234 in 1m ² test pit in approx. center of Trench 6 in area missing concrete floor (Feat. 3); dark gray-black silt; 5YR5/2
SP 238	5	lot below SP 235; coarse dark gray sand with broken concrete and mortar pieces in western half of trench; 7.5YR4/1
SP 239	6	dark gray sitly sand found around line of conch shells immediately west of Feature 3, the concrete floor in Trench 6; 7.5YR6/2
SP 240	7	third soil deposit, below SP 236, in Trench 7; equivalent to SP 230 in Trench 5; 10YR6/2 medium coarse sand
SP 241	6	third deposit in of 1m ² test pit in approx. center of Trench 6 in area missing concrete floor (Feat. 3); broken concrete pieces/fragments in eastern portion of 1x1, with light gray-brown silty sand (10YR6/3) in western half of test pit

Summary Lot List for 2017 Excavations at the San Pedro Site, Ambergris Caye, Belize

SP 242	5	Century British Honduras era flooring?
SP 243	7	lot below SP 240 but same deposit, a 10YR6/2 medium coarse sand
		lot below SP 241, but same light gray-brown silty sand (10YR6/3) in western half
		of 1m ² test pit in approx. center of Trench 6 in area missing concrete floor (Feat.
SP 244	6	3)
SP 245	8	first lot in Trench 8, disturbed dark brown sandy topsoil with building debris and modern materials
		fourth stratigraphic deposit in $1m^2$ test pit in approx. center of Trench 6 in area
SP 246	6	shells and shell fragments/coral
0. 2.0		thin lense of light grayish brown (10YR6/2) medium sand in SE quadrant of 1m ²
		test pit in approx. center of Trench 6 in area missing concrete floor (Feat. 3);
SP 247	6	lense below SP 246, approx. 2-3 cms in depth
CD 2 / 2		lot below SP 246 in 1m ² test pit in approx. center of Trench 6 in area missing
SP 248	6	concrete floor (Feat. 3), at same level bgs of SP 247
65.240	_	lot below SP 243 on either side of Feat. 4, wall stub in Trench 7; very dark brown
SP 249	/	(7.5YR4/3) mottled with pale brown (10YR6/3) silty sand
60.250	_	lot below SP 242, a medium gray (7.5YR4/1-5/1) compacted sand - late 20th
SP 250	5	Century British Honduras era flooring?
		fifth stratigraphic deposit in 1m ² test pit in approx. center of Trench 6 in area
60.054	6	missing concrete floor (Feat. 3); lot below SP 247 & 248; a coarse beach sand
SP 251	6	with broken coral fragments and small shells, 7.5YR8/2
		and small shells, 7.5YR8/2, in $1m^2$ test pit in approx. center of Trench 6 in area
SP 252	6	missing concrete floor (Feat. 3)
		Small charcoal lens in SE quadrant of trench beginning at 53 cm below ground
SP 253	5	surface; intrusive into Lots SP 242 and SP 250; 7.5YR4/1
		Maya midden deposit directly below lot SP 252 in 1m2 test pit in approx. center
		earth with abundant cultural material: appears undisturbed. Red Pavil Group
SP 254	6	Maya sherds found
		Maya midden deposit directly below and equivalent to SP 254 in 1m2 test pit in
		approx. center of Trench 6 in area missing concrete floor (Feat. 3); 7.5YR4/2 and 7.5YR4/3 dark earth with abundant cultural material, incl. Zalal Coursed Incised
SP 255	6	Early Postclassic sherd; undisturbed
		lot below SP 245: 7 5YR3/1-3/2 dark humic sand: mixed British and Maya
SP 256	8	materials; lot above SP 259
		dark grav-brown (10YR3/1) slightly humic, coarse sand with British Victorian era
SP 257	5	artifacts
		lot below SP 255, medium-dark gray coarse sand and darker soil with Maya
	G	cultural material - lighter colored sand from beach overwash episode mixed with
1 JE / JA	0	

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SP 259	8	lot below SP 256; 7.5YR3/1-3/2 dark, coarse sand; mixed British era and Maya cultural material, with large Maya refittable sherds found in the NE corner of trench. Probable British era disturbance of top of Maya midden.
SP 260	5	lot below SP 257; very dark gray brown (10YR3/1 & 10YR4/2) silty sand; mixed British Victorian era cultural material with Maya cultural material, probably disturbed midden with Hubelna system griddle rim sherds
SP 261	6	lot below SP 258; light amounts of Maya cultural material, base of EPC midden in 7.5YR6/3 & 7/3 deposit in 1m2 test pit in approx. center of Trench 6, in area missing concrete floor (Feat. 3)
SP 262	5	modern (mid-late 20th Century) trash pit in the NE corner of trench, dug through SP 257, SP 260, SP 266, SP 281
SP 263	7	lot below SP 249, dark gray-brown (7.5YR4/1 mottled with 10YR6/2) medium coarse sand, either side of Feature 4 with some clay lenses west of wall stub
SP 264	6	lot below SP 261; a single Maya artefact in 7.5YR4/2 & 4/3 deposit in 1m2 test pit in approx. center of Trench 6, in area missing concrete floor (Feat. 3), otherwise sterile sand
SP 265	8	lot below SP 259; very dark gray and dark brown (7.5YR3/1 & 3/2) silty sand with mainly Maya cultural material and some British material in top few cms. of lot
SP 266	5	lot below SP 260; dark gray coarse sandy loam (10YR 4/2) Maya midden, undisturbed, with abundant Maya sherds, including Hubelna unslipped, lithics and faunal material
SP 267	8	lot below SP 265; very dark gray and dark brown (7.5YR 3/1 & 3/2) silty sand with Maya cultural material - midden? - and irregular areas of very light colored fine silty clay that may represent disturbed/fragmented Maya floor; miniature flaring neck Payil Red jar with two horizontal strap handles in lot
SP 268	7	lot below SP 263; dark gray silty sand (7.5YR 4/1 mottled with 10YR 6/2) beginning @ 76-82 cmbs; disturbed Maya midden with very large (ca 34 cm dia.) intact Maya vessel (in several lg. pieces extending from 98.5-118 cmbd)
SP 269	6	lot below SP 264; light beige-pink, coarse beach sand & tiny pieces of coral (7.5YR 8/3) absent of cultural material
50.270	0	lot below SP 267; probable thin Maya flooring consisting of 'greasy' fine silty clay? (7.5R 8/1, 5YR 7/6 & 2.5Y 7/1) mixed with sand and sm. shell pieces and associated very dark gray and dark brown (7.5YR 3/1 & 3/2) silty sand with undisturbed Maya midden with high density of Maya sultural materials
SP 270	6	lot below SP 269; light beige-pink, coarse beach sand & tiny pieces of coral (7.5YR 8/3) absent of cultural material
SP 272	6	lot below SP 271; light beige-pink, coarse beach sand & tiny pieces of coral (7.5YR 8/3) absent of cultural material
SP 273	8	all material in and immediately around a thin walled, utilitarian Maya ceramic vessel (itself SP 290) locted near SW corner of trench, base of lot SP 270, intact <i>in situ</i> but fragmented upon removal

SP 274	7	lot below SP 268 on west side of wall stub (Feature 4); mainly Maya material but some British artifacts; lot south of SP 276, possible Maya floor
SP 275	7	Wall scrapings/cleaning of sides of Feature 4, wall stub in trench
SP 276	5	lot below SP 266; Maya cultural materials including several large sherds and lithics in a light brown silty sand (7.5YR 4/2) mottled with 7.5YR 2.5/2
SP 277	5	charcoal and conch/broken conch concentration in center-NE quadrant of trench overlying SP 266, immediately south of SP 262 (modern rubbish pit feature); lot begins at 136-140 cmbd.
SP 278	8	lot below SP 270, coarse light brown sand (7.5YR6/4) below Maya flooring and associated midden material; lot does not extend across southern 1/2-1/3 of Trench 8; this sub-floor deposit punctuated by small-medium size pit features; moderately high density of Maya cultural materials, including Tulum plain and Navula system jar sherds
SP 279	7	removal of wall stub (Feat. 4) materials, mixed cultural material, mostly Maya with some British era artifacts. Maya Red Payil Group sherds present
SP 280	7	charcoal lens within lot SP 268 (10YR 2/1); +/- 6-10 cms. In depth
SP 281	5	lot below SP 276; light brown (7.5YR 4/2) coarse silty sand; Maya cultural material (sherds) and faunal remains only (no British material)
SP 282	7	lot equivalent stratigraphically to SP 274; disturbed Maya flooring deposit similar to that seen in Trench 8, a 'greasy' fine silty clay? (7.5R 8/1, 5YR 7/6 & 2.5Y 7/1) mixed with sand and sm. shell pieces; surface of probable floor undulates quite a bit, but floor only seen in South half of trench on west side.
SP 283	5	lot below SP 281; probable thin Maya floor similar to that found in Trenches 7 & 8 (lots SP 282 and SP 270, respectively); thin Maya flooring consisting of 'greasy' fine silty clay? (7.5R 8/1, 5YR 7/6 & 2.5Y 7/1) mixed with sand and sm. shell pieces. A censer pedestal poss. of the Chen Mul Modeled system found in lot
SP 284	8	lot below SP 278; coarse, light gray (7.5YR 7/2 and 10YR 7/2) beach sand deposit located in SE quadrant of trench; Maya cultural material only
SP 285	8	very dark brown circular, shallow bowl-shaped soil stain (10YR 3/2) inside/within SP 284. 7 cms max depth. Maya sherds only
50.296		Material located immediately around Burial A
SP 200	7	lot below SP 282; second lot of disturbed Maya flooring; a 'greasy' fine silty clay? (7.5R 8/1, 5YR 7/6 & 2.5Y 7/1) mixed with sand and sm. shell pieces; surface of probable floor undulates quite a bit, but floor only seen in South half of trench on west side
SP 288	, , , , , , , , , , , , , , , , , , , ,	lot below SP 283; mixed, mottled sand - white sandy areas (7.5YR7/2) mixed with brown (7.5YR 4/2) sand
SP 289	5	charcoal and broken conch shell lens @ 182 cmbd measuring +/- 60 cms N-S x 50 cms. E-W

SP 290	8	thin-walled, very dark brown, fragmented Maya ceramic vessel, but whole (articulated) <i>in situ</i> , located in SW corner of Trench 8; Caylea's pot (cooking?)
SP 291	5	Burial A - skeletal material only
SP 292	7	PNK (provenance not known) chert biface preform and flake

Appendix 2

Preliminary Report on the Maya Ceramic Artifacts Recovered at the San Pedro site in 2017

by James J. Aimers

San Pedro Pottery Analysis, 2017

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Introduction and Procedures

From July 17 to 23, 2017, Jim Aimers examined 6334 sherds and vessels from the site of San Pedro, Belize. The goal of this research was to produce a basic type-variety classification with some modal data (primarily lip forms) to assist in placing the collection in time and to assess the extent and nature of the site's interaction with other sites and regions. Given such a short period to assess over 6000 sherds, no attempt was made to classify sherds to the varietal level because varieties are local and most, if not all, of the San Pedro pottery was imported.

Of the 6334 sherds, 959 (15%) could be classified at the Type level while at the Group level 1255 sherds (20%) could be classified. Anything classified at the Type or Group level can be assigned to a Ware. I did not speculate about Ware designations for sherds that could not be assigned to a ceramic Type or Group in this analysis as there were very few sherds that could be identified solely on fabric or surface. More general, non-Type-variety categories were used instead of Ware (e.g., "Non-diagnostic red-slipped" was used in place of Ware designations for body sherds with red slip that did not easily align with a well-known Ware like Fine Orange Ware, etc.).

Overview of the Collection

The collection was dominated by Postclassic pottery (historic pottery was assessed by Traci Mayfield). Of the 1052 sherds that could be assigned to a chronological period with some confidence, 1031 (98%) dated to the Late Postclassic. The main types were the red-slipped Red Payil Group types (Payil Unslipped and Palmul Incised), unslipped bowl and jar styles generally placed in the Unslipped Navula Group, and Hubelna Unslipped (a thick, soft, vesicular pottery thought to have been used for griddles). Fifteen sherds (0.01%) were identified as Pozo Unslipped, a type that spans the Early-to-Late Postclassic. Seven sherds exhibited characteristics characteristic of the Terminal Classic period (e.g. slate-like finish, lip modes). Only two sherds exhibited characteristics of the Classic period (rim/lip modes). No sherds exhibited characteristics of Preclassic types.

Implications

This sample demonstrates that San Pedro had a robust Postclassic occupation. As at other sites with Postclassic evidence (e.g., Marco Gonzalez, Lamanai), the pottery suggests northern and coastal trade connections for San Pedro. Of particular importance is the abundance of Red Payil Group sherds (490 or 47% of 1052 diagnostic sherds). Red Payil Group sherds are most abundant along the coast of Quintana Roo and are thought to have been produced in the vicinity of Tulum. Lots SP254 and SP279 contained sherds that resemble the forms of Zakpah Group censers from Lamanai (and also found at Marco Gonzalez), but these were very eroded and this identification is not certain. Lot SP283 contained a censer pedestal

that might be from a Late Postclassic Chen Mul Modeled System effigy censer, best-known from Mayapan but found across much of the northern Maya lowlands.

Notes of Specific Observations made on Ceramic Materials from some San Pedro lots:

Trench 5

SP260

There are three vesicular cream deep bowl sherds with upper and lower everted lips. There are also 11 Hubelna system griddle rim sherds. These have the typical triangular rim but in some cases, it appears that they are also deep bowls and not griddles.

SP266

Hubelna Unslipped paste in deep bowl form with upper lower everted rim. All of this should probably be called Hubelna regardless of paste color. There are griddles and deep bowls.

SP 283

Chen Mul censer pedestal is Mayapan Unslipped Ware: Unslipped Panaba Group. Ochoa (2007:388) discusses why this group overlaps with the Navula Group.

Trench 6

SP254

This lot has at least five very coarse tempered horizontal rims that look like the form of Zalal Gouged-incised chalices from Lamanai, but the paste is coarser and seems to grade into the Hubelna paste. No evidence of slip but the surfaces are in very poor condition.

Trench 7

SP268

This lot includes a partial unslipped incurving bowl with striations and an upper everted pointed lip. Surfaces vary from buff to gray. Medium gray paste is very consistent and fully oxidized. 33 cm. diameter to outside of lip. Pot itself is wider than the lip.

SP279

There are a large number of rims that look like they are from Zalal Gouged-incised chalices but they are quite vesicular. They are thinner than what I've been calling griddles and deep bowls in other contexts so they may be very poorly preserved Zalal Gouged-incised. It would be worth taking another look at these. Scott Simmons noted that preservation for even very small fish bones is good here and we don't have this kind of erosion with other ceramic types.

SP280

Lot SP280 had four rims of Tulum Plain jars. Sanders (1960) noted that these are basically the unslipped version of Tulum Red, but the paste in this case seems to be much courser. Forms are exactly the same. The Palmul Incised and Payil Red sherds have a rather fine tan to orange paste. There were also three round bowl sherds. The bowls look like those illustrated in Sanders

(1960: Fig 6c 8, 12). Jars look like Sanders (1960: Fig 6e 51). Paste is chunky with variably-sized inclusions; color ranges from orange to brown. Very large milky inclusions are present and a lot of crystalline calcite which reflects light. Surfaces for jars are generally a light orange, varying sometimes to tan on exteriors and light brown on interiors.

SP282

This large lot is dominated by Red Payil group pottery and Navula system pottery. Some of the Unslipped jars have Terminal Classic-looking pointed lips. I tentatively identified them as Cambio Unslipped to make that distinction.

Trench 8

SP267

The only whole vessel is a miniature flaring neck jar with two horizontal strap handles. Slip is not preserved but paste surfaces suggest that it was red slipped. It is almost certainly Payil Red.

SP270

This lot appears to be entirely Postclassic. I did not see a lot of the out curving jar rims I associate with the Terminal Classic. One or two of the line sinkers appear to be made of Belize Group ash-tempered sherds, confirming connection to the mainland (possibly the Belize Valley) and that they used broken pots from the Late Classic to make line sinkers in the Postclassic. There seems to be an increase in the very vesicular cream-colored rims with the distinctive upper lower everted rims (see also Lot SP260 from Trench 5). In some cases, these appear to be round bowls, but in other cases they appear to be griddles. In lots prior to SP270 they appear to be bowls and I have classified them that way (not as Hubelna system, which have the more triangular rims).

SP278

This is a big lot with a fair number of jars. I have classified two as Pozo Unslipped system because they are smaller and lighter and have rougher surfaces than the larger, better-made Navula system sherds. There is the cup-shaped part of at least one frying pan censer and probably a handle of another. I called these Navula Unslipped following Walker (1990) at Cerro Maya. I distinguished Tulum Plain jar sherds from Navula Unslipped system jar sherds based on the absence of the bolster on the rim. Tulum Plain sherds are smaller, thinner, and better-made (form), although both types are well-made. Out of 415 unslipped body sherds there was only one striated sherd.

SP290

Partial vessel from Trench 8. No rim. Coarse buff paste. Non-diagnostic.

References Cited

Ochoa, Jose Manuel

2007 Las Esferas Ceramicas Tases Del Posclasico En El Norte De La Peninsula De Yucatan (Ca. 1100-1550 D.C.). In *La Produccion Alfarera En El Mexico Antiguo*, edited by B. L. M. Carrion and A. G. Cook, pp. 383-406. INAH, Mexico D.F.

Sanders, William T.

1960 *Prehistoric Ceramics and Settlement Patterns in Quintana Roo, Mexico.* Contributions to American Anthropology and History 12, Carnegie Institution of Washington Publication 606, Washington, D.C.

Walker, Debra Selsor

1990 Cerros Revisited: Ceramic Indicators of Terminal Classic and Postclassic Settlement and Pilgrimage in Northern Belize. Unpublished Ph.D. dissertation, Department of Anthropology, Department of Anthropology, Southern Methodist University, Dallas.

Appendix 3

Preliminary Report on the Lithic Artifacts Recovered at the San Pedro site in 2017

by W. James Stemp Analysis of the Chipped Stone Tools from the Ambergris Caye Archaeological Project II 2017 Archaeological Field season: Excavations at the San Pedro site, Ambergris Caye, Belize. Raw Material, Production Technology, Tool Use, and Trade and Exchange

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Introduction

This report summarizes the results of the analysis of the chipped lithic assemblage excavated at Parham property on the grounds of the Hostel La Vista (now Parham Plaza Hotel) in San Pedro Town, Ambergris Caye, Belize, in May and June of 2017. This is the same property where excavations were conducted by Elizabeth Graham and David Pendergast in the early 1990s (Graham and Pendergast 1994; Pendergast and Graham 1991); however, the Sands Hotel previously stood in this location. The report provides data on the raw materials, the production technology and tool use, and discusses aspects of trade and exchange, tool curation and expedient technology at San Pedro. Comparisons to the chipped stone tools excavated at San Pedro by Graham and Pendergast in the early 1990s (Stemp 2001, 2004, 2016; Stemp et al. 2011) and other sites on Ambergris Caye are also provided.

The 2017 Chipped Stone Tool Assemblage

In all, 521 chipped stone artifacts were recovered from that portion of the San Pedro site that lies on the Parham family property during the 2017 field season. Most of the assemblage was obsidian (309 or 59.3%) with the rest being chert, chalcedony, and limestone (212 or 40.7%) (Figure 1).

The Obsidian Sub-assemblage

Raw Material

Based on visual observation of artifact color, translucency, surface texture, banding, inclusions, and refracted light diffusion (see Braswell et al. 2000; McKillop 1995; Stemp et al. 2011), the obsidian sub-assemblage from the 2017 field season primarily consists of obsidian from the highlands of Guatemala (243 or 78.6%). Most comes from the Ixtepeque source (224 or 72.5%), with small quantities from El Chayal (19 or 6.1%) (Figure 1). El Chayal obsidian was identified based on its generally milky gray or clear gray/dark gray frosted appearance, its wide and irregular banding (when present), small dark inclusions in the clearer examples, and its smooth to dull "dry soap" surface texture. Ixtepeque obsidian was identified by its typically blackish-brown to blackish-gray appearance (sometimes with red-caramel tinge), its straight narrow banding, few inclusions, and its very smooth, glassy surface (Braswell et al. 2000). The rest of the gray obsidian artifacts (65 or 21.0%) were classified as "Indeterminate" in terms of source because they could not be confidently identified in the field. It is believed that most of them are from the Guatemalan highlands - either Ixtepeque or El Chayal obsidian (43 or 13.9%); however, this could not be determined accurately without the reference collection present in the field. The remaining 22 (7.1%) artifacts classified as "Indeterminate" were likely made from obsidian from other sources in highland Guatemala or central Mexico (see McKillop 1995 for

Ucareo obsidian on Ambergris Caye). The higher percentage of artifacts manufactured from Ixtepeque obsidian is consistent with Postclassic occupation at San Pedro, given the shift in procurement emphasis in highland Guatemalan sources from El Chayal to Ixtepeque noted at coastal Maya sites near the end of the Classic period (Braswell 2003; Clark 1989; Golitko et al. 2012; McKillop 1995, 1996; Stemp et al. 2011).

In addition to the gray/black obsidian, one artifact, a small percussion flake, may have been made from green Pachuca obsidian (Figure 2; see below). This requires chemical analysis to confirm as there was a significant amount of Historic period green bottle glass also recovered from the excavation units. If it is Pachuca obsidian, it would be the first example from the San Pedro site and would confirm a lithic connection to central Mexico. All obsidian source assignments listed in this report are considered preliminary, pending chemical characterization.

Production Technology and Tool Use

Almost all obsidian artifacts were non-cortical prismatic blades (302 or 97.7%) (see Clark 1988:12, Fig. 5-11; Clark and Bryant 1997: 112, Fig. 2; Hirth 2008: 448, Fig. 6) (Table 1, Figures 3, 4), of which five or possibly six are first/second-series blades. Most were proximal or medial segments with evidence of transverse snapping breaks (De León et al. 2009). Two of the distal prismatic blade segments (1 Ixtepeque, 1 Indeterminate) have cortex of their dorsal surfaces near their distal ends/bases. Another blade segment with dorsal cortex was a distal fragment whose source was Indeterminate, although it is most likely Ixtepeque. On this distal segment, the thin line of cortex was not on the end/base, but along the dorsal ridge. A fourth proximal blade segment with cortex was made from Ixtepeque material and had a pecked striking platform and an intact overhang. The bulb of percussion and blade thickness suggest that this cortical blade segment was produced through percussion.

Whole blades and proximal blade segments mostly possessed ground/pecked platforms (107 of 125 or 85.6%), as would be expected in the Postclassic (McKillop, 1995:165; see Crabtree 1968: 463; Sidrys 1979: 594-595) (Table 2, Figures 3 and 4). Nine (7.2%) whole blades or proximal blade segments had scratched platforms and four had plain platforms (3.2%). Of the Ixtepeque obsidian whole blades and proximal blade segments, 81 (90.0%) possessed ground/pecked platforms. Most of the El Chayal (62.5%) and the indeterminate (80.8%) obsidian whole blades and proximal blade segments also had ground/pecked platforms. Also consistent with Postclassic production, most (78.4%) of the whole blades and proximal blade segments did not have the overhang trimmed from the platform as a core preparation technique (see McKillop 1995: 165). The trimming of overhangs on some blades and the presence of scratched platforms may indicate that these blades were from earlier periods (before Terminal Classic). Whether the presence of these blades is due to the substantial mixing of deposits at San Pedro or some obsidian recycling form earlier periods cannot be known for certain. There were many more whole blades and proximal blade segments with ground/pecked platforms from the 1990s excavations on the Parham's /Sands Hotel property conducted by Pendergast and Graham (see Stemp et al. 2011: 145, Fig. 7). In terms of obsidian sources and production, the 2017 sub-assemblage is very similar to the sub-assemblage from the San Pedro excavations on the Parham's/Sands Hotel property in the early 1990s that

consisted of 75.4% Ixtepeque obsidian, 94.4% prismatic blades, and 96% ground/pecked platforms (see Stemp et al. 2011).

Most of the obsidian blades and blade segments were trapezoidal in cross-section (83.3%) with only 36 (11.8%) blades and blade segments possessing triangular cross-sections and 15 (4.9%) with three or more dorsal blade scar ridges (Table 3). These data are generally consistent with those associated with third series blade removal from blade cores (see Clark and Bryant 1997: 119, Table 3); however, due to mixing of deposits at San Pedro, the reliance on these percentages to estimate reduction stage should be viewed cautiously. A majority of blades and blade segments with trapezoidal cross-sections (80.9%) was also noted for the obsidian recovered during the earlier 1990s excavations (Stemp et al. 2011: 146, Table 2).

The blades and blade segments from the 2017 excavations are wide on average, generally wider than those from contemporary inland sites (Table 4). Wide obsidian blades suggest that the San Pedranos may have had access to reduced blade cores earlier in the reduction process than inhabitants from inland sites. It is also possible that wide blades with lower cutting-edge-to mass ratios (see Sheets and Muto 1972) indicate that there was not necessarily substantial concern over preservation of limited raw material as the blades on San Pedro were wider and thicker, and therefore heavier, than those at inland sites (Table 4). These data are comparable to those for the blades and blade segments recovered from the early 1990s excavations (Stemp et al. 2011).

Four blade segments from the 2017 excavation were used as spokeshaves (Figure 5) (see Coe 1959; Willey et al. 1965). Blade segments used as spokeshaves were also found in the San Pedro assemblage excavated by Pendergast and Graham in the early 1990s (Stemp, pers. observ., 1996). These functions were verified through experiments (Figure 6) and verified with use-wear consistent with whittling wood. In the San Pedro assemblage from the 1990s, the obsidian blades used as spokeshaves were included in the "wood – scrape/plane/whittle" and "hard – scrape/plane/whittle" use-wear categories (see Stemp 2016: 167, Table 1).

Given the heavy edge wear observable with the naked eye on some blades from the 2017 excavations, they were intensively used (mostly on hard materials) and/or recycled from earlier deposits and reused for additional tasks (see Stemp 2016). Observation of the blades' and blade segments' edge with a 10x hand lens revealed that most use-related flaking was bifacial, suggesting the majority of these artifacts were used in longitudinal motions, such as cutting or sawing. The striations parallel and diagonal to the tools' edges on both faces of the blades and blade segments supports the use of the blades as cutting or sawing implements.

In addition to the blades, there was one exhausted core fragment that was identified as Indeterminate in terms of source, although it is likely from Ixtepeque. There were also two whole non-cortical hard-hammer flakes. One was Ixtepeque obsidian; the other may be green obsidian from Pachuca (see above). The Ixtepeque flake possesses a crushed striking platform and is likely a casual percussion flake from a polyhedral core (see Stemp et al. 2011). The green obsidian flake has a flat, plain (not ground, pecked, or scratched) striking platform. In the early 1990s excavations, three whole exhausted polyhedral cores recovered and eight polyhedral blade core fragments were recovered. All eleven artifacts were from the Ixtepeque source. One cortical hard-hammer flake, 12 non-cortical hard-hammer flakes, and one blocky fragment (Stemp et al. 2011: 142, Fig. 5).

Trade and Exchange

Based on the reduction products, the obsidian sub-assemblage represents indirect procurement of obsidian by the San Pedro Maya from already reduced polyhedral cores that arrived on the caye. As noted above, the mean prismatic blade widths and the mean cutting edge to mass ratios suggest that the San Pedranos in the Late Postclassic-Colonial period were acquiring prepared and already reduced cores earlier rather than later and/or were not as concerned with conservation of obsidian. They were producing some comparatively wide and large blades from cores that had not been significantly reduced yet (see Hirth 2008: 450, Table 3). Overall, it seems the San Pedro Maya had quite good access to obsidian, specifically from Ixtepeque, from the Postclassic into Historic times, particularly when compared to those who were contemporaneously inhabiting inland sites (McKillop 1995; Sidrys 1979; Stemp et al. 2011).

Estimates of the amount of obsidian reaching San Pedro can be calculated using the number of obsidian items or mass of obsidian by volume of excavated soil (i.e., density) and the ratio of blades to cores at the site. However, as noted above, the mixing of deposits at San Pedro, will have an effect on the reliability of these data. The density of obsidian recovered during the 2017 excavations was approximately 6.1 items (or 8.6 g) of obsidian per cubic meter of soil. The density of obsidian from the early 1990s excavations was generally the same with 6 items (or 14.7g) of obsidian per cubic meter of soil (Stemp et al. 2011: 148). The main difference in the mass per cubic meter was the recovery of three whole blade cores and eight core fragments in the the early 1990s. These data indicate that the quantity of the material acquired by the San Pedro Maya was generally low. Yet, the density of obsidian at San Pedro is greater than the densities at most Classic period sites on the mainland sites, with the exception of the major regional centers such as Tikal and Copan (Sidrys 1976: Table 1).

In addition to calculating the density of obsidian at San Pedro, the ratio of blades to cores can also be considered in terms of amount of production at the site. Experimental reduction of a polyhedral core by Sheets and Muto (1972: Table 1) produced 83 blades from a single core. McKillop (1989: 39) produced 125 blades per core, Clark (1986: 36) reports the production of 150 blades per core and Aoyama (2017: 292) suggests between 150 – 200 blades per core. If the obsidian whole blades and proximal blade segments from the 2017 excavations are used, the ratios would be 124 blades/core for all obsidian and 90 blades/core for Ixtepeque obsidian (assuming the core fragment is, in fact, from Ixtepeque). The ratios from the early 1990s excavations at San Pedro are 46.7 blades/core for all obsidian and 41.7 blades/core for Ixtepeque obsidian (Stemp et al. 2011: 149). These ratios do not include medial or distal fragments because it is difficult to know how many medial fragments were produced (see De León et al. 2009) from a single blade nor which distal fragments are from which proximal

fragments. Nevertheless, these data, if using the Clark (1986) and Aoyama (2017) ratios, suggest that polyhedral cores arrived on the caye already in reduced condition. However, both the obsidian density and blades per core ratio data may be a bit misleading because these data likely also reflect the fact that substantial quantities of blades from San Pedro were actually traded inland for other resources (see Johnson 1976: 126-127). The San Pedranos most likely acquired much more obsidian than they kept on the caye for their own use.

If the green hard-hammer flake is Pachuca obsidian, it would be the first example from the San Pedro site and would confirm a lithic connection to central Mexico (Argote-Espino et al. 2012; Spence 1996; Moholy-Nagy 1999, 2008; Ponomarenko 2004; Tenorio et al. 1998), although some of the Indeterminate obsidian could be from Mexican sources. Lithic links to Mexico on Ambergris Caye have been demonstrated through the Ucareo obsidian from San Juan and Laguna de Cayo Francesca (McKillop 1995: 168, Table 29) and green obsidian from Marco Gonzalez (Graham 1989: 152; Graham and Pendergast 1989), Laguna de Cayo Francesca (McKillop 1995: 168, Table 29). Laguna de Cayo Francesca (McKillop 1995: 171; 1996: 54-55) and San Juan (Guderjan et al. 1989; McKillop 1995: 167; 1996: 54-55). The green obsidian flake probably dates to the Terminal Classic into the Postclassic and was likely not a prestige good at this time (see Braswell 2003: 156; Golitko et al. 2012: 511). Green obsidian was traded down the Caribbean coast as evidenced by its presence in relatively small amounts at a number of sites (e.g., Dreiss and Brown 1989: 70, Table 2; McKillop 1989:45-46; 1996: 54-55; Pendergast 1979, 1990).

The Chert, Chalcedony, and Limestone Sub-assemblage

Raw Material

Because no chert or chalcedony sources occur on Ambergris, all of this raw material was imported from the mainland (Cornec 1985; Guderjan 1988: 221; Hult and Hester 1995). In terms of the non-obsidian lithic sub-assemblage, 153 artifacts (72.2%) were identified as Northern Belize Chert-bearing Zone (NBCZ) chert (Figure 1). The identification of the NBCZ lithic material was based primarily on visual examination of stone color, color patterning, and grain size (see Hester and Shafer 1984: 158; McAnany 1989: 334; Stemp 2001: 26). There were 15 (7.1%) artifacts of cherts other than NBCZ material, but their sources are unknown. Some of these lower quality cherts may have been recovered from mainland sources around Northern River Lagoon (Mock 1997), Rocky Point (Kelly 1982), Midwinter Lagoon (S. Mazzullo, personal communication 2000), Saktunja/Cabbage Ridge (Speal 2006), and/or Laguna de On (Masson 1997; Oland 1999). A small amount of honey-colored chalcedony (8 or 3.8%) was identified, and 5 (2.4%) limestone flakes and chunks were recovered. The chalcedony was identified by its translucent to semi-translucent appearance (Mitchum 1991:45) and its fibrous texture. The chalcedony excavated from San Pedro may have been obtained from mainland locations, such as the limestone facies north of the NBCZ, across the Freshwater Creek and New River faults, the Progresso area, near Richmond Hill, Kichpanha (Hester and Shafer 1984:158-160; Mitchum 1991:45) and/or in the vicinity of Laguna de On (Oland 1999:105, Table 1). The rest of the chert and chalcedony sub-assemblage (29 or 12.3%) was too badly burnt and/or patinated to reliably the artifacts assign it to a specific source category. These artifacts were grouped into the

"Indeterminate" category. The burnt artifacts possessed one or more of the following characterisitcs: Smoother or 'soapy/greasy' texture; color change depending on severity of burning (pink, red, gray, black, white or calcined) and elemental composition of the raw material, potlid fractures, heat crazing, and possible weight loss (see Luedtke 1992: 97; Purdy 1975: 136-140). Some Indeterminate artifacts had a white or black patina (Rottlander 1975; Luedtke 1992; Cackler et al. 1999). The black patina may be the result of manganese-iron oxidation due to submersion in salt/brackish water or a weathering process of alternating or periodic wet-dry conditions, in which the artifact was repeatedly submerged in water and then exposed to a dry environment (Hester et al. 1982; Shafer and Hester 1990; Cackler et al. 1999). Two of the artifacts from the 2107 excavations look like fine-grained black flint, rather than chert. It is possible that these are stone types introduced to the caye by Europeans, possibly Spaniards or the British, as ship ballast.

The raw material types from the 2017 excavations on the Hostel La Vista property are similar to those from the early 1990s excavations in the same location. In the 1990s excavations, 434 non-obsidian chipped stone artifacts were recovered. Of these, 334 (77%) were made from NBCZ chert, 20 (4.6%) were produced from brown, honey-colored, and gray chalcedonies, and 76 (17.5%) were other coarser-grained cherts or indeterminate materials. Unlike in the 2017 excavations, there were 3 (0.7%) quartzite and 1 (0.2%) slate artifacts recovered in the early 1990s. Evidence for European contact is represented by two pieces of black flint - a gunflint and a strike-a-light fire-flint. (Clarke 1935; Hamilton 1979, 1980; Hamilton and Fry 1975; Lavin 1965; Noel Hume 1976).

Production Technology and Tool Use

Forty-one (19.3%) of the 212 chert, chalcedony, and limestone chipped stone artifacts from the 2017 San Pedro excavations were classified as formal tools (Table 5). Based on tool morphology and production technology, the majority of these formal tools are identical to those from the workshops at Colha (Shafer and Hester 1983; Hester and Shafer 1984). The majority (19 or 46.3%) of the formal tools are thin bifaces, specifically lenticular bifaces of the laurel-leaf and lozenge forms (Figures 7, 8, 10) from the late facet of the Early Postclassic (ca. AD ?) at Colha (Shafer and Hester 1983; Hester and Shafer 1991). One lenticular biface made from chalcedony was also found. Similar lenticular bifaces are noted from other sites on Ambergris Caye (McKillop 1995; Stemp 2001; Stemp and Graham 2006). A smaller number of large bifaces (Figure 7), both oval (4 or 9.8%) and general-utility (1 or 2.4%) forms, were also found. The 4 oval bifaces are similar to those from the Late Classic/Postclassic, rather than the Late Preclassic, variety described from Colha (Hester 1985; Shafer 1991:33-34, Figure 2). One of these bifaces was recycled into a hammerstone based on significant edge crushing. Miscellaneous thick (3 or 7.3%) and thin (5 or 12.2%) biface fragments were also found. They are from oval bifaces, thicker celts, and lenticular bifaces. The rest of the formal assemblage consists of one blade, one thick narrow biface, one biface stem (either from a stemmed macroblade or a stemmed biface), 4 retouched macroblades, and 2 small side-notched points (SSNP) (Figures 8, 9). The SSNPs are similar to the Late Postclassic-Colonial period examples reported from other sites in Belize and Guatemala (Meissner 2014; Oland 2009, 2013; Shafer

and Hester 1988; Simmons 1995, 2002). One chert SSNP was excavated from Marco Gonzalez in the 1980s (see Stemp 2001).

Although the range of formal tool types recovered from the early 1990s excavations at San Pedro is similar, the relative proportions of some types vary. Most significantly, many more lenticular bifaces were recovered during the 2017 excavations than in the early 1990s excavations and more large bifaces (oval and general-utility) were recovered during the early 1990s excavations (see Stemp 2001, 2004). There were proportionally fewer formal tools or tool fragments recovered during the early 1990s excavations (12 of all non-obsidian artifacts) (Stemp 2004: 39). The formal tools in the non-obsidian chipped stone tool sub-assemblage from the early 1990s San Pedro excavations consisted of nineteen heavily used, reworked, or recycled large bifacial tools and fragments from large bifaces. Only two complete bifaces were recovered from this site in the early 1990s. One was a whole oval biface and the other was a thick general-utility celt (see Hester 1985; Shafer and Hester 1983). Four of the large biface fragments described above were recycled into hammerstones or pounding tools. Only one medial lenticular biface fragment similar to those reported from the 'Late Facet' of the Early Postclassic period at Colha was excavated from San Pedro in the early 1990s (Hester and Shafer 1991). The rest of the non-obsidian formal tools recovered in the early 1990s included twentytwo smaller fragments or edges from thick bifaces, such as the oval or general-utility bifaces, thin biface fragments, some blade fragments, a macroblade fragment, a retouched blade fragment, and one almost complete stemmed blade (Stemp 2001, 2004).

The informal chert, chalcedony, and limestone tool sub-assemblage from the 2017 excavations at San Pedro primarily consist of hard-hammer flakes (84 or 49.1%), bifacial thinning flakes (39 or 22.8%), flake cores and core fragments (9 or 5.3%), of which some were, recycled into hammerstones, and blocky fragments (37 or 21.6%) (Table 6, Figure 10). The majority of the informal tools were made from NBCZ chert (116 or 67.8%), with 17 (9.9%) made from other mainland chert (of which 2 may be European flint), 7 (4.1%) were chalcedony, 5 (2.9%) were limestone, and 26 (15.2%) were made from Indeterminate chert or chalcedony based on burning and various types of patination. These percentages are generally similar to those from the early 1990s excavations at the site; however, there was no limestone recovered in the early 1990s, but there was some quartzite and slate. Moreover, more flakes from the 1990s excavations were retouched and some were worked into a denticulate, a burin, and a scraper (Stemp 2001).

Most of the flakes from the 2017 were non-cortical (59 or 70.2%) with very few early stage decortication flakes. Most flakes were made from NBCZ chert (56 or 66.7%). This pattern is similar to that from the 1990s excavations, in which 66% were non-cortical and 74.9% were NBCZ chert (Stemp 2001: 40). The difference in percentage of NBCZ chert flakes may be due to the burning and patination of material form the 2017 excavations. Many of the flakes (14 or 38.9%) from the 2017 excavations had flat striking platforms, but there was a significant number of cortical platforms (13 or 36.1%) as well (Table 7). Some of the lipped and facetted platforms may indicate unsuccessful attempts at bifacial thinning (see Stemp 2001: 40).

The percentages of non-cortical bifacial thinning flakes in the informal tool subassemblage from the 2017 (92.3%) and early 1990s (83.3%) excavations are both high and the percentages of NBCZ chert bifacial thinning from both excavations (2017 - 89.7%; 1990s -84.7%) are about the same (Stemp 2001: 41). Most of the bifacial thinning flakes are likely repair/rejuvenation flakes rather than production flakes; this assessment is partly based on the percentages of non-cortical flakes and some edge damage on the dorsal aspects near the platforms that indicate removal from used bifaces. Most (25 or 89.3%) of the bifacial thinning flakes from the 2017 excavations possess lipped and/or facetted platforms (Table 8). The flakes seem to be of two different types, in terms of production, based on the striking platforms and bulbs of percussion. Soft-hammer percussion flakes possess facetted, lipped striking platforms and relatively flat bulbs of percussion. They are similar to those reported from the Early Postclassic workshop deposits at Colha (Shafer and Hester 1983:531, Fig.6b, f; see Hayden and Hutchings 1989: 246-247, Fig. 6). The 'harder'-hammer percussion flakes (Hayden and Hutchings 1989:249) possess striking platforms that can be beveled at right angles to the tool surface, but still may be lipped (see Callaghan 1979: 24). The striking platform sometimes has cone-like fractures indicative of a small contact surface and a more pronounced bulb of percussion. Most of the bifacial thinning flakes (15 or 53.6%) possess traits that are consistent with soft-hammer percussion, while the rest of the flakes have more pronounced bulbs of percussion and tend to be thicker, suggesting possible use of a 'harder' hammer. These numbers are different from those reported for the bifacial thinning flakes from the early 1990s excavations (Stemp: 41), in which only 12.8% were produced using a soft hammer and the rest seem to be the result of 'harder' hammer percussion. Percentages of hinge terminations (21%) on the NBCZ flakes and bifacial thinning flakes from the 2017 excavations San Pedro may indicate lower skill level in stone tool flaking (Table 9).

The flake cores and fragments from both the 2017 and early 1990s excavations are technologically similar with multi-directional flake removals. The fact that flake cores and core fragments of both NBCZ and other cherts were recovered at San Pedro indicates that, in addition to formal tools, some cores and/or nodules of mainland chert did make it to San Pedro. The use of some cores and fragments as hammerstones is seen in both the 2017 and 1990s excavations. Some blocky fragments were also recycled as hammerstones/ pounding stones as well (see Stemp 2001: 43-44, 2004: 39).

Trade an Exchange

The non-obsidian chipped stone tool sub-assemblage from the 2017 San Pedro excavations seems to represent three different procurement and use strategies. First, the San Pedro Maya relied heavily on the acquisition of finished formal tools, specifically lenticular and lozenge bifaces, from the Early to Middle Postclassic Colha workshops in the NBCZ (Hester 1985; Hester and Shafer 1984, 1991; Shafer and Hester 1983). Once acquired, these tools were curated and repaired/recycled as evidenced by resharpening and the conversion of biface fragments into pounding tools or hammerstones. This pattern of tool curation has been noted at other sites on Ambergris Caye (Hult and Hester 1995; Stemp 2001; Stemp and Graham 2006; also see McAnany 1988, 1989) and is also seen in the lithics from the excavations at San Pedro in the early 1990s (Stemp 2001, 2004, 2016). Some of the formal may have been recycled from earlier deposits at San Pedro. This is suspected due to the nature of some of the tool types and the fact that the workshops at Colha ceased production after the Middle Postclassic. Based on the bifacial thinning flakes and biface edges recovered duing the 2017 excavations, bifaces were repaired on the caye. Two Late Postclassic small side-notched projectile points made from NBCZ chert recovered in 2017 are the first to be found at San Pedro. Three CBZ chert macroblades also made it to San Pedro, ostensibly as finished implements from the mainland. There is not enough NBCZ debitage, specifically early stage reduction debitage, or tool preforms/manufacturing failures to support formal tool production at San Pedro itself. The import of finished tools from the mainland has also been argued for other sites on Ambergris Caye (Hult and Hester 1995: 160; Stemp 2001; Stemp and Graham 2006). Given the import of finished tools from the Northern Belize and the heavy curation of these tools, it seems doubtful that the San Pedro Maya traded these tools with people off the caye; however, they may have exchanged tools with other Maya at sites on the caye. Use-wear evidence indicates that biface repair/resharpening flakes at San Pedro and other Ambergris Caye sites were used as *ad hoc* tools (Hult and Hester 1995; Stemp 2001, 2004, 2016; Stemp and Graham 2006).

In addition to the acquisition of finished tools from Colha, the chipped stone tools from the 2017 excavations demonstrate that San Pedranos also acquired a relatively small quantity of nodules/cores of NBCZ chert, which they used for *ad hoc* or expedient flake production. Given the absence of primary (100% dorsal cortex) or early stage secondary (>50% dorsal cortex) cortical NBCZ chert flakes, these nodules/cores were likely acquired after already having been reduced to some degree (i.e., decortication), which would make sense in terms of long-distance transportation by water. Evidence for the use of NBCZ chert flakes and other debitage as tools has been demonstrated based on use-wear analysis on the caye at a number of sites, including San Pedro (Hult and Hester 1995; Stemp 2001, 2004, 2016; Stemp and Graham 2006).

Based on the 2017 San Pedro excavation evidence, the Maya at this site also acquired lower quality chert from unknown mainland sources in the form of nodules/cores. These nodules/cores were flaked on the caye and the flake used as *ad hoc*/expedient tools much in the same way that the NBCZ chert nodules/cores were. Very small amounts of chalcedony and limestone were recovered suggesting the use of these raw materials for expedient tool production as well. A reliance on non-NBCZ cherts was also noted when the 1990s material from San Pedro was analyzed (Stemp 2001, 2004).

Discussion

Overall, it appears the Maya had reasonably good access to chipped stone well into the Colonial period. These tools were imported from a variety of locations, including central Mexico, highland Guatemala, and Northern Belize. Most of the obsidian tools consist of prismatic blades made from Ixtepeque obsidian, although a significant amount of blades were also made from El Chayal material. As noted above, this pattern is consistent with Postclassic coastal trade models based on chemical sourcing (see Braswell 2003; Golitko et al. 2012). The blades are generally wider than those found at contemporary mainland sites and tend to possess lower cutting-edge-to-mass ratios, suggesting access to blades from earlier in the
sequence of prismatic blade removals from polyhedral cores and perhaps less concern with conservation of raw material. Polyhedral cores arrived on the caye already prepared for blade removal and some were already reduced to some degree. The fact that a few earlier series blades were recovered, at least one distal blade segment has a plunging termination, there is some cortex on four blade segments, and one core fragment was recovered lends some support to the suggestion that obsidian did not arrive as whole blades or as blades already snapped into segments (see De León et al. 2009: 118-119). This interpretation is supported by the exhausted cores and core fragments, two 'first series' blade segments, and the two distal blade segments with plunging terminations recovered during the 1990s excavations at the site (see Stemp et al. 2011: 146). However, it may be that some blades did arrive already segmented given the proximal-distal blade segment ratios for Ixtepeque (4.7:1), El Chayal (1.8:1), and Indeterminate (3.8:1) obsidian and the medial-distal segment ratios for Ixtepeque (6.3:1), El Chayal (1.8:1), and Indeterminate (6.2:1) obsidian recovered during the 2017 excavations (see De León 2009: 119, Table 3). It may also be that blades produced on the caye were then segmented locally and the less useful distal segments were disposed of.

It is difficult to gauge obsidian blade curation, although some blades show heavy macroscopic edge wear. It is likely some blades (trimmed overhangs, scratched platforms, El Chayal) were recycled from earlier periods, but how many is not known. Based on blade-to-core ratios, the San Pedranos traded some blades from the caye inland to other sites, but specific quantities are not known. The data from the early 1990s excavations at the site suggest more blades were traded to mainland sites. Blades seem to be the only intentional obsidian tools at San Pedro. No scrapers, bifaces, or SSNPs were recovered, unlike at other Late Postclassic-Colonial period sites in Belize, such as Progresso Lagoon and Caye Coco (Masson 1999; Oland 2009, 2013), Santa Rita Corozal (Shafer and Hester 1988), Lamanai, and Tipu (Simmons 1995, 2002), and Guatemala (Meissner 2014).

In instances when non-obsidian raw material type could be determined, almost all formal tools were produced on fine-grained Northern Belize Chert-bearing Zone (NBCZ) chert. This combination of tool types was also observed in the assemblage excavated from San Pedro in the early 1990s (Stemp 2001, 2004) and at some of the later Postclassic period occupations at Marco Gonzalez (Stemp 2001, Stemp and Graham 2006) to the south and those at sites on the northern end of Ambergris Caye (Hult and Hester 1995). Like the 1990s San Pedro chert sub-assemblage, and those from Marco Gonzalez and sites on the northern end of the caye, evidence indicates that formal tools arrived on the caye in finished form from workshops on the mainland in or around Colha. Once on the caye, the Maya living there used the chert tools available to them quite heavily and attempted to preserve them as long as possible. The quantity of bifacial thinning flakes and biface edge repair flakes attest to this fact. Tool curation is quite obvious. After significant tool exhaustion or breakage, many tools continued to be used and/or were recycled into hammerstones/pounding stones.

The obsidian and chert formal tools from San Pedro seem indicative of a generalized lithic assemblage that was used for a wide range of subsistence and domestic activities by a small coastal population. Importantly, the San Pedro Maya also relied heavily on the locally produced *ad hoc*/expedient technology based on the reduction of cores to produce simple flakes (see Speal 2009) and the opportunistic use of the byproducts of biface repair to increase the quantity of available stone tools. Because there were very few specially designed tools excavated from the early 1990s and 2017 excavations, such as drills, burins, or scraper, the inhabitants did not possess the specialized tool types necessary for larger-scale craftproduction.

Unlike other Maya sites, there were more obsidian artifacts than chert artifacts at San Pedro. The ratio of obsidian to chert artifacts is roughly 1.46:1 using the 2017 excavation data and about 1.2:1 for the chipped stone tools from the Late Postclassic-Early Colonial period excavated at this site in the 1990s (Stemp 2016). These ratios suggest that the San Pedro Maya may have had better access to obsidian than chert, especially in the Late Postclassic-Colonial period. This would make sense given the cessation of formal chert tool production at Colha in the Middle Postclassic.

In sum, the lithic assemblage excavated in 2017 on the Hostel La Vista property in San Pedro was very similar to that recovered from the earlier excavations at the same location almost 30 years ago.

References Cited

Aoyama, K. 2017 Ancient Maya economy: lithic production and exchange around Ceibal, Guatemala. *Ancient Mesoamerica* 28: 279-303.

Argote-Espino, D., J. Sole, P. Lopez-Garcia, and O. Sterpone 2012 Obsidian subsource identification in the Sierra de Pachuca Otumba volcanic regions, Central Mexico, by ICP-MS DBSCAN statistical analysis. *Geoarchaeology* 27: 48-62.

Braswell, G. E.

2003 Obsidian exchange spheres. In *The Postclassic Mesoamerican World*, edited by M. E. Smith and F. F. Berdan, pp. 131-158. University of Utah Press, Salt Lake City.

Braswell, G. E., J. E. Clark, K. Aoyama, H. I. McKillop, and M. D. Glascock 2000 Determining the geological provenance of obsidian artifacts from the Maya region: A test of the efficacy of visual sourcing. *Latin American Antiquity* 11:269-282.

Cackler, P., M.D. Glascock, H. Neff, and B. Mitchum-Chiarulli 1999 Effects of weathering on the coloration of chert and its implications for provenance studies. *Lithic Technology* 24:81-90.

Clark, J. E.

1986 From mountains to molehills: A critical view of Teotihuacan's obsidian industry. In *Research in Economic Anthropology, edited by* B. L. Isaac, pp. 23-74. Supplement 2, JAI Press, Greenwich.

Clark, J. E.

1988 *The Lithic Artifacts of La Libertad, Chiapas, Mexico: An Economic Perspective*. Papers of the New World Archaeological Foundation, No. 52, Brigham Young University, Provo.

Clark, J. E.

1989 Obsidian: The primary Mesoamerican sources. In *La obsidiana en Mesoamérica*, edited by M. Gaxiola G. and J. E. Clark, pp. 299-319. Instituto Nacional de Antropología e Historia, México, D.F.

Clark, J. E. and D. D. Bryant 1997 A technological typology of prismatic blades and debitage from Ojo de Agua, Chiapas, Mexico. *Ancient Mesoamerica* 8: 111-136.

Clarke, R. 1935 The flint knapping industry at Brandon. *Antiquity* 10: 38-56.

Coe, W. R.

1959 *Piedras Negras Archaeology: Artifacts, Caches, and Burials*. Museum Monographs, University Museum, University of Pennsylvania, Philadelphia.

Cornec, J. H.

1985 Note on the Provisional Geological Map of Belize at the Scale of 1:250,000: Petroleum Office, Ministry of Natural Resources, Belmopan, Belize. Manuscript on file with the Geology and Petroleum Office, Belmopan, Belize.

Crabtree, D. E. 1968 Mesoamerican polyhedral cores and prismatic blades. *American Antiquity* 33:446-478.

De León, J. P., K. G. Hirth, and D. M. Carballo 2009 Exploring Formative Period obsidian blade trade: Three distribution models. *Ancient Mesoamerica* 20: 113-128.

Dreiss, M. L. and D. O. Brown 1989 Obsidian exchange patterns in Belize. In *Research in Economic Anthropology*, edited by P. A. McAnany and B. L. Isaac, pp. 57-90. Supplement 4, JAI Press, Greenwich.

Graham, E.

1989 Brief Synthesis of Coastal Site Data from Colson Point, Placencia, and Marco Gonzalez, Belize. In *Coastal Maya Trade*, edited by H. McKillop and P.F. Healy, pp. 138-154, Occasional Papers in Anthropology No.8, Trent University, Peterborough.

Graham, E. and D. M. Pendergast

1989 Excavations at the Marco Gonzalez site, Ambergris Cay, Belize, 1986. *Journal of Field Archaeology* 16:1-16.

Graham, E. and D. M. Pendergast

1994 *The Sands of Time: San Pedro, Ambergris Caye, 1993*. Archaeological Newsletter, Series II, No. 52. Royal Ontario Museum, Toronto.

Guderjan, T. H.

1988 *Maya Maritime Trade at San Juan, Ambergris Caye, Belize*. Ph.D. dissertation, Southern Methodist University, Dallas.

Guderjan, T. H, J. F. Garber and H. A. Smith

1989 Maritime trade on Ambergris Caye. In *Coastal Maya Trade*, edited by H. McKillop and P. F. Healy, pp.123-134, Occasional Papers in Anthropology, No.8, Trent University, Peterborough.

Hamilton, T.M. (1979) Guns, Gunflints, Balls and Shot. In *Tunica Treasure*, edited by J.P. Brain, pp. 206-216, Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 71, Harvard University, Cambridge.

Hayden, B. and W. K. Hutchings

1989 Whither the billet flake? In *Experiments in Lithic Technology*, edited by D. S. Amick and R. P. Mauldin, pp. 235-257, BAR International Series 528, Oxford.

Hamilton, T. M.

1980 The gunflint in North America. In *Colonial Frontier Guns*, edited by T. M. Hamilton, pp. 138-147. The Fur Press, Chadron.

Hester, T. R.

1985 The Maya lithic sequence in Northern Belize. In *Stone Tool Analysis: Essays in Honor of Don E. Crabtree,* edited by M.G. Plew, J.C. Woods, and M.G. Pavesic, pp. 187-210, University of New Mexico Press, Albuquerque.

Hester, T. R. and H. J. Shafer 1984 Exploitation of chert resources by the ancient Maya of Northern Belize, Central America. *World Archaeology* 16: 157-173.

Hester, T. R. and H. J. Shafer

1991 Lithics of the Early Postclassic at Colha, Belize. In *Maya Stone Tools: Selected Papers from the Second Maya Lithic Conference*, edited by T. R. Hester and H. J. Shafer, pp.155-162, Monographs in World Prehistory No.1, Prehistory Press, Madison.

Hirth, K. G.

2008 The economy of supply: Modeling obsidian procurement and craft provisioning at a Central Mexican urban center. *Latin American Antiquity* 19: 435-457.

Hult, W. and T. R. Hester

1995 The Lithics of Ambergris Caye. In *Maya Maritime Trade, Settlement, and Populations on Ambergris Caye, Belize,* edited by T. H. Guderjan and J. F. Garber, pp. 139-161, Maya Research Program and Labyrinthos, Lancaster.

Johnson, J. K. 1976. *Chipped Stone Artifacts from the Western Maya Periphery*. Unpublished Ph.D. Dissertation. Southern Illinois University, Carbondale.

Lavin, J. D. 1965 A History of Spanish Firearms. Herbert Jenkins, London.

Luedtke, B. E. 1992 An Archaeologist's Guide to Chert and Flint. Archaeological Research Tools 7, Institute of Archaeology, University of California, Los Angeles.

McAnany, P. A. 1988 Effect of lithic procurement strategies on tool curation and recycling. *Lithic Technology* 17: 3-11. McAnany, P. A.

1989 Stone-tool production and exchange in the Eastern Maya Lowlands: The consumer perspective from Pulltrouser Swamp, Belize. *American Antiquity* 54: 332-346.

Masson, M. A.

1997 Cultural transformation at the Maya Postclassic community of Laguna de On, Belize. *Latin American Antiquity* 8: 293-316.

Masson, M. A.

1999 Postclassic Maya communities at Progresso Lagoon and Laguna Seca, Northern Belize. *Journal of Field Archaeology* 26: 285-306.

McKillop, H.

1989. Coastal Maya trade: Obsidian densities at Wild Cane Cay. In *Research in Economic Anthropology*, edited by P. A. McAnany and B. L. Isaac, pp. 17-56. Supplement 4, JAI Press, Greenwich.

McKillop, H.

1995 The role of northern Ambergris Caye in Maya obsidian trade: Evidence from visual sourcing and blade technology. In *Maya Maritime Trade, Settlement, and Populations on Ambergris Caye, Belize*, edited by T. H. Guderjan and J. F. Garber, pp. 163-174. Maya Research Program and Labyrinthos, Lancaster.

McKillop, H. 1996. Ancient Maya trading ports and the integration of long-distance and regional economies: Wild Cane Caye in south-coastal Belize. *Ancient Mesoamerica* 7(1):49-62.

Meissner, N. J. 2014 *Technological Systems of Small Point Weaponry of the Postclassic Lowland Maya (A.D. 1400-1697*). Unpublished Ph.D. dissertation, Southern Illinois University, Carbondale.

Mitchum, B. A.

1991 Lithic artifacts from Cerros, Belize: Production, consumption, and trade. In *Maya Stone Tools: Selected Papers from the Second Maya Lithic Conference*, edited by T.R. Hester and H.J. Shafer, pp. 45-53, Monographs in World Archaeology No.1, Prehistory Press, Madison.

Moholy-Nagy, Hattula 1999 Mexican Obsidian at Tikal, Guatemala. *Latin American Antiquity* 10: 300-313.

Moholy-Nagy, H.

2008 *The Artifacts of Tikal: Ornamental and Ceremonial Artifacts and Unworked Material.* Tikal Report No. 27, Part A. University Museum Monograph 127. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.

Noel Hume, I.

1976 A Guide to Artifacts of Colonial America. A. A. Knopf, New York.

Oland, M. H.

1999 Lithic raw material sources at the southern end of the Freshwater Creek drainage: A view from Laguna de On, Belize. *Lithic Technology* 24: 91-110.

Oland, M. H.

2009 Long-Term Indigenous History on a Colonial Frontier: Archaeology at a 15th-17th Century Maya Village, Progresso Lagoon, Belize. Unpublished Ph.D. dissertation. Northwestern University, Evanston.

Oland, M. H.

2013 The fifteenth-seventeenth century lithic economy at Progresso Lagoon, Belize. *Lithic Technology* 38: 81-96.

Pendergast, D. M. 1979 *Excavations at Altun Ha, Belize 1964-1970*. Vol. 1, Royal Ontario Museum, Toronto.

Pendergast, D. M. 1990 *Excavations at Altun Ha, Belize, 1964-1970*. Vol. 3, Royal Ontario Museum, Toronto.

Pendergast, D. M. and E. Graham 1991 *The Town Beneath the Town: 1991 Excavations at San Pedro, Ambergris Caye, Belize*. Archaeological Newsletter, Series II, No. 45, Royal Ontario Museum, Toronto.

Ponomarenko, A. L. 2004 The Pachuca obsidian source, Hidalgo, Mexico: A geoarchaeological perspective. *Geoarchaeology* 19: 71-91.

Purdy, B.A. 1974 Investigations concerning the thermal alteration of silica minerals: An archaeological approach. *Tebiwa* 17: 37-66.

Rottländer, R. 1975 Formation of patina on flint. *Archaeometry* 17: 106-110.

Shafer, H. J.

1991 Late Preclassic formal stone tool production at Colha, Belize. In *Maya Stone Tools: Selected Papers from the Second Maya Lithic Conference*, edited by T. R. Hester and H. J. Shafer, pp. 31-44, Monographs in World Archaeology No.1, Prehistory Press, Madison.

Shafer, H. J. and T. R. Hester 1983 Ancient Maya chert workshops in Northern Belize, Central America. *American Antiquity* 48: 519-543. Shafer, H. J. and T. R. Hester

1988 Preliminary analysis of Postclassic lithics from Santa Rita Corozal, Belize. In *A Postclassic Perspective: Excavations at the Maya Site of Santa Rita Corozal, Belize*, edited by D. Z. Chase and A. F. Chase, pp. 111-122. Monograph 4, Pre-Columbian Art Research Institute, San Francisco.

Shafer, H.J. and T.R. Hester

1990 The Puleston axe: A Late Preclassic Maya hafted tool from Northern Belize. In *Ancient Maya Wetland Agriculture: Excavations on Albion Island, Northern Belize*, edited by M.D. Pohl, pp. 279-294, Westview Press, Boulder.

Sheets, P. and G. R. Muto 1972 Pressure blades and total cutting edge: An experiment in lithics technology. *Science* 175: 632-634.

Sidrys, R. V. 1976 Classic Maya obsidian trade. *American Antiquity* 41: 449-464.

Sidrys, R. V. 1979 Supply and demand among the Classic Maya. *Current Anthropology* 20: 594-597.

Simmons, S. E.

1995 Maya resistance, Maya resolve: The tools of autonomy from Tipu, Belize. *Ancient Mesoamerica* 6: 135-146.

Simmons, S. E. 2002 Late Postclassic-Spanish Colonial period stone tool technology in the southern Maya lowland area: The view from Lamanai and Tipu, Belize. *Lithic Technology* 27: 47-72.

Speal, C. S.

2006 Regional economic integration in the coastal Maya Lowlands: The lithic assemblage of Saktunha. *Lithic Technology* 31: 3-26.

Speal, C. S.

2009 The economic geography of chert lithic productionin the southern Maya Lowlands: A comparative examination of early-stage reduction debris. *Latin American Antiquity* 20: 91-119.

Spence, M. W.

1996 Commodity or gift: Teotihuacan obsidian in the Maya region. *Latin American Antiquity* 7: 21-39.

Stemp, W. J.

2001 *Chipped Stone Tool Use in the Maya Coastal Economies of Marco Gonzalez and San Pedro, Ambergris Caye, Belize.* BAR International Series 935, Oxford.

Stemp, W. J.

2004 Maya coastal subsistence and craft-production at San Pedro, Ambergris Caye, Belize: The lithic use-wear evidence. *Lithic Technology* 29: 33-73.

Stemp, W. J.

2016 Coastal Maya obsidian tool use and socio-economy in the Late Postclassic-Early Spanish Colonial period at San Pedro, Ambergris Caye, Belize. *Journal of Field Archaeology* 41: 162-176.

Stemp, W. J. and E. Graham

2006 Ancient Maya procurement and use of chipped chert and chalcedony tools at Marco Gonzalez, Ambergris Caye, Belize. *Lithic Technology* 31: 27-56.

Stemp, W.J., E. Graham and J. Goulet

2011 Coastal Maya obsidian trade in the Late Postclassic to Early Colonial Period: The view from San Pedro, Ambergris Caye, Belize. *Journal of Island and Coastal Archaeology* 6: 134-154.

Tenorio, D., A. Cabral, P. Bosch, M. Jiménez-Reyes, and S. Bulbulian 1998 Differences in coloured obsidians from Sierra de Pachuca, Mexico. *Journal of Archaeological Science* 25: 229-234.

Willey, G.R., W. R. Bullard, Jr., J. B. Glass, and J. C. Gifford 1965 *Prehistoric Maya Settlements in the Belize Valley*. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 54, Harvard University, Cambridge.

Tables

Table 1. Obsidian Artifacts from Hostel La Vista, San Pedro – 2017 Excava	tions.
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Tool type	El Chayal	Ixtepeque	Pachuca	Indeterminate
Prismatic blades – pressure (non-				
cortical)*				
Whole	1	6	0	2
Proximal	7	84	0	24
Medial	7	113	0	31
Distal	4	18#	0	5
Prismatic blades – pressure (cortical)				
Whole	0	0	0	0
Proximal	0	0	0	0
Medial	0	0	0	0
Distal	0	1	0	2
Prismatic blades – percussion (cortical)				
Whole	0	0	0	0
Proximal	0	1	0	0
Medial	0	0	0	0
Distal	0	0	0	0
Flakes – hard-hammer (non-cortical)				
Whole	0	1	1^	0
Proximal	0	0	0	0
Medial	0	0	0	0
Distal	0	0	0	0
Exhausted pressure core fragment	0	0	0	18
Total	19	224	1	65

*Includes four, possibly five, first/second-series blades.

[#]One distal fragment has a plunging/outre-passé termination.

^Possibly green bottle glass.

⁸Possibly Ixtepeque obsidian.

Table 2. Striking Platform Types on Whole Obsidian Prismatic and Percussion Blades and Proximal Obsidian Prismatic and Percussion Blade Segments from Hostel La Vista, San Pedro – 2017 Excavations.

Platform type	El Chayal	Ixtepeque	Indeterminate	Total
Ground/pecked with overhang	3	74	18	95
Ground/pecked and trimmed	2	7	3	12
Scratched with overhang	0	1	0	1
Scratched and trimmed	2	3	3	8
Plain with overhang	0	0	2	2
Plain and trimmed	1	1	0	2
Indeterminate/damaged	0	5	0	5

Table 3. Obsidian Blade Cross-section Shape from Hostel La Vista, San Pedro – 2017 Excavations.

Cross-section shape	El Chayal	Ixtepeque	Indeterminate	Total
Triangular	1	27	8	36
Trapezoidal	14	183	56	255
Other (3+ dorsal ridges)	3	9	3	15

Table 4: Obsidian prismatic blade lengths, widths, and cutting-edge to mass ratios from San Pedro and other Maya sites.

	Period of occupation	Mean blade length (cm)	Range – blade length (cm)	Mean blade width (cm)	Range – blade width (cm)	Cutting edge/mass ratio (cm/g)
Experimental reduction (Sheets and Muto 1972: Table 1)	n/a	10.4	6.2 – 12.7	1.53	0.8 - 2.4	2.3
San Pedro – El Chayalª (2017 Excavations)	Moslty Late Postclassic- Historic	7.5	7.5	1.42	0.87 - 2.1	5.03
San Pedro – Ixtepeque (2017 Excavations)	Mostly Late Postclassic- Historic	6.8	5.1 – 9.1	1.29	0.54 – 1.99	4.97
San Pedro – indeterminate (2017 Excavations)	Mostly Late Postclassic- Historic	7.7	7.7 – 7.8	1.27	0.76 - 1.84	5.0
San Pedro – El Chayal ^a (Stemp et al. 2011: Table 3)	Late Postclassic – Early Historic	4.1	4.1	1.46	0.73 – 2.11	5.0
San Pedro – Ixtepeque (Stemp et al. 2011: Table 3)	Late Postclassic – Early Historic	7.3	5.6 – 9.2	1.3	0.7 – 2.5	4.89
San Pedro – other gray ^b (Stemp et al. 2011: Table 3)	Late Postclassic – Early Historic	n/a	n/a	1.45	0.95 – 2.0	4.21
San Pedro – other black ^b (Stemp et al. 2011: Table 3)	Late Postclassic – Early Historic	n/a	n/a	1.46	0.7 – 2.0	4.68
Los Renegados – El Chayal (McKillop 1995a: Table 30)	Postclassic	n/a	n/a	1.3	n/a	4.49
Los Renegados – Ixtepeque (McKillop 1995a: Table 30)	Postclassic	n/a	n/a	1.34	n/a	4.19
Los Renegados – all grey (McKillop 1995a: Table 30)	Postclassic	n/a	n/a	1.34	n/a	4.19
Wild Cane Cay – El Chayal (McKillop 1996: Table 3)	Early Postclassic	n/a	n/a	1.10	n/a	4.34

Wild Cane Cay – Ixtepeque	Early	n/a	n/a	1.50	n/a	3.13
(McKillop 1996: Table 3)	Postclassic					
Wild Cane Cay – all gray	Early	n/a	n/a	1.23	n/a	4.55
(McKillop 1996: Table 3)	Postclassic					
Patchchacan – all obsidian ^c	Postclassic	n/a	n/a	1.19	n/a	6.64
(Sidrys 1979: Table 1)						
Corozal Beach – all obsidian ^c	Postclassic	n/a	n/a	1.14	n/a	5.12
(Sidrys 1979: Table 1)						
Santa Rita Corozal – all obsidian	Postclassic	n/a	n/a	1.15	n/a	5.24
(Sidrys 1979: Table 1)						
Chan Chen – all obsidian ^c (Sidrys	Postclassic	n/a	n/a	1.11	n/a	6.56
1979: Table 1)						
Sarteneja – all obsidian	Late	n/a	n/a	1.07	n/a	7.44
(Sidrys 1979: Table 1)	Postclassic					
Ichpaatun – all obsidian	Late	n/a	n/a	1.14	n/a	5.66
(Sidrys 1979: Table 1)	Postclassic					
Mayapan – all obsidian	Late	n/a	n/a	1.1	n/a	5.70
(Sidrys 1979: Table 1)	Postclassic					

^aonly one whole El Chayal obsidian blade recovered.

^bno whole obsidian blades recovered.

^cthe majority of obsidian dates to this period, but not all.

Table 5. Non-obsidian Formal Artifacts from Hostel La Vista, San Pedro – 2017 Excavations.

Tool type	NCBZ chert	Chalcedony	Indeterminate (burnt/patinated/black oxidation)
Blades	1	-	-
Oval bifaces	2	-	1
Oval bifaces recycled into hammerstones	1	-	-
General utility bifaces	1	-	-
Narrow thick bifaces	1	-	-
Miscellaneous thick bifaces	3	-	-
Lenticular bifaces (lozenge and laurel-leaf)	17*^	1	1
Miscellaneous thin bifaces	4	-	1
Bifacial stems (stemmed macroblade or stemmed	1	-	-
biface)			
Retouched macroblades	4	-	-
Small, side-notched points	2	-	-
Total	37	1	3

*Includes one stemmed artifact.

^Includes repaired/recycled artifacts.

Tool type	CBZ chert	Other chert	Chalcedony	Limestone	Indeterminate (burnt/patinated/black
	enere	enere			oxidation)
Flakes (primary - 100% cortex)	-	-	-	-	1
Flakes (secondary - >50% cortex)	-	-	-	1	-
Flakes (secondary - <50% cortex)	14	6	-	1	2
Flakes (tertiary – 0% cortex)	41	1	3	1	12
Bifacial thinning flakes	3	-	-	-	-
(secondary - <50% cortex)					
Bifacial thinning flakes (tertiary –	32	-	4	-	-
0% cortex)					
Retouched flakes (tertiary – 0%	1	-	-	-	-
cortex)					
Flake cores	-	2	-	-	-
Flake cores recycled into	1	-	-	-	-
hammerstones					
Flake core fragments	3	1*	-	-	1
Flake core fragments recycled	1	-	-	-	-
into hammerstones					
Nodules	-	1	-	-	-
Blocky fragments	19	6^	-	2	10
Blocky fragments recycled into	1	-	-	-	-
hammerstones					
Total	116	17	7	5	26

Table 6. Non-obsidian Informal Artifacts from Hostel La Vista, San Pedro – 2017 Excavations.

*Artifact may be European flint brought over as ship ballast.

^Includes one artifact that may be European flint brought over as ship ballast.

Table 7. Platform Types on Non-obsidian Flakes and Proximal Flake Fragments from Hostel La Vista, San Pedro – 2017 Excavations.

	CBZ chert	Other chert	Chalcedony	Limestone	Indeterminate (burnt/patinated/black oxidation)
Cortical	6	4	-	1	2
Flat	9	2	1	-	2
Flat & lipped	3	-	-	-	-
Lipped	1	-	1	-	-
Facetted & lipped	3	-	-	-	-
Crushed	1	-	-	-	-

Table 8. Platform Types on Non-obsidian Bifacial Thinning Flakes and Proximal Bifacial Thinning Flake Fragments from Hostel La Vista, San Pedro – 2017 Excavations.

	CBZ chert	Chalcedony
Cortical & lipped	1	-
Flat & lipped	5	1
Lipped	4	1
Facetted	1	-
Facetted & lipped	12	-
Crushed	3	-

Table 9. Termination Types on Non-obsidian Flakes/Bifacial Thinning Flakes and DistalFlake/Bifacial Thinning Flake Fragments from Hostel La Vista, San Pedro – 2017 Excavations.CBZ chertOther chertChalcedonyIndeterminate

			,	(burnt/patinated/black oxidation)
Feather	48	3	3	7
Hinge	13	-	-	3
Step	1	-	-	-

Figures



Figure 1. Chipped stone artifact raw material types from Hostel La Vista, San Pedro – 2017 excavations.



Figure 2. Possible green obsidian flake from Lot 250 from Hostel La Vista, San Pedro – 2017 excavations.



Figure 3. Obsidian prismatic blade and blade segments from Lot SP270 from Hostel La Vista, San Pedro – 2017 excavations. Note the ground platforms and the overhangs on the whole blades and proximal segments.



Figure 4. Obsidian prismatic blade segments from Lot SP260 from Hostel La Vista, San Pedro – 2017 excavations. Note the ground platforms and the overhangs on the proximal segments.



Figure 5. Obsidian medial prismatic blade segment used as a spokeshave from Hostel La Vista, San Pedro – 2017 excavations.



Figure 6. Experimental obsidian proximal blade segment used as a spokeshave by W. J. Stemp.



Figure 7. Chert bifaces and biface fragments from Lot SP266 from Hostel La Vista, San Pedro – 2017 excavations. Note the repaired/resharpened oval biface (left), the lenticular biface [laurel-leaf] (top center), the proximal oval biface fragment (bottom center), the lenticular biface [laurel-leaf], and the lenticular biface [lozenge].



Figure 8. Chert bifaces and biface fragments from Hostel La Vista, San Pedro – 2017 excavations. Note the lenticular biface [lozenge] (left), the proximal biface stem/fragment (center), the repaired/resharpened biface (right).



Figure 9. Obsidian prismatic blade segments (left), chert thick, narrow biface (center), and chert small side-notched point [SSNP] (top right) from Lot SP277 from Hostel La Vista, San Pedro – 2017 excavations.



Figure 10. Chert artifacts from Lot SP270 from Hostel La Vista, San Pedro – 2017 excavations. Note the core/nodule (top left), biface/bifacial core recycled into a hammerstone (bottom left), and the stemmed lenticular biface (center right). Also included are core fragments, flakes, and bifacial thinning flakes.

Appendix 4

Preliminary Report on the Faunal Remains Recovered at the San Pedro site in 2017

by Tracie Mayfield

Results of Preliminary Zooarchaeological Analyses of Faunal Remains Recovered during 2017 Excavations at the San Pedro site, Ambergris Caye, Belize

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Introduction

The following report presents the results of preliminary zooarchaeological analyses of faunal remains recovered during 2017 excavations at Hostel La Vista, San Pedro Town, Ambergris Caye¹. Excavations recovered a total of 3,680 individual faunal specimens (NISP). Vertebrate remains were identified using standard zooarchaeological methods (Reitz and Wing 2008)². Species identified are summarized in faunal categories based on vertebrate class to facilitate comparisons of relative dietary contribution.

A number of primary data classes are recorded, including taxonomic identification, skeletal element, element portion, and fusion. The Number of Identified Specimens (NISP), or bone count, is determined for each taxonomic identification. Specimens that cross-mend with other specimens in the same minimum analytical unit (lot) are counted as single specimens. No attempt was made to cross-mend specimens from separate lots within individual trenches.

All specimens were weighed to provide additional information about the relative abundance of identified taxa. Indicators for sex, age at death, and modifications such as rodent/carnivore gnawed, burned/calcined, cut, hacked, crushed/impacted, twisted, drilled, or worked bone were noted where observed. Specimen descriptions, analyses, and interpretations are sorted into three interpretive contexts: 1) total assemblage, 2) mixed context³, and 3) Maya context. Sixty-seven lots (levels), located within four trenches (units) were excavated during the 2017 field season. Of those, 15 lots contained no faunal remains.

General Assemblage

A total of 3,680 (NISP) faunal specimens were recovered in 2017. Fifty-two taxonomic identifications were noted in the assemblage (Table 1).

¹ Analysis is based on field identifications undertaken during the 2017 excavations.

² The majority of mixed lots were not screened (defined later in this report), but all Maya (only) contexts were screened using 1/16th mesh.

³ Mixed contexts include modern, colonial, and Maya artifacts.

Common Name	Taxon	NISP	BIOMASS
anteater	Pilosa	1	0.16%
barracuda	Sphyraenidae	129	6.68%
bird/large	Aves (large)	20	0.50%
bird/medium	Aves (medium)	18	0.26%
bird/medium-large	Aves (medium-large)	12	0.21%
bird/small	Aves (small)	5	0.05%
bird/small-medium	Aves (small-medium)	13	0.20%
Brocket deer	Mazama sp.	1	0.85%
chicken	Gallus gallus	4	0.06%
COW	Bos taurus	93	11.80%
crab	Pleocyemata	128	0.61%
crocodile	Crocodylus sp.	5	0.11%
deer	Odocoileus sp.	32	4.19%
dog	Canis sp.	3	0.57%
Drums and Croakers (fish)	Sciaenidae	38	0.00%
fish/bony (large)	Osteichthyes (large)	50	2.20%
fish/bony (medium-large)	Osteichthyes (medium-large)	230	3.17%
fish/bony (medium)	Osteichthyes (medium)	20	0.68%
fish/bony (small-medium)	Osteichthyes (small-medium)	316	2.20%
fish/bony (small)	Osteichthyes (small-medium)	43	0.59%
fish/bony (UNID)	Osteichthyes (UNID)	132	1.82%
fish/bonv (var.)	Osteichthyes (var.)	1.195	4.87%
Gibnut (Paca)	Cuniculus paca	2	0.28%
	Ignanidae	21	0.25%
nammal/large	Mammalia (large)	253	17.08%
mammal/medium	Mammalia (medium)	63	2.97%
mammal/medium-large	Mammalia (medium-large)	68	4 93%
mammal/small	Mammalia (small)	28	0.42%
mammal/small-medium	Mammalia (small-medium)	81	1.92%
mammal/UNID	Mammalia UNID	5	0.02%
manatee (W. Indian)	Trichechus manatus	12	8.58%
mouse (New World)	Peromyscus sp.	5	0.00%
Parrot Fish	Scaridae	1	0.64%
Dig/Deccarv	Sus scrofa/Pecari taiacu	195	11.62%
rat (New World)	Signom dontinac	1	0.01%
reptile	Reptilia (UNID)	2	0.02%
reptile/large	Reptilia (large)	5	0.15%
reptile/small	Reptilia (small)	8	0.02%
reptile/small-medium	Repuilia (small-medium)	1	0.02%
rodent/medium	Rodentia (medium)	2	0.05%
shark	Chondrichthyes	2	0.19%
shell/American Auger	Terebridae	12	0.00%
shell/conch	Strombidae	26	0.00%
shell/ovster	Crassostrea sp		0.00%
shell/Sunray venus	Macrocallista nimbosa	1	0.00%
shell/UNID	shell (UNID)	89	0.00%
shell/Zebra	Austrocochlea sp.	2	0.00%
shell/Zigzag scallon	Euvola sp.	$\frac{1}{1}$	0.00%
snake	Serbentes	10	0.05%
sting rav	Raiifornes	1 5	0.24%
turkev	Meleagris gallopavo	64	2.59%
turtle	Testudines	226	6.18%
		3.680	100.00%

Table 1. Identified Fauna from 2017 Investigations at the San Pedro site

Fish (Osteichthyes) and crab (Pleocyemata) make up the largest proportion of individual specimens (29.54%). Mammals (Mammalia) were the second most abundant fauna (22.09%) and the third and fourth were reptile (Reptilia) (7.55%) and bird (Aves) (3.70%). Mammals make up the largest percentage of biomass (65.45%), followed by fish and crab (23.7%), reptile (6.79%), and bird (3.87%) (Table 1).

Biomass, an estimate of the amount of meat tissue contributed by different taxa, is used in an attempt to compensate for some of the problems encountered with NISP. Predictions of biomass are based on the allometric principle that the proportions of body mass, skeletal mass, and skeletal dimensions change with increasing body size. The relationship between body weight and skeletal weight is described by the allometric equation (Simpson et al. 1960): Y = aXb. In this equation, X is specimen weight, Y is the biomass, b is the constant of allometry (the slope of the line), and a is the Y intercept for a log plot using the method of least squares regression and the best-fit line (Casteel 1978:71-77; Reitz and Cordier 1983:237-252; Reitz et al. 1987:304-317; Wing and Brown 1979). Values for a and b are derived from calculations based on data at the Florida Museum of Natural History, University of Florida, and the University of Georgia Museum of Natural History. Allometric formulae for biomass estimates are not currently available for amphibians or lizards so biomass is not estimated for these groups. All skeletal portions were represented within the total assemblage.

Vertebra/rib/vertebral column (49.46%), general element (UNID) (23.42%), and general element (quarter) (8.37%) combined made up the majority of the assemblage. The high percentage of vertebra/rib/vertebral column elements is expected in an island setting where marine fauna are regularly exploited for consumption. Marine resources are caught and (usually) cooked whole, and to this end, complete specimens are deposited into the archaeological record. Mammals, on the other hand, are frequently butchered before reaching cooking, eating, and disposal sites, which results in the absence or paucity of certain body sections (e.g. feet and head). General elements were the second most abundant skeletal portion (23.42%) which suggests specific foodway activities and behaviors were being performed routinely and frequently at the site...practices which would have rendered the remains unidentifiable as specific bone or portions of bone due to heating, butchery, and pre/post-cooking processing activities.

The assemblage contained 166 (NISP) burned or calcined elements [4.51% of the combined assemblage NISP]. The small percentage of burned or calcined specimens suggests meat foods were frequently prepared via boiling (e.g. soups and stews), instead of roasting, which would result in a higher percentage of burned or calcined remains. Burns may also occur if specimens are burned intentionally or unintentionally after discard. Burning at extreme temperatures can cause calcification and is usually indicated by blue-gray discoloration.

Sixty-three (NISP) specimens have evidence of butchery, processing, and preparation (e.g., cut and hack marks; local impact/crushing; abrading/grinding/polishing; and twisting), which represents 1.71% of the total assemblage. Modifications can indicate butchering methods as well as site formation processes. Cuts are small incisions across the surface of specimens. These marks were probably made by knives as meat was removed before or after the meat was cooked. Cuts may also be left on specimens if attempts are made to disarticulate the carcass at joints. Some marks that appear to be made by human tools may actually be abrasions inflicted after the specimens were discarded, but distinguishing this source of small cuts requires access to higher-powered magnification than is currently available (Shipman and Rose 1983). Cut marks on deer elements, particularly on astragali and proximal phalanges may also originate from skinning activities (Pavao-Zuckerman 2007). Hack marks are evidence that some larger instrument was used. Presumably, a cleaver, hatchet, or axe would have been employed as the carcass was being dismembered rather than after the meat was cooked. Similarly, percussion marks or evidence of local impact/crushing or twisting would suggest that the bone was cracked open to expose the marrow cavity, either for the extraction of the marrow itself, or for grease-rendering (Outram 2001).

Worked specimens, show evidence of human modification for reasons likely unrelated to butchery (e.g. carved, drilled, or polished specimens). Gnawing by rodents and carnivores indicate that specimens were not immediately buried after disposal. While burial would not guarantee an absence of gnawing, exposure of specimens for any length of time might result in gnawing. Rodents include such animals as squirrels, mice, and rats. Much like the small number of burned or calcined specimens, the low percentage of processing marks suggests preparation methods that utilized whole animals, rendering butchery unnecessary, at least for the most part. The complete absence of rodent gnawing points to systematic food disposal that included quick burial of meat food remains.

The final attribute category applied in this analysis, is domestic versus wild fauna, which will be further discussed by context below. Wild specimens make up 78.02% of the total faunal assemblage and domestic specimens account for 4.46%. A large wild fauna percentage is expected from an island or coastal site, due to much of the meat food being harvested from abundant marine environments.

Mixed Contexts

Lots that are not fully comprised of Maya artifacts are defined here as 'mixed context'⁴. Of the 41 mixed context lots⁵, eight contained no faunal remains⁶. A total of 48 distinct taxonomic identifications were noted in the assemblage. Fish (Osteichthyes) (39.20%) made up the largest portion of individual specimens (NISP); of note barracuda (Sphyraenidae) accounted for 4.62% of the total assemblage. Large mammals (11.63%) were the second most abundant taxa. Turtle (Testudines) (9.5%), pig/peccary (*Sus scrofa/Pecari tajacu*)⁷ (7.94%), and cow (*Bos taurus*) (4.83%) were the third, fourth, and fifth most frequent taxa. Fish make up the largest percentage of biomass (15.84%), followed by cow (15.05%), pig/peccary (12.25%), and manatee (10.79%).

⁴ Two lots (NISP=13) contained only modern materials, but are added to the 'Mixed Context' category for the purposes of this report. The remaining 39 lots contain a mix of modern, colonial, and Maya materials.

⁵ Unit 5=lots 226, 229, 230, 235, 238, 242, 250, 257, 260, and 262; Unit 6=lots 227, 228, 232, 234, 237, 239, 241, 246, 247, and 251; Unit 7= lots 240, 243, 249, 263, 268, 274, 275, 279, 282, and 292; Unit 8= lots 245, 259, 265, and 267.

⁶ Unit 5=lot 253; Unit 6=lots 231, 244, and 248; Unit 7= lots 233, 236, and 280; Unit 8= lot 256.

⁷ Distinction between wild and domestic pigs is difficult as these taxa have the same morphology, and during the colonial period both roamed free and likely crossbred, further obfuscating the distinction between species. As such, pigs are considered one taxa for the purposes of this report, although it can be assumed that over time, the ratio of wild to domestic fauna began to favor domestic taxa over wild.

Maya Contexts

Of the 24 Maya context lots⁸, seven contain no faunal remains⁹. A total of 32 distinct taxonomic identifications were noted in the assemblage. Fish (85.29%) made up the largest portion of individual specimens (NISP); of note barracuda accounted for 2.28% of the total assemblage. Medium to large mammals (3.93%) were the second most abundant taxa. Turtle (Testudines) (2.45%), pig/peccary (*Sus scrofa/Pecari tajacu*)¹⁰ (2.39%), and deer (*Odocoileus sp.*) (1.14%) were the third, fourth, and fifth most frequent taxa. Fish make up the largest percentage of biomass (32.27%), followed by medium to large mammals (21.28%), turtle (6.46%), and deer (6.1%).

Interpretation, Discussion, and Conclusions

No significant changes, other than the introduction of domesticates which replaced deer, occurred over time between pre- and post-Columbian contexts. All contexts show significant reliance on marine foods, a trend that continues to this day. It must be noted here that salted pork may have contributed to consumptive biomass after colonial contact, but those taxa do not leave a significant trace in the faunal record. A large number of metal barrel straps were recovered during the 2017 excavations, but the contents of those barrels are currently unknown.

Although few studies have focused on the foodway preferences and technologies of nineteenth-century Belize, a recent study of faunal and food remains (Thornton and Ng 2014), elucidated variable wild vs. domesticate food strategies between socio-economic and ethnic groups at Holotunich during the nineteenth century. The authors note that whereas both Maya and post-emancipated labor groups preferred or supplemented their protein intake from wild sources, documentary evidence suggests that hardwood extraction teams, in particular, consumed salted pork and other prepackaged food items that would have left very little skeletal evidence (Mayfield et al. 2017) and similar patterns were also noted at Lamanai within nineteenth-century contexts (Mayfield 2015).

⁸ Unit 5=lots 266, 267, 277, 281, 283, and 286; Unit 6=lots 252, 254, 255, 258, 261, and 264; Unit 7= none; Unit 8= lots 270, 273, 278, 284, and 285.

⁹ Unit 5=lots 289 and 291; Unit 6=lots 269, 271, and 272; Unit 7= lot 292; Unit 8= lot 290.

¹⁰ Distinction between wild and domestic pigs is difficult as these taxa have the same morphology, and during the colonial period both roamed free and likely crossbred, further obfuscating the distinction between species. As such, pigs are considered one taxa for the purposes of this report, although it can be assumed that over time, the ratio of wild to domestic fauna began to favor domestic taxa over wild.

Works Referenced

Casteel, R.W.

- 1977 Characterization of Faunal Assemblages and the Minimum Number of Individuals Determined from Paired Elements: Continuing Problems in Archaeology. *Journal of Archaeological Science.* 4(2):125-134.
- 1978 Faunal Assemblages and the" Wiegemethode" or Weight Method. *Journal of Field Archaeology*. 5(1):71-77.

Mayfield, Tracie

2015 Historical-Archaeological Analysis of The Nineteenth-Century British Plantation Settlement At Lamanai, Belize (1837-1868). Doctoral dissertation, the University of Arizona, Tucson, School of Anthropology.

Mayfield, Tracie, Elizabeth Graham, and David Pendergast.

2018 Cane and Consumerism: Nineteenth-Century Sugar-Growing at Lamanai, Belize in *Technology and Tradition after the Spanish Invasion*, edited by Rani Alexander. University of New Mexico Press.

Outram, Alan K.

2001 A New Approach to Identifying Bone Marrow and Grease Exploitation: Why the "Indeterminate" Fragments should not be Ignored. *Journal of Archaeological Science* 28: 401-410.

Reitz, Elizabeth J. and D. Cordier

1983 Use of Allomentry in Zooarchaeology: In Shell Middens, Fishes, and Birds. Eds J. Clutton-Brock and C. Crigson. *Oxford British Archaeological Reports International Series*. 2:237-252.

Reitz, Elizabeth J. and Elizabeth S. Wing

2008 *Cambridge Manuals in Archaeology: Zooarchaeology.* Cambridge University Press: New York and Cambridge.

Reitz, Elizabeth J., I.R. Quitmyer, H.S. Hale, S.J. Scudder, and Elizabeth S. Wing 1987 Application of Allometry to Zooarchaeology. *American Antiquity.* 52(2):304-317.

Shipman, P., and J. Rose

1983 Evidence of Butchery and Hominid Activities at Torralba and Ambrona: An Evaluation Using Microscopic Techniques. *Journal of Archaeological Science* 10(5):465-474.

Pavao-Zuckerman, Barnet

2007 Deerskins and Domesticates: Creek Subsistence and Economic Strategies in the Historic Period. *American Antiquity* 72(1):5-33.

Thornton, Erin Kennedy and Olivia Ng Cackler

2014 Late Nineteenth and Early Twentieth-Century Animal Use by San Pedro Maya and British Populations and Holotunich, Belize. In *The Archaeology of Mesoamerican* Animals, edited by Christopher Götz and Kitty F. Emery, pp. 351–380. Lockwood Press, Bristol, Connecticut.

Wing, E.S. and A. Brown

1979 Paleonutrition: Method and Theory in Prehistoric Foodways. Academic Press, New York.

Appendix 5

Preliminary Report on the Historic & Modern Artifacts Recovered at the San Pedro site in 2017

by Tracie Mayfield

Results of Preliminary Analyses of Historic and Modern Artifacts Recovered during 2017 Excavations at the San Pedro site, Ambergris Caye, Belize

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Introduction

The modern and colonial artifact assemblage consists of 4,693 (NISP) objects. For the purposes of this report, 'modern materials' (NISP= 714) refer to artifacts manufactured after 1930 and 'colonial materials' (NISP=3,888) refer to post-Columbian artifacts manufactured before 1930¹¹. The time distinction made by this author is based, generally, on market changes within the Central American economic sphere.

Changes, driven largely by a more pervasive and extensive influx of materials coming out of the United States post-1930 (Swayne 1917; Adams 2003; Armstrong and Hauser 2009) than what had come before, impacted the archaeological record to a degree that a second dating category is merited here. Interestingly, only a small number of possible Spanish artifacts were recovered¹² and British colonial materials date from approximately 1720, although the mean occupation dates for all trenches trend around 1900¹³. Of note, the following report is based on field identification/preliminary analysis only.

Modern/colonial artifacts make up 37% of the overall assemblage (NISP=4,693 of 12,620). Trenches 5, 6, 7, and 8 all contained modern and/or colonial materials. Trench 5 modern/colonial lots included 226, 229, 230, 235, 238, 242, 250, 253, 257, 260, and 262. Trench 6 lots included 227, 228, 231, 232, 234, 237, 239, 241, 244, 246, 247, 248, and 251. Trench 7 lots included 236, 240, 243, 249, 263, 268, 274, 275, 279, 280, 282, and 287¹⁴. And lastly, Trench 8 lots included 245, 256, 259, 265, and 267. Of forty-two modern/colonial period lots, only two contained solely modern materials (trench 6, lots 231 and 251).

¹¹ Total assemblage also included ecofacts (NISP=9) and unidentified/UNID artifacts (NISP=82).

¹² Possible (wheel thrown) olive jar sherds were recovered (NISP=10), but further analysis is needed before a positive identification can be made.

¹³ The bulk of the colonial artifacts were produced (approximately) post-1830 and before 1890, although some ceramic wares, e.g. whiteware, are still produced today, which impacts the tenacity of dating formula outcomes and can skew median occupations later in time than was actually the case.

¹⁴ Only one lot in trench 7 (lot 292) contained pre-Columbian artifacts exclusively.

Use Categories

Use categories identified during field season 2017, included architecture¹⁵, construction, foodways, health and hygiene (e.g. medicines and chamber pots), household, industrial¹⁶, and personal (e.g. buttons, smoking pipes, and other items that would be owned or used by a single person). The bulk of materials (66.08%) are related to foodway activities¹⁷ (e.g. food storage, preparation, and serving vessels; including bottles, cans, and other object forms). Construction (12.65%), household (9.19%), health and hygiene (4.45%), personal (3.19%), architectural (3.13%), and industrial (1.3%) materials make up the remaining assemblage. Category percentages by trench also trend along the same lines (Figure 1).



Figure 1. Use categories identified during the 2017 field season.

Ceramic Artifacts

Ceramic objects made up 31.18% of the total site assemblage. Twelve ceramic ware types were recovered¹⁸, the bulk of which were whiteware (78.75%), which were manufactured post-1820. Twenty-seven unique ceramic object forms were identified. The highest frequency forms were bowls (30.38%), plates (37.24%), saucers (7.57%), and teacups (6.85%). Interestingly, chamber pot sherds (NISP=67) made up the fifth most frequent object form (6.04%) in the assemblage. Thirty ceramic decoration types were identified. The most frequent

¹⁵ For the purposes of this report, architectural materials are distinct from construction materials. Architectural materials do not contribute to the framework of a structure (e.g. window glass).

¹⁶ For the purposes of this report, industrial materials are distinct from construction materials. Industrial materials are more robust, larger, etc. than equivalent materials categorized as construction.

¹⁷ Does not include faunal specimens in count. Please see faunal analysis section for those data.

¹⁸ Annularware/slipware, creamware, earthenware, fine earthenware, ironstone, slipped wares/mocha, pearlware, porcelain, rockingham, stoneware, whiteware, and yellowware.

types were glazed, transfer print, floral (painted under-glaze), banded, and sponged/cut-sponged; 29.9%, 19.93%, 17.14%, 15.4%, and 9.62%, respectively.

Mean Ceramic Dating

Mean ceramic dating (South 1977 and 1979; Miller 1984 and 1991; DAACS 2017), a formula used to date sites based on the average age and frequency of recovered ceramics, was used to establish occupation dates for the site assemblage and each trench assemblage. Mean ceramic dates are as follows: site (1904), trench 5 (1903), trench 6 (1902), trench 7 (1904), and trench 8 (1906). Due to the large number of whitewares (78.75%/NISP=1,122 of 1,375 total NISP), produced circa 1820 to present, it is likely that the mean dates are skewed slightly forward in time.

Glass Artifacts

Glass objects made up 43.81% of the total site assemblage. Twenty-two distinct forms were identified. The highest frequency forms were bottles (84.15%), window glass (6.66%), and tumblers (3.03%). In order to use glass materials to help date the site and individual trenches, mean ceramic dating formulas were applied to glass frequencies and types¹⁹. Mean 'glass' dates (DAACS 2016; SHA 2017) are as follows: site (1894), trench 5 (1900), trench 6 (1900), trench 7 (1890), and trench 8 (1879). Much like high whiteware percentages within the ceramics assemblage, broad production dates of some glass colors (e.g. clear, amber, green/1800-2017) likely skew the dates forward in time to some degree.

Other Datable Objects/Data Sets

A total of 487 nails were recovered during the 2017 excavations. Mean 'nail' dates (Wells 1998; Visser 2017), based on technology (e.g. hand wrought, machine made, cut vs. wire, etc.) are as follows: site (1882), trench 5 (1892), trench 6 (1885), trench 7 (1866), and trench 8 (1891). Although kaolin smokes pipes are useful dating objects, the formulas for pipe dating, based on bore hole size, break down post-1800 (Noël-Hume 1985; Deetz 1986), and all but one (NISP=10), were manufactured post-1800.

Conclusions

The bulk of the 2017 assemblage was related to foodways (distribution, storage, preparation, and serving), which was expected. After preliminary analysis, the large number of chamber pots (6.04% of the ceramic assemblage, after plates, bowls, and tea cups, and saucers) and the wide variety of forms, colors, and designs suggests that not a *single* household, but rather a boarding house or communal dump was located on the property in the mid to late-nineteenth century. And, likely continued to be used in this manner until present day²⁰. The

¹⁹ Broad production dates were utilized, based on production (hand-blown v. machine made), and glass color technologies.

²⁰ At the time of excavations, the site was occupied by the Hostel La Vista and the Island Torch restaurant.

majority of colonial materials, generally, date between 1830 and 1900, which would coincide with San Pedro Town's occupation history (Table 1)²¹.

Mean Occupation	Total				
Data	Assemblage	Trench 5	Trench 6	Trench 7	Trench 8
Ceramic	1904	1903	1902	1904	1906
Glass	1894	1900	1900	1890	1879
Nails	1882	1892	1885	1866	1891

Table 1. Mean occupation data by trench and total assemblage.

Artifact materials, forms, waretypes, decoration patterns, colors, and production technologies recovered during the 2017 field season are consistent with colonial contexts dating between 1800 and 1900 and with the late-colonial history of Ambergris Caye. The paucity of Spanish produced objects is currently a mystery as Spanish colonists were known to have been harvesting hard woods and present on the island from soon after the 'discovery' of Belize (1503) and well into the nineteenth century. More research is needed in order to understand why so few Spanish artifacts have been found at the San Pedro site. Early occupation began with ownerships rights of the Island claimed by Von Ohlafen via squatter's rights, around 1850 (Parham 2017). The Caste Wars (1847-1855) hampered development in the mid-nineteenth century, but sustained occupation and steady population growth was resumed after 1855. San Pedro is first mentioned in historical documents in 1850 (AmbergrisCaye.com) and after a series of owners/bankruptcies the Blake family purchased the Island in 1869 and started a coconut plantation. The lands were distributed between families who had fled the Caste Wars with the Blakes, which began a period of construction and increased permanent settlement (AmbergrisCaye.com 2017; Parham 2017). Sustained settlement has continued to this day.

²¹ Nails generally trend earlier than ceramic and glass artifacts, which is consistent with construction phases vs. occupation phases.

Works Referenced

Adams, William Hampton

2003 Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use, and Disposal of Artifacts. *Historical Archaeology* 37(2):38–64.

AmbergrisCaye.com

2017 *The History of Ambergris Caye*. Electronic document, <u>http://www.daacs.org/aboutDatabase/MCDTypes.html</u>, accessed December 1, 2017.

Armstrong, Douglas V., and Mark W. Hauser

2009 A Sea of Diversity: Historical Archaeology in the Caribbean. In *International Handbook of Historical Archaeology*, edited by Teresita Majewski and David Gaimster, pp. 583–612. Springer, New York.

Carpentier, Donald and Jonathan Rickard

2001 lip Decoration in the Age of Industrialization" in Ceramics in America, Milwaukee.

DAACS (Digital Archaeological Archive of Comparative Slavery)

2017 DAACS MCD Types Database: Thomas Jefferson Foundation. Electronic document, http://www.daacs.org/aboutDatabase/MCDTypes.html, accessed December 1, 2017. 2016 DAACS Cataloging Manual: Glass Vessels, Electronic document, https://cdn.daacs.org/wp-content/uploads/2017/01/DAACSGlassVesselManual.pdf, accessed December 1, 2017.

Deetz, James

1996 *In Small Things Forgotten: An Archaeology of Early American Life*. Anchor Books, New York.

Goldberg, Arthur

2003 Highlights in the Development of the Rockingham and Yellow Ware Industry in the United States—A Brief Review with Representative Examples. In *Ceramics in America* 2003, edited by Robert Hunter. University Press of New England, Hanover, pp. 26-46.

Miller, George L. Miller

1991 A Revised set of CC Index Values for Classification and Economic Scaling of English Ceramics from 1787 to 1880. *Historical Archaeology* Vol 25, no. 1: 1-25.
1984 Marketing Ceramics in North America: An Introduction. *Winterthur Portfolio* 19(1):1–5.

Noël-Hume, A.

1985 A Guide to Artifacts of Colonial America. Alfred A. Knopf, New York.

Parham, George

2017 Ambergris Caye, Belize History. Electronic document,

https://ambergriscaye.com/pages/mayan/amberhistorygeorge.html, accessed December 1, 2017.

Rickard, Jonathan

2006 *Mocha and Related Dipped Wares, 1770-1939*. University Press of New England, Lebanon, NH.

Society for Historical Archaeology (SHA)

2017 *Bottle Dating*. Electronic document, <u>https://sha.org/bottle/dating.htm</u>, accessed December 3, 2017.

South, Stanley

1979 Historic Site Content, Structure, and Function. *American Antiquity* 44:213–237. 1977 *Method and Theory in Historical Archaeology*. Academic Press, New York, New York.

Swayne, Eric

1917 British Honduras. The Geographical Journal 50(3):161–175.

Visser, Thomas D.

2017 *Nails: Clues to a Building's History*. Electronic document, <u>http://www.uvm.edu/%7Ehistpres/203/nails.html</u>, accessed December 1, 2017.

Wells, Tom

1998 Nail Chronology: The Use of Technologically Derived Features. *Historical Archaeology* 32(2):78-99.