

Spring 5-11-2013

Investigations of a Ground Stone Tool Workshop at Pacbitun, Belize

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INVESTIGATIONS OF A GROUND STONE TOOL WORKSHOP AT PACBITUN, BELIZE

by

DREW WARD

Under the Direction of Jeffrey B. Glover, Ph.D.

ABSTRACT

The Ancient Maya site of Pacbitun is centrally located between the two major ecozones of the Belize River Valley and the Mountain Pine Ridge in west-central Belize. In June 2012, investigations began on a group of mounds, known as the Tzib Group, located outside of Pacbitun's site core in order to investigate the group's potential as a locale for ground stone tool workshops. Excavations at the Tzib Group uncovered over 1000kg of granite debitage as well as mano and metate preforms at varying stages of production. In analyzing the possibility of a ground stone production center, this paper seeks to expand upon previous research at Pacbitun pertaining to resource acquisition, craft-specialization, and exchange as a result of the site's central location in the valley during the Late Classic period (AD 600-900).

INDEX WORDS: Granite, Craft specialization, Craft production, Lithic, Economic complexity, Mano, Metate, Maya, Mesoamerica, Classic period, Belize

INVESTIGATIONS OF A GROUND STONE TOOL WORKSHOP AT PACBITUN, BELIZE

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DREW WARD

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

in the College of Arts and Sciences

Georgia State University

2013

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2013

INVESTIGATIONS OF A GROUND STONE TOOL WORKSHOP AT PACBITUN, BELIZE

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May 2013

Dedicated to my Family.

ACKNOWLEDGEMENTS

I would like to thank foremost, my committee members for their advisement throughout the process of conducting this research. Additionally, I would like to thank Linda Howie and Sheldon Skaggs for their help in analyzing the production debris found in Mano Mound and George Micheletti for volunteering his time to help with excavations. Finally, I would like to thank everyone involved with the Pacbitun Regional Archaeological Project (PRAP). This includes staff members, project friends, as well as the residents of San Antonio, Belize.

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1 INTRODUCTION

This thesis analyzes a group of structures known as the “Tzib Group” within the ancient Maya polity of Pacbitun in Cayo, Belize. In the past few decades, the site of Pacbitun has been heavily researched as a production hub utilizing materials from various ecological zones of Belize. In recent years, the Pacbitun Regional Archaeological Project (PRAP) under the direction of Terry Powis has conducted investigations with an increased focus on the site’s hinterland. This thesis aims to expand upon prior research at Pacbitun by evaluating a ground stone tool production site located roughly 0.75 km from the core of this ancient Maya site.

1.1 Purpose of the Study

Ground-stone tools in the form of manos and metates would have been utilized in nearly every Maya household for the processing of their staple crop, maize. Much has been done archaeologically to analyze these tools in their completed form, however, the archaeological record is lacking in terms of investigations of production prehistorically. A great deal of what archaeologists know about the production process of manos and metates comes from the ethnographic record. To remedy this lack of data, this thesis creates a detailed description and interpretation of potentially the first mano and metate workshop found in the ancient Maya Lowlands. Conducting this analysis provides insight into the prehistoric production process of tools essential to the ancient Maya’s subsistence practices as well as the socio-economic status of those producing the tools. Additionally, this thesis expands upon existing literature that notes Pacbitun as a production hub for resources coming from various ecological zones and addresses how the site was situated within the Maya Lowlands.

1.2 Expected Results

This thesis establishes the Tzib Group located within the periphery of Pacbitun as either a production site for manos and metates, and/or as a secondary deposition site. To determine the status of this structure, this thesis will rely on the use of ethnographic and archaeological data retrieved from lithic production sites and compare findings to those at the Tzib Group.

Additionally, my analysis will reference various economic theories in archaeology with the ethnographic record in order to discern the socio-economic status of those living in the Tzib Group during the Classic period (AD 250 – 900).

Furthermore, analyzing the Tzib Group and the artifacts found within this area creates a framework for future PRAP investigation aimed at evaluating the region's potential as a ground stone tool production hub. Such investigations will include sourcing raw materials used for production, determining whether or not the production is relegated to a single structure or area, and determining potential destinations for finished manos and metates.

I begin this investigation of the Tzib Group in Chapter 2 where I provide basic overview of ways in which craft-production has been viewed within an archaeological setting. Within Chapter 2, I also discuss the notion of Middle Range Theory and address how mano and metate production has been documented in the ethnographic record. In Chapter 3, I introduce the cultural and environmental setting of the Tzib Group. Chapter 4 summarizes my methods utilized during the 2012 field season. From there, I move to Chapter 5 where I analyze the artifacts found with Tzib Group before discussing the implications of my findings in Chapter 6. I conclude this thesis in Chapter 7 with a summary of my findings and recommendations for future research at the Tzib Group.

2 THEORETICAL BACKGROUND

2.1 Introduction

This chapter covers manners in which specialization has been identified and researched in archaeology and the Maya area as well as some of the issues that result from categorizing means of production. Additionally, I discuss the use of Middle Range Theory in archaeology and how the ethnographic record has contributed to our understanding of mano and metate production in the Maya area. Reviewing these subjects provides a framework for discussing the particular findings at the Tzib Group.

2.2 The Trajectory of Craft Specialization Theories in Archaeology

Notions of craft specialization have been the focal point of many archaeological investigations (eg., Brumfiel and Earle 1987; Clark 1995, 2007; Costin 1995, 1998). The study of specialization's theoretical evolution aligns closely to that of archaeology as a whole. Perspectives on this issue have moved from neoevolutionary perspectives to approaches that analyze the issue in terms of agency and the community. These have the ability to shape understandings of political, social, and economic complexities within a given region. To understand the economic complexity at ancient Maya sites, I first provide an overview of how craft specialization has been conceptualized archaeologically. The purpose of this analysis is to introduce a basic theoretical framework that I utilize in my analysis of Mano Mound.

2.2.1 Early Economic Theories

Early models analyzing the economy as an archaeological entity grew out of neoevolutionary and systems-based theoretical models (Clark 2007:20; Smith 2004). Many of these theories have been broken down into three distinct frameworks: the commercial development model, the adaptationalist model, and the political model (Brumfiel and Earle 1987:1). These models are primarily products of processualist thinking that attempted to create broad generalizations to explain human behavior.

The commercial development model is correlated with modern ideas of capitalism. According to this model, a positive correlation exists between specialization, exchange and the growth of the economy as a whole (Brumfiel and Earle 1987:1). Rather than a centralized entity mobilizing production efforts in one direction or another, this model relies heavily on the free market. In commercial development situations where internal and external constraints are minimized, “concentration[s] of information and capital” are the primary factors in exchange (Rathje and Sabloff 1973:223).

Rather than production being an unrestricted enterprise, the adaptationalist model proposes an active effort by a political elite to influence the market economy (Brumfiel and Earle 1987:2). The reasons for the centralization of the economy are varied. Early adaptationalist models saw elite involvement in the economy as an attempt to redistribute resources across varying ecozones (Brumfiel and Earle 1987:2; Service 1962, 1975). Aside from analyzing redistribution, this model addresses long-distance trade as a catalyst for elite intervention. Adhering to Marcel Mauss’ (1990[1923]) explanation of the significant social role played by the gift, some have claimed that this focus on trade would have created systems of reciprocity. This gift giving would, in turn, lead to a population that would be willing to “share with a less

fortunate partner” (Brumfiel and Earle 1987:2; see also Flannery 1968). The less fortunate recipient of this gift would then be bound into a social contract with the gift-giver; thus fostering social inequality.

The adaptationalist model, however, does not take into account personal motives of elites. The political model explains elite engagement in the economic sphere as a means for expanding political control (Brumfiel and Earle 1987:3). The centralization of political control over economies allows for localized bureaucracies to increase their power (Rathje and Sabloff 1973:223). These governing agencies exert their power through taxes, monopolizing commodities, and law enforcement (Berdan 1975:120-30; D’Altroy and Earle 1985; Rathje and Sabloff 1973:223). Like the adaptationalist model, the political model also involves the redistribution of wealth. However, in the political model, wealth redistribution is seen as a display of power, meant to solidify one’s place within a society (Brumfiel and Earle 1987:3). Furthermore, the control of commodities as proclaimed by Rathje and Sabloff (1973), is enacted through a close association with craft specialists (Brumfiel and Earle 1987:3).

2.2.2 Categories of Specialization

As seen in these economic models, scholars must address the role of craft producers in order to analyze the relationship between elites, non-elites, and the economy. Craft specialization has been defined in terms of “the production of alienable goods by a segment of the population for consumption outside the producers’ own household” (Inomata 2001:322). Craft specialists are individuals whose livelihood is based, or partially based on the production of a good, rather than basic subsistence practices. Cathy Costin (1991:4) states that the specialist’s house is one that does not produce all of the goods it consumes. Often specialists are labeled as

either independent/attached specialists and/or full-time/part-time (Brumfiel and Earle 1987:5; Costin 1991). Understanding specialization requires a careful investigation of these permutations.

Rather than focusing on the crafts being produced, a great deal of archaeological research has focused on the labor devoted to production (e.g., Hirth 2009:23). Often, research with this focus leads to the creation of the categories of full-time and part-time specialists. Full-time specialists are those whose time is primarily devoted to their trade. In these situations, the producer relies heavily on primary food producers to meet their subsistence needs (Kohl 1996:40). Part-time specialists are those who craft a good, but are self-sufficient in meeting their subsistence needs. Cook (1982) and Hayden (1987) address this notion in their ethnography of modern-day mano and metate producers in the Valley of Oaxaca, Mexico. In these situations, the producers of manos and metates were those who possessed little or no land (Cook 1982:129-30; Hayden 1987:10). Being a part-time specialists gave the mano and metate producers a means to compensate for a low crop-yield.

Independent specialists are those who produce goods and services for an “unspecified demand” that fluctuates depending on external market, environmental, and political factors (Brumfiel and Earle 1987:5). This type of specialist is primarily concerned with achieving high levels of efficiency and security (Brumfiel and Earle 1987:5). Efficiency refers to the desire to maximize the potential gain from production. Security deals with maintaining a buffer between production and external factors that could hinder the completion of a project. To achieve these goals, much of what is produced by independent specialists would need to be practically suited for domestic use (Costin 1991:11). By producing utilitarian or quotidian goods, specialists can market their products to a much larger range of consumers (Costin 1991:11). Thus, in Costin’s

model, independent specialization is a demand-based economic venture (Clark 1995:286; Costin 1991:11).

Attached specialists are those who produce for a specified patron and are typically contractually bound to their patron (Brumfiel and Earle 1987:5). Typically, the relationship between producer and consumer here has been seen as that of lower classes producing for upper classes. Rather than being influenced by the market economy, attached specialization is more intimately connected to political economy and rulership (Costin 1991:9; Earle 1981). This form of production has been seen as involving the production of luxury goods and weaponry for a ruling elite (Aoyama 2007:3). Items such as these primarily serve the purpose of demonstrating wealth and power over a group (Costin 1991:11).

Having an attached relationship with producers created a situation where the ruling elite could maintain a monopoly of the production of these symbols of wealth and power (Costin 1991:11-12). Furthermore, this control of production allowed elites to dictate the materialization of an ideology in the form of commodities (DeMarrais et al. 1996; Inomata 2001:324). Materializing an ideology for elites fostered the creation of what is known as “high culture” (Baines and Yoffee 1998:235). The creation of this form of culture allows elite individuals to distinguish themselves from other groups (Inomata 2001:324).

Notions of elite individuals being concerned with the control of certain commodities has led to a shift in understanding the relationship of attached producers to consumers. (Clark 1995:286) states that the key factor in labeling specialization should be alienation over goods (see also LeCount 2001:338). In independent specialization, the producer is the rights holder of the crafted goods. In attached models, the consumer owns the rights of the produced goods (Clark and Parry 1990:298; Inomata 2001:323). Determining this ownership

archaeologically can partially depict the level of centralization in economic organization. For instance, in labeling producers as independent one can piece together the limits of economic centralization within a polity (Stein 1996:26).

2.2.3 Critiques of Categorizing Specialization

Although the models mentioned above provide valuable framework for analyzing past economies, there are a few issues one must keep in mind. Models for analyzing economics and craft specialization are deeply rooted in the theoretical perspectives of structural-functionalism (Clark 1995:278). One critique of these models states that they do not encompass all aspects of production and consumption (Clark 1995:279; Flad and Hruby 2008; Smith 2004). For the attached versus independent specialists model to work cross-culturally, it needs to be analyzed at the level of individuals and their activities (Inomata 2001:323). The traditional perspective of viewing specialization as a measure of social complexity needs to be abolished (Hirth 2009:14). Avoiding these generalizations allows one to see the two categories of craft-specialization not as absolute schemes, but rather a continuum of variation (Smith 2004; Stein 1996:26).

A third category aside from the independent/attached dichotomy arose in the theory of embedded specialization (Ames 1995:158). The definition provided earlier of attached specialization confers the notion of a hierarchy existing between producer and consumer. Attached specialization categories deem specialists as being of low status compared to their patrons (Ames 1995; Inomata 2001:323). In this embedded specialist model, the house is the focus, and it can be seen as a corporate entity based on affinity and consanguinity (Gillespie 2000:468; Levi-Strauss 1982:174, 1987:152). Janusek (1999) delves into this matter in more detail in his analysis of Andean Tiwanaku populations. Here, localized groups in the form of

houses are production-based entities that are operated by community authorities within larger regional political systems (Janusek 1999:125). According to Janusek (1999:125), these house groups were semiautonomous groups producing non-sumptuary goods.

Furthermore, Flad and Hruby (2008:5) mention that many analyses regarding the notion of full- and part-time specialization are part of an outdated evolutionary model. Individuals who produce goods may not necessarily rely on crafting as a means for subsisting. Combining the notion of an embedded specialist with examples of producing goods for status symbols illuminates this point. In situations such as the one pointed out by Flad and Hruby (2008:5), embedded specialist operate within a production environment with the intention of crafting goods to increase social capital, rather than economic capital.

It has been stated that “crafting is a metaphor for social identity and a symbol for social category” (Costin 1998:4). Analyzing a crafted good in a Maussian (Mauss 1923) manner illuminates this notion of a crafted item possessing social capital. Objects are often seen as containing the essence of the individual who crafts, or owns the item (Clark 2009:23; Mauss 1990[1923]). This notion has been referred to as “dividual” personhood (Clark 2009:23; Strathern 1988;1999). Individuals who possess an object are able to “cleave” off portions of their personhood and imbue it within an object (Clark 2009:23). An example of transferring fragments of oneself can be seen in the aforementioned notion of “high culture” (Baines and Yoffee 1998:235; Inomata 2001:324). Many of the technical abilities used in the crafting of an object could have taken a long period of time to obtain (Inomata 2001:332; McAnany 1993). Transferring the iconographic aspects of high culture into a crafted object acts as the materialization of the producer’s life-history. Exchanging the crafted object is akin to exchanging a material representation of one’s self.

2.2.4 Houses, Communities, and Specialization

Historically in archaeology, there has been an empirical focus when studying notions of a house (Hirth 2009:14). Before moving forward, it is important to note that the house mentioned in this section is not the same corporate entity as noted in the previous section by Gillespie (2000) and Levi-Strauss (1982;1987). Rather, in this section the house is defined by its physical nature, and the household is regarded as a social entity (e.g., Ashmore and Wilk 1988; Ashmore 2002). In the past, the house has been seen as a means for estimating population density and establishing a temporal settlement chronology. In traditional analyses, the house has been treated as a static entity, able to withstand external social forces (Hirth 2009:14). However, the house is a much more complex unit of archaeological study. Within his analysis of the house as a basis for craft-specialization, Janusek (1999) states that production was deeply rooted in identity. Within houses and households, the production of goods acted as a catalyst for creating distinctions between corporate entities and overarching ethnic groups (Janusek 1999:125). Additionally, in producing communities and households, the act of crafting the object rather than the physical object itself expresses the group's/individual's identity (Costin 1998:1).

The term “community-specialization” has been coined to refer to an “aggregation of specialists within a region” (Abbott 2000:546; Costin 1991:13). In the Maya world, groups were often formed in interdependent-specialized communities (Scarborough and Valdez 2003, 2009:211). Rather than being organized in a hierarchical manner, they were split along ethnic boundaries (O’Shea 1989; Speal 2009:92). Alternatively, some have argued that groups possessed a heterarchical relationship with one another (e.g., Ashmore 2002; Crumley 1979; Potter and King 2008; Scarborough and Valdez 2003). This notion claims that instead of a single set hierarchy, group relations are defined by a system of hierarchies that are constantly shifting

as a result variety of economic or social circumstances. Thus, the economic strategies employed by communities among the Maya had a drastic impact on household integration, large polities and hinterland settlement organization (Yaeger 2003:57). These strategies would have affected intricate group relations and potentially altered group ranking.

2.3 Mano and Metate Production in Modern and Prehistoric Mesoamerica

Ethnographic data offer archaeologists a tool for bridging the gap between the static archaeological record and the dynamic lives of past peoples. By observing the production processes modern groups utilize in producing lithic goods, archaeologists gain a valuable perspective in the time and energy required to produce such tools in the past. The process of creating stone tools is a representation of a group's technology (Braswell 2011:1). Furthermore, these tools are both the product of pre-historic social systems as well as being intimately involved in the constitution of these societies. Combining ethnographic data with an analysis of lithic tool workshops at Pacbitun illuminates the social, political, and economic complexity of the region.

As hinted to, I incorporate the notion of *Middle Range Theory* as discussed by Binford (1967). This theory relies on the use of analogy to compare data from the ethnographic record to data from the archaeological record in order to bridge a connection between the two. However, there are some issue to be cognizant of when utilizing this theory. To view the ethnographic record as a clear representation of the past involves the assumption that culture is a static entity that has remained unchanged for generations. However, such an assumption does not hold weight as social aspects of the human condition are, and have been, changing for a multitude of

reasons. Thus, the ethnographic helps create a broad framework for developing research hypotheses rather than an infallible depiction of the past lives of social agents.

2.3.1 Mano and Metate Form

Food processing and storage is a key feature of agricultural societies. Grain-based foods such as maize must be harvested from the fields, and transformed into an edible and storable entity. In the case of grain-based agrarian societies, grinding technologies often utilize two-piece tool kits, such as manos and metates (Adams 2008:17). In ancient Maya society, the grinding motion of manos and metates allowed for the processing of maize, the staple crop of Mesoamerica (Duffy 2011:ii). The tools come in a wide variety of sizes and shapes, but have generally been divided into the categories of one-handed and two-handed implements (Duffy 2011:24). In her analysis of manos found at Mayapan, Proskouriakoff (1962:339) notes that manos over 12.6 cm in length are considered two-handed. The two-handed manos are typically used with trough-shaped metates (Duff 2011:37; Proskouriakoff 1962:339). Additionally, Schlanger (1991:462) notes in her analysis of Anasazi-crafted manos that two-handed manos and trough metates are typically utilized for processing maize.

2.3.2 Ethnographic Examples of Mano and Metate Production

Much of what is known about the production of manos and metates comes from the ethnographic record. Scott Cook (1982), Bryan Haden (1987), and Michael Searcy (2011) have conducted ethnographic analyses of modern Mesoamerican populations. Bryan Hayden and colleagues (1987) conducted an ethnography among indigenous Maya populations in the modern Guatemalan town of Malacanticto. Hayden's Maya metatero (mano and metate crafter)

informant, Ramon Ramos, utilized traditional methods to craft stone manos and metates. In contrast, Cook (1982) and Searcy (2011) witnessed modern technologies, such as metal tools and explosives, used in production. In referencing the ethnographic data, one can utilize the aforementioned concept of *Middle Range Theory* as discussed by Binford (1967) to obtain a glimpse of past societies.

The *metatero* is an individual who specializes in the production of manos and metates. This individual is responsible for the creation of manos and metates from the initial quarrying to the finishing modifications (Searcy 2011:33). Due to modern economic stressors, Hayden (1987a:10) states that his informant, Ramon, happens to be one of the last remaining full-time *metateros* in his region. This limited number of full-time *metateros* is not unique to Ramon's hometown of Malacatancito. Indeed, the three ethnographies regarding this subject list *metateros* as being part-time specialists (Cook 1982:129-30; Hayden 1987a; Searcy 2011). Cook (1982:131) states that the *metateros* in his ethnography typically come from an impoverished background. Thus, the production of manos and metates was an alternative to those individuals who possessed little or no land of their own (Cook 1982:129-30; Hayden 1987a:10). Additionally, Cook states that around one-third of his informants discussed the notion that the life-style of a *metatero* offers them a way to gain capital outside of the agricultural system in place (Cook 1982:131). *Metateros* who do not own their own quarry can rent property from someone who does by giving a portion of their final product to the landowner (Searcy 2011:52).

The first stage of metate production occurs with the procurement of suitable resources at a quarry site (Hayden 1987a:20-21). In the focus area of Hayden's ethnography, vesicular basalt was the primary type of stone used for mano and metates. At the quarry site, basalt blanks are quarried from the larger outcroppings (Hayden 1987a:21:2; Searcy 2005:14). Once these blanks

were obtained, the first stage of reduction, known as the *estillar* phase, or roughing out phase, could begin.

The *estillar* phase saw the largest amounts of debitage created from reduction. From the large blanks, artificial striking platforms are created; afterwards, two-handed picks (percussion tools) are used to strike the platform. In this form of reduction, flakes from 2 cm x 2 cm to 10 cm x 20 cm broke off of the basalt blank. Michael Searcy's (2011) ethnographic work refers to this stage as the *pelar la cara*, or face-peeling phase. The result is a crude form of a metate (Cook 1982:192-5; Searcy 2011:45). The completion of work at the quarry site, utilizing only stone tools, can take a total of one day per metate (Hayden 1987a:41).

Upon completion of the *estillar* phase, the metate preforms are either transported to an intermediate river site, or the producer's own workshop (Cook 1982; Hayden 1987a:35; Searcy 2011:37). Hayden refers to this stage as the *repellar*, or thinning phase. During this stage, the debitage becomes markedly smaller than that produced during the *estallar* phase. Hayden goes on to state that not only were the flakes in this stage smaller, but they were less recognizable. The condition of these flakes is due to the fact that many of the flakes were pulverized during reduction (Hayden 1987a:36). This stage involves a higher degree of precision than the previous stages, yet still requires considerable force (Cook 1982:194; Hayden 1987a:36). Thus, one careless strike could result in the destruction of the metate (Cook 1982:194). Additionally, among the Zapotec metateros studied by Cook (1982), this stage marked the transformation of a blank into a metate (Cook 1982:194). This stage of processing generally takes around one-and-a-half days per metate (Hayden 1987a:41).

The final stage of reduction is known as the *afinar*, or smoothing stage (Hayden 1987a:41). This stage is usually conducted at the metatero's own personal workshop (Cook

1982:195; Searcy 2011:47). Cook (1982:195) states that this stage involves only flaking strokes to smooth the surface, whereas Hayden (1987a:41) notes that it involves flaking, as well as grinding with a smoothing stone. Generally, the smoothing tool is a mano (Hayden 1987a:41). Additionally, it is almost impossible to identify where this stage of production occurs in the workshop. Searcy (2011:47) states that the reduction produces debitage that is either 1 to 5 cm in width, or purely powder. Once this stage is completed, the result is the complete metate as a product to be sold. Hayden (1987:41) states that the total time to progress through the three stages of production for a single metate totals around 14 hours (two work days), not including transportation.

A metate does not function without a grinding implement. Typically, the same processes that involve metate crafting, are also present in the formation of a mano (Hayden 1987a:44; Searcy 2011:50). Much of the work conducted on manos occurred at the quarry site, or at the intermediate river workshop (Hayden 1987a:46; Searcy 2011:50). In his description of the smoothing stage of metate production, Hayden states that the smoothing stone most often used is a mano (Hayden 1987a:41). This production relationship created a groove in which the adjoining mano could specifically fit (Hayden 1987a:41). Searcy (2011:50) confirms this relationship, but states that some create a surplus of manos. Due to the size and transportability of the mano, they typically have a shorter lifespan than a metate (Searcy 2011:50). The production of a mano adds an additional day to the production of a metate (Hayden 1987a:48; Searcy 2011:50). Hayden (1987:48) states that without the aid of modern technologies, the overall production time of a mano and metate could have taken between 4.5 to 5.5 days in the past.

2.3.3 *Production Sites*

There are various spaces in which the production of a lithic tool can take place. In the case of the aforementioned ground stone ethnographies, the production sequence is broken into two-to-three separate locations (Cook 1982; Hayden 1987a; Searcy 2011). The three ethnographic studies referenced have all included the quarry site, and the finishing workshop in the production process of manos and metates. Nelson (1987:142) who worked alongside Hayden (1987) notes that at the quarry stage, the goal is not only to obtain the resources, but to do away with as much potential debitage before transporting the mano/metate to an intermediate or finalizing site. The areas designated for working on manos and metates at quarry sites are often covered by thatch-roofed shelters (Searcy 2011:53). This designated workspace is typically cleared of all debitage to maintain a clean area (Searcy 2011:53). At times, this refuse has been incorporated into the design of the quarry structure itself. Searcy (2011:53) states that in some instances, he came across quarry workspaces that were elevated with a debitage laden fill.

The house setting often tends to be the location where the final touches are enacted during the production of lithic tools (Cook 1982:196; Hayden 1987a; Nelson 1987:133; Searcy 2011:53; Shafer and Hester 1983:529). Nelson (1987:134) states that metateros possessed a patio workshop adjacent to the main residential structure. Additionally, Shafer and Hester's (1983:530) analysis of chert workshops at the ancient Maya site of Colha document residential workshops as sloping off of the main residential patio. Furthermore, Shafer and Hester (1983:531) state that this household workshop acted as the final stage of production of chert goods. Here household workshops did not contain any chert cobbles, or primary flakes, suggesting that the initial reduction processes occurred elsewhere (Shafer and Hester 1983:531).

Like with the quarry site, debitage is quickly removed from the work stations, and deposited in a nearby location (Nelson 1987:134).

2.3.4 Use-Life of Manos and Metates

Although the ethnographies referenced for this essay depicts the production of manos and metates as a masculine activity, the actual use has been documented as a feminine activity (Searcy 2011:75). Searcy states that women in the groups covered by his ethnography typically use manos and metates on a daily basis. This daily use would have had an effect on the life-span of the stone tools, but there is not a single estimate on the durability of manos and metates. Naturally, this is heavily dependent on the stone resources used to craft the final product. It has been stated that any stone can be used as a grinding implement (Duffy 2011:24). However, what resources are used to create a mano and metate are heavily dependent on a variety of economic and geographic factors. Hayden (1987:15) states that higher quality basalt can last over 30 years. While Searcy (2011:101) claims that some manos and metates he encountered had been passed from generation to generation for 150 years.

Searcy (2011:96) notes that metates are often resurfaced in order to expose vesicles, or cavities within the stone. However, due to excessive refurbishing, or a number of other possibilities, manos and metates break. Hayden's witnesses that upon breakage, manos and metates were utilized for a variety of other uses. For instance, the tools were used as grinders for ceramic temper, salt, sugar, and herbs (Hayden 1987b:191). Searcy (2011:98) reinforces the notion of reusability by claiming that archaeologists rarely find complete manos and metates in dwellings. Instead, they are usually found broken and scattered about a dwelling. Thus, the

ground stone tools are not typically disposed of while they can be utilized in some form or another.

2.4 Conclusions

In this chapter I provided a brief overview of economic models that have been utilized to understand craft-production archaeologically. This overview involved describing a number of ways in which ancient economies and craft-producers have been labeled in an archaeological context as well as some of the issues resulting from utilizing these labels. Additionally, I incorporated *Middle Range Theory* in using accounts of indigenous Maya groups as a means to partially understand the production of manos and metate prehistorically. By discussing these topics, I have created a framework in which to analyze the findings at the Tzib Group during the 2012 field season.

3 CULTURAL AND ENVIRONMENTAL SETTINGS

3.1 Introduction

The political organization of ancient Maya polities has been a heavily debated topic (e.g., Chase and Chase 2003; Iannone 2002; Iannone and Connell 2003; Yaeger and Canuto 2000). Archaeological interpretations of Maya social organization have varied between organizational models that favor decentralized and centralized polities, thus altering how we analyze a polity and its constituent communities. Upon closer analysis of the local community, rather than being an either/or situation, one finds a system that fluctuates between centralization and decentralization. Much of what stimulates this fluctuation is the manner in which communities actively occupy a niche within larger social networks.

In the case of the ancient Maya site of Pacbitun, one finds a site situated to exploit the resources of two neighboring ecozones. This positioning would have impacted its ability to acquire and manipulate raw materials, thus creating a niche for producing communities to acquire and craft various materials. In this chapter I discuss the broad topic of Maya social complexity in the Classic period (A.D. 250-900). From there I analyze the role the Belize River Valley and the site of Pacbitun played in this era of increasing complexity in the Maya area. Addressing these topics provides insight into the potential socio-economic niche the inhabitants of the Tzib Group would have occupied.

3.2 Classic Maya Social Complexity

As alluded to, in order to understand the social complexity of the Belize River Valley, and the site of Pacbitun, it is necessary to address the social organization of the Classic Maya. For decades, there has been an increasing amount of interest in the social complexities of ancient

Maya society during the Classic period. During this time period, the sociopolitical aspects that began to emerge during the Preclassic period (1800 B.C. – A.D. 250) grew in intricacy. This period was characterized by growing populations, increased economic activity and trade, as well as complicated inter-site relations (e.g., Coe 2011). During this time, the elites and non-elites acted to construct their representations of the world through iconographic depictions, and manipulation of the environment (Robin 2004:164). However, a uniform worldview that transcended geographic regions and social boundaries did not exist. This heterogeneity resulted in a Maya society that was both “active and vibrant” (Robin 2004:165).

However, debates regarding how the active nature of the Maya populous influenced the larger political polities during the Classic Period have been taking place for quite some time. Much of this discussion has revolved around how much influence the localized community possessed in the overall political landscape of Maya society. As a result of this discussion, three varying models for interpreting the complexities of Maya social organization have surfaced. These models have ranged from comparing the Classic Maya to a centralized, almost state-like polity, to a loose decentralized organization based on community affiliation (e.g. Gillespie 2000:467; Iannone and Connell 2003; Marcus and Feinman 1998; Yaeger and Canuto 2000).

3.2.1 Decentralized versus Centralized Models

Centralized, state-like polities have institutions in place to control the general populous. In such societies, ornate public works, iconography, and elaborate ceremonies act as social-constructs in order to legitimize control (DeMarrais et al. 1996:20). Arlen and Diane Chase have expanded upon the notion of the built environment reflecting political centralization. For instance, in larger Maya polities like Caracol in Belize, Chase and Chase (2004:117) state that

entire neighboring areas were incorporated into one, large metropolis. This incorporation is argued to suggest that cities such as Caracol reflect a centralization of control during the Classic Period (Chase and Chase 2003:117).

Opponents of the centralized position have often emphasized a network of social relations based on the importance of kinship and the household in Maya society. These decentralized models have drawn analogies from ethnographic and ethnohistorical data from groups living both within and outside Mesoamerica (Iannone 2002:69). In some decentralized models, aspects of Maya society have been described as being made up of house organizations (Gillespie 2000). These organizations are believed to be the building blocks of Maya social organization that influence larger polities as a whole (Fox 1988:104; Fox and Cook 1996:811; Fox et al. 1996:798; Iannone 2002:69).

3.2.2 The Community as a Factor in Political Relations

However, recent studies have shown that the centralized versus decentralized models do not fully illuminate the complex nature of Maya society. Rather than subscribing to this dichotomy, scholars are now seeing Maya social organization as a fluid and fluctuating between centralized and decentralized polities. Like with earlier decentralized theories, this dynamic model places the localized community as the crucial factor in socio-political interactions. Yaeger (2003) addresses this notion in his analysis of political relations between the ancient sites of Xunantunich and San Lorenzo. In this situation, the larger polity of Xunantunich invested time and resources towards the development of the smaller, neighboring site of San Lorenzo. Such developments would, the elite of Xunantunich hoped, motivate the inhabitants of San Lorenzo towards actions that would benefit the polity as a whole. At first, this action led to a

stronger connection between the two sites. As seen in many cases around the Maya area, local elites manipulate their power by relating themselves to a larger, nearby polity (Ashmore and Sabloff 2002, 2003; Glover 2012). However, in the case investigated by Yaeger (2000), the relationship developed with Xunantunich eventually strengthening the sense of community in San Lorenzo. This empowerment led the people of San Lorenzo to identify with the local community rather than the imagined community created by Xunantunich. This demonstrates the power communities have in influencing the actions of larger aggrandizers. Here, the exploitation of a community-based niche acts to create a complex relationship between two interdependent sites.

3.3 The Belize River Valley

The Belize River Valley is an ecological zone in the modern nation of Belize that encompasses the Belize River and its tributaries (Figure 3.1). As an archaeological sub-region it is defined as the immediate area along the river and its tributaries from the Guatemalan border to around the modern city of Belmopan (Chase and Garber 2004:1-3). This river network would have acted as a valuable transportation route from the Caribbean Sea to the Maya heartland of the Petén (Chase and Garber 2004:5; Hammond 1981:157). The eastern portion of this region marks the boundaries of Maya settlement in Central Belize. This drop-off of settlement is due, in part, to the increasingly limited availability of rich soils and drinkable water as one approaches the coast (Chase and Garber 2004:3).

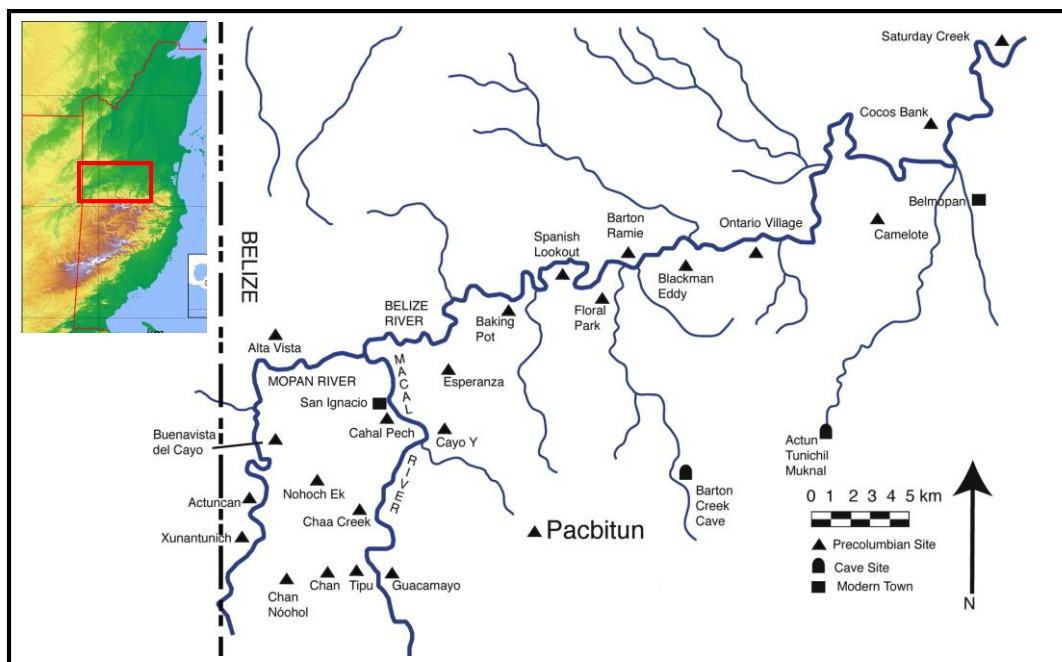


Figure 3.1 The Belize River Valley

Archaeological investigations began in earnest in this zone with the research of Gordon Willey during the mid-20th century (e.g., Sabloff 2004; Vogt and Leventhal 1983; Willey et al. 1965). The efforts of Willey and subsequent archaeologists have set the region apart from investigations at many larger sites in the Maya lowlands as far as length and type of studies are concerned. These differences have been attributed to the emphasis on household archaeology in the region. Thus, archaeological investigations have largely focused on non-elite settlement within the area (D. Chase 2004:335). Gifford (1973) analyzed the ceramic collection amassed from the site of Barton Ramie of the Belize River Valley. From this collection, Gifford created an extensive type-variety ceramic collection for the region that include materials from Middle Preclassic (1000-300 B.C.) to the Late Post-classic (AD 1200-1530) (Chase and Garber 2004:7; Coe 2011; Hammond 1981:163).

As mentioned, the Late Classic period of Maya occupation saw an intricate political system being influenced by the interaction of interdependent communities varying in size. As a

result of their strategic location, some have claimed the Maya in the Belize River Valley would have played a supporting role to the larger sites closer to the Maya Heartland (A. Chase 2004). Additionally, A. Chase (2004:332) argues that the small “nodes” of occupation in the Belize Valley are in stark difference to those found at the larger, nearby site of Caracol. He suggests that this settlement pattern is what one would expect in a contested border zone (A. Chase 2004:332).

If one subscribes to the aforementioned dynamic model of political relations, it is hard to imagine the Maya of the Belize River Valley as passive pawns in larger power struggles. The peripheral sites occupied in the Belize River Valley would have controlled a variety of resources that would have potentially altered their political and economic standing on a macroscopic scale. Sites such as these would have acted as a “nexus where complexity related variables such as wealth, power, identity, and autonomy are interwoven” (Schortman and Urban 2003:137).

3.4 The Maya Mountains

One of the most striking features on modern maps of Belize is the Maya Mountains that occupy half of the country’s southern region (Hammond 1981:159). This geographic region located roughly 20-30km south of the Belize River Valley, greatly influences the drainage, soil, and vegetation of Belize (Hammond 1981:159). The drainage networks from the Maya Mountains would have acted as a natural transportation system to bring resources to those living in the valley. The streams in this area were powerful enough to bring minerals the ancient Maya would have used in construction and tool crafting to areas of lower elevation (Graham 1987:754). Living in close proximity to this ecological area would have given a group an easily accessible assortment of resources to exploit.



Figure 3.2 Physical Map of Belize including the Maya Mountains. Populstat (2004)

3.5 Pacbitun

Pacbitun is a medium sized site located along the periphery of the Belize River Valley and Maya Mountains, near the modern village of San Antonio, Belize. It was originally occupied as a small village during the Middle Preclassic as early as 800 B.C. with occupations lasting until the Late Classic (AD 600 – 900) (Healy et al. 2007:1; Hohman 2002; Powis 2010). The epicenter of the site lies on top of an elevated-limestone plateau with a surrounding “core” area. This area encompasses roughly .5 km² and would have been the ceremonial heart of the polity. Surrounding this core-area is a nine km² periphery zone that, along with the core-zone, is thought to have to have been home to some 5000 to 6000 inhabitants during its height (Healy et al. 2007:21; Weber 2011:55). The site was originally settled in order in order to extort the resource of the Belize River Valley (Graham 1987; Healy 1990).

3.6 Late Classic Intensification at Pacbitun

As stated, the Late Classic period of Maya settlement was partially defined by the intricate relationship between localized communities and larger Maya polities. This relationship holds true for Pacbitun, which saw the increased intensification of land use and natural resources during the Late Classic. Here we see an increased usage of a combination of floral, faunal, and mineral resources during this time period (e.g., Healy et al. 2004; Richie 1990). Combining notions of communities influencing the larger polities, as well as Pacbitun's proximity to two ecozones, one can see this intensified resource utilization as having a large impact on the Pacbitun polity as a whole.

3.6.1 Food Sources

In the late 1980s and early 1990s, research at Pacbitun began focusing more heavily on the site periphery. Under the direction of Paul Healy, Richie (1990) and Sunahara (1994) conducted extensive surveys that covered four-1 km long by 300 m wide transects spanning the inter-cardinal directions from the core-zone outwards. These investigations uncovered a peripheral settlement that overwhelmingly dates to the Late Classic (Richie 1990:194; Sunahara 1994:130). Hilltop areas of these survey areas have alluded to a terrace-based agricultural system (Healy et al. 2004:221). A large portion of the settlement documented in the periphery surrounds these terraces, which suggest forms of landholding with an increased focus on cultivating maize (Healy et al. 2004; Sunahara 1994:133). Additionally, Healy and colleagues (2004:222) claims that evidence of this intensification in the less desirable farming regions suggests an active mobilization of the local workforce.

The faunal resources utilized by the inhabitants of Pacbitun were likely acquired by means of opportunistic hunting in forested and deforested areas (Healy et al. 2004:219-20). However, certain animals such as deer could have been semi-domesticated by the inhabitants of Pacbitun (White et al. 1993:359). Furthermore, populations at Pacbitun utilized a number of aquatic food sources. Remains found at Pacbitun from freshwater gastropods, amphibians, and reptiles suggest a localized exploitation of rivers and streams (Healy et al. 2004:221).

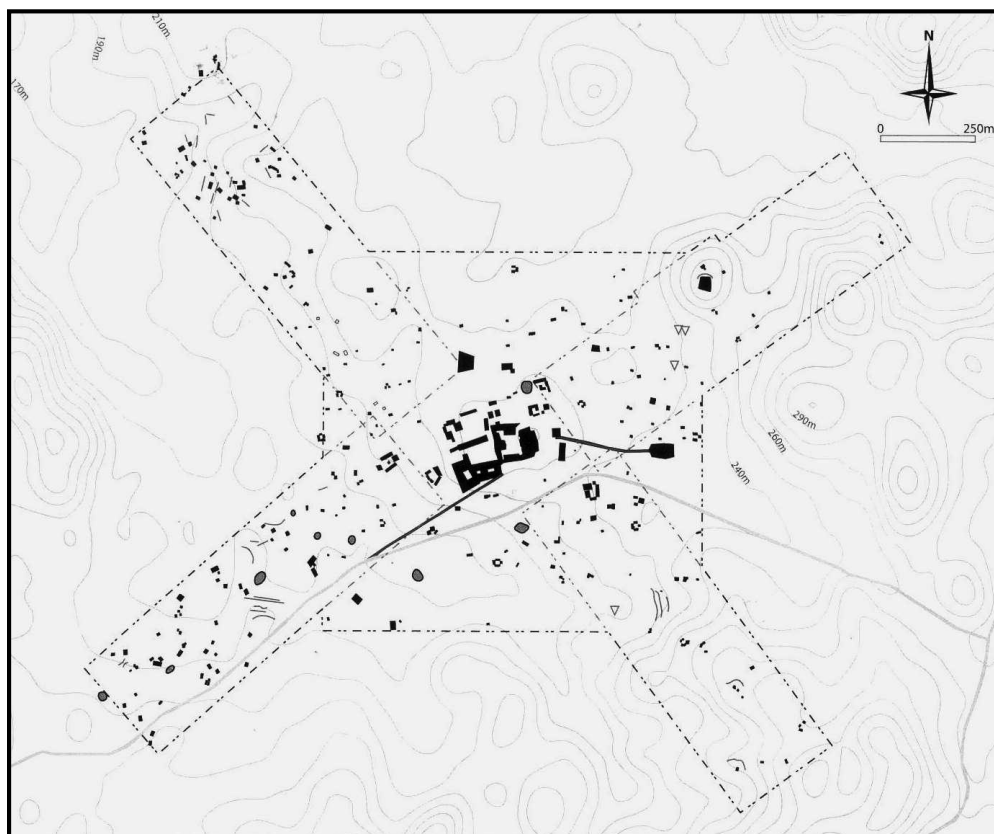


Figure 3.3 Pacbitun Settlement Survey.
Healy (2007: Figure 3)

3.6.2 *Utilitarian Goods and Commodities*

The inhabitants of Pacbitun produced a number of utilitarian and commodity goods for both domestic use and for trade purposes. Production aspects of the site have long been at the heart of a number of studies conducted within the region. Objects such as slate artifacts are believed to have been produced at the site due to “unusually common” debitage found in excavations at the site (Healy et al. 1995:340; 2004:226). Although Pacbitun was a production hub throughout much of its history (see Hohman 2002 for discussion of Middle Preclassic shell bead workshop), production of lithic materials such as slate reached its zenith during the Late Classic (Healy et al. 1995:340; Wagner 2009:101).

3.7 Conclusion

Social complexity has, and continues to be a critical aspect of ancient groups to study archaeologically. In the case of the ancient Maya, this topic has presented itself in the discussion pertaining to the role of localized communities in Maya society. At sites such as Pacbitun, we see a site that is nestled between two ecologically-distinct zones. This location of Pacbitun begs a number of questions regarding how the prehistoric inhabitants would have utilized their environment to occupy a niche within larger inter-site relations. The answers regarding the complexity of Pacbitun and its neighbors lie within a micro-analysis of the polity itself. Understanding the relationship between craft-specializing communities and the larger site itself is crucial. An analysis of this relation can shed light on the manner in which Pacbitun could have utilized its available resources to its advantage.

4 METHODOLOGY

4.1 Introduction

In this chapter I discuss the methods I employed during December 2011 and June 2012 lab and field seasons. I provide a brief overview of the overall project goals during this time period, as well as note my original research intentions for the 2012 field season. I then move on to mention why my research focus shifted from conducting a settlement survey of the Pacbitun periphery to an excavations within the cluster of mounds known as the Tzib Group. Investigations at this group included a horizontal excavation of the structure known as “Mano Mound” as well as a test unit placed in a nearby patio group.

4.2 2012 Research Goals at Pacbitun

Research at Pacbitun over the past few years has focused on the site’s core and the peripher. Investigations at the site core in 2012 incorporated three main research foci. Before the start of this field season, the project was awarded a grant for initiating a ground-based LIDAR survey of the site. This survey, was primarily interested in created a three-dimensional representation of the core-zone of Pacbitun, as well as of a select number of caves occupying the surrounding hinterland. Furthermore, excavations took place at the site core within what is known as Plaza D under the direction of Terry Powis (2012).

Project co-director, Jennifer Weber of the University of Bonn, focused her 2012 investigations on the Mai Causeway as well as the Termini Complex (Structure 10) located at the furthest extent of the causeway. She conducted these investigations in order to analyze the construction of the causeway itself. The Mai causeway begins at the eastern extent of Structure A-1 and runs eastward for 273 m towards Structure 10. Weber (2012) placed three excavation

units within the Mai Causeway and one unit at the base of the Termini Structure. Additionally, five excavation units were placed in the Tzul Causeway, which extends from the site core to Tzul's Cave in Pacbitun's periphery.

Additional investigations conducted in the site periphery were focused within the extensive cave network surrounding the site. John Spenard (2012) is researching Pacbitun's extensive cave network for his doctoral research at the University of California Riverside. In particular he focused his 2012 investigations on a cave known as Actun Lak (Pottery Cave) and a rockshelter referred to as Actun Naj Che (Home Stake Cave). At Actun Lak, Spenard (2012) placed excavations units at the entrance of the cave to better understand the significance of activities occurring inside the cave. Excavations conducted at the entrance of Actun Lak uncovered a landscape that was modified by the inhabitants of Pacbitun. Within Actun Naj Che, Spenard (2012) placed three excavation units along the rockshelter's wall. From these units, Spenard concluded that the structure had endured some form of modification from residents of Pacbitun and potentially housed ceremonial activities associated with burials.

Initially, my research goals for the 2012 field season was geared towards expanding upon settlement surveys conducted at Pacbitun by Richie (1990) and Sunahara (1994) shown in Figure 3.3. Under the direction of Paul Healy, these surveys were aimed at exposing the settlement of Pacbitun within the immediate periphery of the site. My goal was to expand upon these settlement data by conducting a full-coverage settlement survey to the west and north of Pacbitun's site center. During this survey, distance was to act as the primary control for determining what and where to excavate. Structures would be sampled in order to obtain a basic ceramic chronology for determining the duration of occupation. However, upon entering the

field during December 2011, my research focus began to shift from conducting a settlement survey of the Pacbitun periphery to excavations of an area of Pacbitun known as the Tzib Group.

4.3 The Tzib Group

Investigations within the area of Pacbitun known as the Tzib Group began during PRAP's lab season in December 2011. As stated, my research goal initially was to expand upon the periphery mapping projects began by Paul Healy and his students in the 1980s and 1990s. In order to build upon this survey work, I set out alongside John Mai, Adimar Mai, and Javier Mai as well as Patrick Severts to reestablish the aforementioned survey transects. This process involved walking the original survey transects created by Healy (2007: Figure 3). Features that were recognized as being surveyed by Healy were flagged and recorded in a Garmin GPS unit and marked with flagging tape.

We encountered the site that would become known as the Tzib Group while defining the parameters of the northwest transect. While walking the original transect line, Javier Mai escorted Patrick Severts and I to a cluster of mounds located on what is now an open pasture owned by San Antonio resident Mr. Rudolfo Tzib. His pasture and the cluster of mounds within it, are located roughly 0.75 km northwest from the site core of Pacbitun. Mr. Tzib's land is currently used for housing livestock owned by his family. The eastern boundaries of the pasture are characterized thick brush that extends to a small dirt road roughly 175 m from the boundaries of the pasture. The land to the north, west, and south of the Tzib Group is currently used for growing a variety of crops by both the Tzib family and other residents of San Antonio.

Analysis of the Tzib Group began with an unsystematic pedestrian survey of Mr. Tzib's pasture. After this initial pedestrian survey, a Leica Geosystems total station was used to

digitally record the group's location. Surface finds in the pasture included a large quantity of what appeared to be mano and metate fragments at various stages of production as well as residual flakes created from lithic reduction processes. The largest quantities of the fragments noted by a walkthrough of the pasture were located on a stand-alone mound initially labeled "Mano Mound." The exact size of this feature was difficult to discern. This structure sits on top of a slope within the pasture. The western portion of the mound has been subjected to heavy erosion while the eastern section of the mound blends in with the natural apex of the slope on which it sits. The erosion of this structure has been aided by the heavy use of the land for farming and livestock grazing. Local accounts specifically mention periods in the 1980s when agricultural intensification took a heavy toll on the structural integrity of the mound (Antonio Mai, personal communication, 2012). Mai stated that the mound's zenith was bulldozed, thus making the original parameters of the mound difficult, if not impossible to define. A map displaying Mano Mound and the nearest plazuela group can be seen in Appendix D.



Figure 4.1 Mano Mound



Figure 4.2 Example of Surface Finds on Mano Mound

4.3.1 Excavations at the Tzib Group

The first goal of my research in the 2012 field season was to investigate the structure labeled as “Mano Mound.” As stated, discerning the actual boundaries of the mound was difficult due to erosion. Therefore, the location for our excavation unit was chosen based on the zenith of the mound. We placed a 3 m x 3 m excavation unit (Str. 1, Unit1) in what was determined to be the center of the mound in order to expose as much as the mound as possible, both vertically and horizontally in order to find a structure.

Unit 1, Level 1 was characterized by a light brown (7.5 YR 6/3) topsoil that included large amounts of granite debitage. Additionally, large quantities of mano and metate preforms were scattered throughout this level. Shortly after excavation in this unit began, we realized that we had underestimated the sheer density of granite in Level 1. It became apparent that having a 3 m x 3 m unit would hinder my ability to analyze which portions of the structure possessed the highest density of various artifacts. Therefore, it was decided that upon completion of Level 1, the unit would be divided into four 1.5 m x 1.5 m quadrants. The high density of granite debitage in Level 1 can be seen in Figure 4. 3.

The bottom of Level 1 was reached at a depth of between 20 cm - 25 cm below the surface along the eastern section of Unit 1. However, the bottom of Level 1 was reached at roughly 55 cm below surface in the western portion of Unit 1. This drastic difference in depth can be attributed to the aforementioned differences in slope between the two portions of Unit 1. Furthermore, the fact that this mound was bulldozed in the 1980s could also be at fault for the depth discrepancies in Level 1.



Figure 4.3 Partial Profile View of the Southern Wall of Unit 1 Level 1

The southwestern portion of Unit 1 revealed a cluster of mano and metate preforms that rested on top of Level 2. Mano and Metate Cluster 1 was comprised of 16 mano and metate preforms with four blocks of uncut limestone (Figure 4.4). However, portions of this cluster remained embedded in the southern wall of Unit 1. In order to fully expose Cluster 1, a 0.25 m x 1.5 m extension was opened along the southern wall of the southwestern portion of Unit 1. This extension, Unit 1, Extension A was brought down to the top of Level 2. Even after Extension A was brought down to Level 1, a few mano and metate preforms protruded into the southern wall of Unit 1. As a result, it was decided to create a second extension of the same size, Extension B. Excavating this extension revealed that those preforms extending into the southern wall of Extension A represented the extent of the cluster.



Figure 4.4 Mano and Metate Cluster 1 within Unit 1 and Ext. A.

A second, smaller cluster of mano and metate preforms was located in the western portion of Level 1. Out of this cluster, Mano and Metate Cluster 2, roughly 14 preforms with two pieces of amorphous granite were uncovered. The boundaries of this cluster were entirely within Unit 1, therefore, no extension was needed to entirely expose the cluster. All mano and metate preforms found in Unit 1 and Unit 1 Extensions A and B were uncovered in Level 1, with the majority coming from the two identified clusters.

Portions of Level 2 began appearing sporadically throughout the base of Level 1. However, finding a consistent soil change at the bottom of Level 1 proved to be rather time consuming. To speed the process of finding Level 2, we decided to create 0.5 m x 0.5 m test unit in the northeastern corner of Unit 1. This test unit was intended to find the bottom of Level 1

and clearly reveal the transition to Level 2. Eventually, the top of Level 2 was entirely exposed within this expansion. We then began to work from the northeastern corner to expose the remainder of Level 2 within Unit 1. As with the previously mentioned depth differences in Level 1, the beginning of Level 2 was easier to identify in the eastern section of Unit 1 than in the western section. Once the surface of Level 2 was established throughout Unit 1, we began to section the unit off into the aforementioned quads.

Due to the relative shallowness of Level 1 in the northeastern section of Unit 1, it was decided to begin Level 2 in the northeastern quad in order to more efficiently expose the level within this quad. The soil type in this level was markedly different from that found in Level 1. Rather than the top soil found in Level 1, Level 2 was made up of a pale yellow production debris. In the northeastern quad, Level 2 measured to be approximately 60 cm (Figure 4.5) in depth. However, in contrast to Level 1, Level 2 proved to be thicker in the SE and NE quads, rather than in the SW and NW quads. Within the two extensions of Unit 1, Level 2 was almost entirely unrecognizable.

Portions of the production debris in Level 2 initially appeared to be comprised of residue from the *repellar* and *afinar* stages of production, as noted by Hayden (1987). The production debitage from this level is currently being analyzed by geologist Sheldon Skaggs and Linda Howie. Details of Skaggs' (2013) and Howie's (2013) geologic analysis of this production debris are discussed in the following chapter. The number of artifacts found in this level decreased significantly, with granite and chert debitage making up the largest portion of cataloged remains, with no mano and metate preforms found.



Figure 4.5 East Profile of Unit 1, Northeast Quad, Level 2.

Once again, we excavated the northeastern quad first to reveal the next level. The fill that was present in Level 2 of Unit 1 was not found in Level 3. This production debris was replaced by thick, yellowish-brown clay. In Level 3, the artifact density increased greatly from what was found in Level 2. Granite found in this layer dropped off dramatically, while ceramic and lithic remains were uncovered at relatively high densities. Throughout the entire 3 m x 3 m unit, the thickness of Level 3 stayed between 10-15 cm. Level 3 proved to be the last cultural level within the unit. Below this level was bedrock. However, to make sure Level 3 was indeed the extent of cultural occupation within the unit, 10 cm off bedrock was excavated. No evidence of cultural materials were found within these few centimeters, thus excavations in Structure 1 Unit 1 were halted.

As a result of the temporal constraints of the field season, only $\frac{3}{4}$ of the original 3 m x 3 m unit was excavated to bedrock. Excavations in this unit yielded no concrete evidence of the existence of architecture. However this does not dismiss the one time-existence of a workshop. As Searcy (2011) notes, workshops often existed within a perishable structure atop a raised platform. Initially, there were plans to further investigate the potential of a physical structure. We had originally hoped to create three 2 m x 0.5 m trench units extending to the north, south, and east of the structure. The western portion of the mound was not to be sampled as a result of the drastic drop-off in elevation. There were hopes that these trenches would expose any physical wall that surrounded the unit. Once again, the temporal constraints that limited bringing every quad from Unit 1 to bedrock limited our ability to create the aforementioned trenches (see below for future research objectives).



Figure 4.6 Complete East Profile View of Unit 1, Northeast Quad.

As stated, the unsystematic survey of the Tzib Group uncovered a single plazuela group within the confines of Mr. Tzib's pasture. This structure is located roughly 50 m - 100 m southwest of Mano Mound. This plazuela group housed three structures located along the eastern, western, and northern sides of the plaza. We decided it would be beneficial for the research project to investigate whether or not there was a connection between the plazuela group and Mano Mound. Much like Mano Mound, this structure had mano/metate preforms as well as granite debitage scattered about the feature's surface. Although, this structure appeared to have a less dense concentration of granite artifacts than found on Mano Mound. Thus, a 1 m x 1 m unit was placed within the center of the northern structure of this group (Structure 2, Unit 1). This unit was comprised of four cultural occupation levels above bedrock. Less than 10 flakes of granite were recovered from this unit with ceramics dating to the Late Classic period making up the majority of artifacts excavated. Due to time constraints on the field season, no further excavations took place at the plazuela group

4.4 Summary

While conducting archaeological research, it is sometimes necessary to adapt and deviate from one's original research goal in lieu of new findings. Surface findings of mano and metate preforms at the Tzib Group resulted in me deviating from my original goal of expanding upon previous settlement data at Pacbitun. To investigate the nature of the Tzib Group as a production site, I placed excavation units within the structure known as Mano Mound and the northern structure of a nearby patio group. Excavations in Mano Mound uncovered high densities of granite debitage as well as mano and metate preforms. Additionally, this unit yielded a layer of what appeared to be production debris. A detailed description of findings from these excavations

will be discussed in the following chapter. Finally, although the surface of the patio group contained high densities of granite artifacts, my excavation in the structure uncovered very little granite debitage.

5 ANALYSIS

5.1 Introduction

Here I provide an overview of the artifacts recovered from both Mano Mound and the nearby patio group. I begin by analyzing lithic and ceramic remains found at Mano Mound. I then move on to discuss the peculiar production debris found within Level 2 of my excavation at Mano Mound. This discussion of the production debris will involve a breakdown of the mineral composition of the material as discerned from a double-blind study. From there, I move on to describe findings within the 1 m x 1 m test unit placed in the nearby patio group.

5.2 Mano Mound

5.2.1 *Lithic Analysis*

As stated, granite artifacts made up the vast majority of data uncovered from the excavation of the structure known as Mano Mound. I decided to split the granite refuse not labeled as mano or metate preforms into the categories of flakes or scatter. Based on Cook (1982) Hayden (1987) and Searcy's (2011) ethnographic accounts of modern metateros, the presence of a striking platform and bulb of percussion served as the criteria to distinguish flakes from scatter. In their depictions of the initial stages of production, metateros utilized kinetic energy to strike a mano or metate blank to reduce the preform to a desired size, which would have caused the formation of the aforementioned striking platform and bulb of percussion. Unit 1 Level 1 produced 180.5kg of granite flakes and 264.75kg of granite shatter. In Level 2, granite debitage decreased to less than 100g with debitage being completely absent from Level 3.

Table 5.1: Breakdown of Granite Debitage Excavated from Mano Mound

| Level | Flakes (kg) | Shatter (kg) |
|--------------|--------------------|---------------------|
| 1 | 180.5 | 264.76 |
| 2 | 38 | 18.5 |
| 3 | 7 | 5.25 |

Excavations within Unit 1 Level 1, including Extensions A and B, uncovered 57 identifiable mano preforms. All 57 of these mano preforms were fragmented with most fractures appearing to occur down the middle of the granite preform. Two measurements were taken of the mano preforms excavated from the Tzib Group. The first measurement was taken at the widest two points on the fracture of the object. The second measurement was taken from the most medial point of the fracture to the most lateral point of the preform.

Table 5.2: Mano Measurements.

| | |
|----------------------------|--------------|
| Average Width (cm) | 8.94 |
| Average Length (cm) | 12.78 |



Figure 5.1 Representative Samples of Granite Debitage Found in Unit 1, Level 1.
(Photo Courtesy of Terry Powis)



Figure 5.2 Representative Sample Mano Preforms Found in Unit 1, Level 1
(Photo Courtesy of Terry Powis)

Interestingly enough, the number of metates found within Level 1 appear in a much lower frequency than manos. From Unit 1 Level 1, 17 metate preforms were found. Metate preforms were rather troublesome to identify as compared to mano preforms. All metate fragments were roughly the size of some of the larger flakes produced by what Hayden (1987) termed the *estillar* phase of production. The distinguishing factor that was utilized for separating metate preform fragments from flakes was the observed presence of smoothing on the artifact's surface. Out of these 17 metate preforms, only one possessed a trough formation indicative of a metate in the latter stages of the *afinar* phase of production. This trough form can be seen in the far left metate example in Figure 5.3.



Figure 5.3 Representative Sample of Metate Fragments.
(Photo Courtesy of Terry Powis)

Chert was also present in abundant amounts within Unit 1 Level 1 and Extensions A and B. Within this level, five chert cobbles were found with smoothing present. Spink (1984:79) notes that although chert is widely used for chipped tools, it can also be used as a polishing tool. According to Spink (1984:7), chert is typically harder than the granite tools. Thus, the reduction tactics seen in the *afinar* stage of production could have been performed with such cobbles.

Chert flakes found in Level 1, and subsequent levels, were broken down into the categories of primary, secondary, and tertiary flakes. There were 76 primary flakes, 303 secondary flakes, and 135 tertiary flakes. The majority of chert flakes found were excavated from the two extensions to the unit. Additionally, it was in this level of Unit 1 that the lone chert biface was found. Unlike with granite and ceramic artifacts, chert remains were present in Unit 1 Level 2 in comparatively high frequencies. In this level, I recovered 23 primary, 166 secondary, and 150 tertiary flakes with 1 cobble. Chert flakes dropped off slightly in Level 3. Here, 33 primary, 102 secondary and 31 tertiary flakes were found.

Flakes found in this unit point to a few potential scenarios. One scenario suggests that chert was somehow utilized in the production process of manos and metates. As stated, production workshops are often in close proximity to a residential structure (Cook 1982:196; Hayden 1987a; Nelson 1987:133; Searcy 2011:53; Shafer and Hester 1983:529). Thus, a second scenario points to chert tools being crafted in this location for domestic consumption. Although, these two situations are not necessarily mutually exclusive.

Table 5.3: Chert Artifacts in Mano Mound

| Level | Primary Flakes | Secondary Flakes | Tertiary Flakes | Bifaces | Cobbles |
|--------------|-----------------------|-------------------------|------------------------|----------------|----------------|
| 1 | 76 | 303 | 135 | 1 | 5 |
| 2 | 23 | 166 | 150 | 0 | 1 |
| 3 | 33 | 102 | 31 | 0 | 0 |

**Figure 5.4 Chert Cobbles****Figure 5.5 Chert Biface**

5.2.2 *Ceramic Analysis*

Ceramics found within Mano Mound are indicative of the Spanish Lookout (AD 700-900) phases as described by Gifford (1972). Within Unit 1, no whole ceramic vessels were found. Sherds found in this unit primarily consisted of Dolphin Head Red, Cayo Unslipped, and Garbutt Creek types. I recovered ceramic types from this time period in all three levels of Unit 1 and both extensions. Thus, utilizing Gifford's work, the aforementioned sherd types suggests a Late Classic occupation. A complete breakdown of ceramics found in Mano Mound can be seen in Appendix A.

5.2.3 *Production Debris Analysis*

To investigate the nature of the material found in this level, we took samples of the material to be geologically analyzed in a double-blind study (Ward and Powis 2013) performed by both Sheldon Skaggs and Linda Howie. Skaggs's (personal communication, 2013) preliminary analysis of the debris noted two distinct fractions. The first fraction, according to Skaggs, was relatively fine and was more than likely made up of quartz. The second fraction was extremely angular, thus the material had more than likely not endured natural erosive processes. According to Skaggs, this angularity appeared to be the result of intentional hammering and/or grinding. Overall, Skaggs notes that this fraction was poorly sorted and contained traces of biotite, muscovite, quartz, hornblende, potassic feldspar, calcium/sodium feldspar.

Howie (personal communication, 2013) also noted a clear size differential between material fractions. The larger fraction, which consisted of residue sieved with 2-4 mm mesh, was comprised of granite fragments similar in texture to sugar, as well as ceramic and slag fragments. Howie stated that the granite fragments appeared to have been heat-treated. Heating the material

could have increased the malleability of the granite in order to shape the material into a mano or metate. While analyzing some of the material during the 2012 field season, our excavation team noted that some of the granite had a yellowish hue and was more brittle than material without this coloring. At this time, we are unsure as to whether or not this hue is the result of natural weathering processes or the result of heat-treating.

In the smaller fraction, Howie (personal communication, 2013) witnessed the same angularity as Skaggs and stated that the angularity was most likely the result of intentional working. To further solidify this notion, Howie compared this fraction to granite samples that had intentionally been crushed with a mortar and pestle in a lab environment. She stated that the samples crushed in the lab were identical in angularity to debris sampled retrieved from Mano Mound. However, there was something peculiar regarding the mineral composition of the granite residue. Howie compared the percentage of quartz found within the production debris to the percentage one would expect to find naturally in granite and determined that quartz was underrepresented in the sample of granite residue from Mano Mound. Quartz, according to Howie, is the hardest mineral found within granite and occurs in larger particles within the rock. Thus, quartz would not break down as easily as other minerals found in granite. Howie pointed out that quartz could have been selected for in the granite residue and utilized in future mano and metate production as an abrasive. More research will need to be conducted to fully examine the various explanations for the relative lack of quartz within the debris found in Unit 1 Level 2. Furthermore, Howie (personal communication, 2013) noticed traces of sandstone within this fraction. This material, according to Howie, is not local to the area and could have been brought in to utilize in the mano and metate production process as an abrasive as well.

5.3 The Plazuela



Figure 5.6 The Northern Structure of the Plazuela (Structure 2)

5.3.1 *Lithic Analysis*

As stated, a test unit (Structure 2, Unit 1) was placed within the center of the northern Structure of the only identified plazuela group in the Tzib Group. Although granite debitage dotted the surface of the structure, only a handful of flakes were uncovered from this test unit. Due to the unit's relatively small size, this cannot be considered a representative sample of the entire plazuela. Chert comprised the largest amount of lithic material found within this unit. Flakes found here include one primary flake, eight secondary flakes, 13 tertiary flakes, and one obsidian flake. Additionally, 36 slate fragments were found within this 1 m x 1 m unit.

5.3.2 Ceramic Analysis

In contrast to Mano Mound, ceramics made up the large majority of artifacts found within this unit. These ceramics also fall within the Spanish Lookout Phase (AD 700-900). Aside from sherds, one anthropomorphic ceramic figurine fragment was found within this structure. A complete breakdown of ceramics found in the plazuela can be found in Appendix B.

5.4 Summary

Lithic materials make up the largest percentage of artifacts recovered from Mano Mound. Granite had the highest representation of artifacts found in the unit with roughly 514 kg of debitage being found in all three stratigraphic levels combined. Additionally, the 57 mano preforms and 17 metate preforms were all found within Level 1 of Mano Mound with none being found in subsequent levels. Analysis of the production debris found in Unit 1 of Mano Mound determined that the material is in fact residue from intentionally hammering or grinding granite rock.

6 DISCUSSION

6.1 Introduction

In this chapter I combine the theories and data discussed in previous chapters in order to fully address question raised by the excavations at the Tzib Group. Such questions include an interpretation of both the production process occurring at Mano Mound as well as of the producers themselves. Additionally, I present a number of characteristics one would expect to find at a production site, and systematically analyze such criteria in comparison with findings at Mano Mound. Based on the geologic analyses of tools and the byproducts of their production, I list a number of potential sources of raw materials that the prehistoric *metateros* would have had at their disposal. Furthermore, in this chapter, I attempt to place the *metateros* of the Tzib Group within the complex social network of the Late Classic polity of Pacbitun.

6.2 Interpretation of the Mano and Metate Production Process

6.2.1 *Sourcing the Material*

Before discussing the chaîne opératoire involved in crafting manos and metates at the Tzib Group, it is necessary to outline a few potential sources for the material the prehistoric *metateros* would have utilized. Graham (1987) notes that the Maya Mountains and their intricate network of streams proved to be a valuable resource for the ancient Maya living nearby. Knowing the resources a group of crafters would have had access to allow one to attempt to trace produced goods to their origin (Graham 1987).

Dixon (1956) conducted an extensive geologic survey of the southern portion of Belize that included the Maya Mountains and associated bodies of water. It is in the central and southern portions of Belize that the majority of the granite in the country is located (Dixon 1956;

Graham 1987:756). However, varieties of granite vary from location to location (Dixon 1956; Graham 1987:756). Dixon (1956:35) points out two common forms of granite found within his survey area. The first, most common type is a mica-based granite that bears inclusions of biotite. Less common than mica-granite is muscovite granite. This granite according to Dixon (1956:35) is generally located closer to the coast of Belize between the Mullins River and the Silk Grass Creek.

Skaggs (personal communication, 2013) notes that the two forms of granite noted by Dixon (1956) are not mutually exclusive. According to Skaggs, this “bi-mica” type of granite forms from potassium-rich magma. This type of magma also results in the formation of pink-orthoclase feldspar within the granite (Skaggs, personal communication, 2013). While conducting my initial analysis of granite recovered from Mano Mound, I noted the slightly pink hue of a number of the granite artifacts. Graham (1987:756) also notes the occurrence of the bi-mica form of granite. Granite comprised of both biotite and muscovite are primarily located within the Stann Creek District of Belize (Graham 1987:756; Shipley 1978). Additionally, Graham (1987) and Shipley (1978) confirm that muscovite granite is typically not found in the western portion of Belize where the Mountain Pine Ridge is located. Thus, at least a portion of the material used in mano and metate production potentially comes from granite outcrops such as the Hummingbird batholith (Graham 1987; Howie, personal communication 2013; Shipley 1978) in the Stann Creek district. However, granite found within Mano Mound will require a more in-depth geologic analysis to make any concrete connections to one or more source.

6.2.2 *The Production Process at Mano Mound*

As stated in Chapter 2, Hayden (1987a) gives a detailed description of the three phases of mano and metate production that he terms the *estillar*, *repellar*, and *afinar* stages. Hayden (1987) based a great deal of his categorization of these processes on the amount of reduction occurring at the described locales. Many of the flakes found during the excavation of Mano Mound fall within the *estillar* phase of production described by Hayden (1987a:27-35). As noted above, Hayden (1987a), Cook (1982), and Searcy (2011) state that subsequent stages of production occur at either an intermediate river site or at a home workshop. Additionally, flakes from the *repellar* stage of production also appeared within this structure. Skaggs' (2013) analysis states that the large portion of the material from Level 2 is potentially a result of the *afinar* stage of production that largely focuses on the smoothing of the mano and/or metate preform to its final state.

There are seemingly multiple explanations for the occurrence of debitage from the three aforementioned categories within a single area. In Chapter 5, I noted that manos made up the highest number of ground stone tools found within Mano Mound. Hayden (1987a:46) and Searcy (2011:50) state that due to relative short production time of manos, they are generally produced start to finish in a single area. Thus, Mano Mound, could potentially have served as a production locale for manos rather than the much more labor intensive metates. Being that the *afinar* stage of production involves very little reduction via forceful striking, one would not expect to find fragments resulting from an improper strike or geologic impurities within the granite itself.

A second explanation of the mano-metate ratio at Mano Mound focuses on the notion that manos are much smaller than metates, and thus, have a shorter use-life (Searcy 2011:50).

According to Searcy (2011), the mano to metate production ratio is heavily dependent on the individual metatero and the demand for his/her product. Metateros who witnessed a higher demand for manos due to their relative frailty in comparison to metates, produced more manos (Searcy 2011:50). Thus, Mano Mound could have functioned primarily as a mano production site rather than one that produced the two-piece set.

As mentioned in Chapter 2, Searcy (2011:53) states that debitage is generally removed from the metatero's workspace. Thus, a third proposition suggest that Mano Mound was not the stage for mano and metate production at all. Rather, the location of the "mound" was utilized as a dumping site for the debris resulting from production activities occurring elsewhere within the area. This notion is discussed in further detail in the subsequent section.

6.3 Interpretation of Unit 1 Level 2

Skagg's (2013) and Howie's (2013) analysis of the fine-grained material that comprised Unit 1 Level 2 shed a great deal of light on the type of debris that results from grinding manos and metates to their desired form. However, the fact that this granite residue only occurs in Level 2 raises a number of questions. One such question revolves around the notion mentioned in the previous section. With production occurring at this location, one would expect to find granite residue intertwined with the preforms and debitage found in great quantity within Level 1. The relative lack of debitage in Level 2, and the complete lack of preforms in this level potentially suggests that the production debris was deposited at an earlier time than the debitage and preforms.

Alternatively, the clear stratigraphic differences between Levels 1 and 2 could be the result of purposeful maintenance on the behalf of the metateros working at the site. As discussed

in Chapter 2, *metateros* sometimes used the debitage from *mano* and *metate* production to build or reinforce the platforms in which they worked (Searcy 2011:53). As noted in Chapter 4, the majority of *manos* and *metates* uncovered from Mano Mound rested directly on top of Level 2. Thus, the debris which resulted from the production process could have been maintained as a surface area in order to continue production within the workshop area.

Furthermore, the fact that the production debris is present in Level 2 at all might suggest that the lithic remains found in Mano Mound are in their primary context. Healen (1995) suggests that secondary lithic depositions are biased towards larger-sized debitage. Thus, evidence of the *repellar* and *afinar* stages of production would appear in lower frequency within the excavation unit. The intact state of the production debris from Level 2 demonstrates the type of residue that Healen (1995) states is not typically present within a secondary deposit.

6.4 The Metatero at Pacbitun

Making any inference into the lives of the *metateros* who would have produced the preform tools found at Mano Mound requires an investigation into the structures in which they resided. Due to the disproportionate ratio of artifacts associated with production versus those associated with domestic use, it is difficult to state whether or not Mano Mound was used for anything other than a workshop. As stated, ceramics made up the majority of artifacts found within the test unit placed in the plazuela with a few pieces of granite debitage. Thus, the structure was more than likely domestic in nature with potentially some connection to the granite industry in the area as opposed to solely a production site. Determining the socio-economic status of the *metateros* at Pacbitun is an issue discussed in the following chapter.

Despite the constraints mentioned above, we can make some inferences about the form of production at the Tzib Group. Shafer and Hester (1991) note that chert workshops at the site of Colha were connected to the ceremonial center suggests a direct elite control. The slate workshop noted at Pacbitun by Healy and colleagues (1995) was located in close proximity to monumental structures within the site's core. The sole plazuela in the area was the largest structure in the Tzib Group and is, as stated, around 50 m from Mano Mound. Based on investigations during the 2012 field season it is difficult to discern whether or not there was any direct link between the two structures. Furthermore, Aoyama (2007:3) states that producers with an attached relationship with elites often produce luxury goods, while independent specialists produce utilitarian goods. Thus, the location of Mano Mound within the periphery of Pacbitun and the nature of the goods produced at the site initially points to a more independent operation. Addressing this notion more in-depth is discussed in the following chapter.

6.5 Conclusion

Based on the evidence presented in the past three chapters, I believe that it is clear to label the structure known as "Mano Mound" as a production site for ground-stone tools. This conclusion is due to the vast quantities of debitage ranging from the granite residue found in Unit 1 Level 2, to the large flakes that would have been produced during what Hayden (1987) terms the *estillar* phase of production. Furthermore, I believe this structure primarily served as a location for crafting manos, rather than metates due to the disproportionate ratio of manos to metates and the similarities with ethnographic data detailing mano production. Aside from addressing the production process at Mano Mound, in this chapter I have outlined a few potential sources for the granite utilized in crafting these tools. Such sources range from granite outcrops

in the Mountain Pine Ridge to outcrops in the Stann Creek District of Belize. Although we can firmly state that Mano Mound was a production center, there are questions that still require consideration. Questions left unanswered during the course of this thesis are briefly noted in the following chapter.

7 CONCLUSION AND RECOMMENDATIONS FOR FUTURE RESEARCH

Understanding the production, exchange, and use of a tool kit utilized by the ancient Maya on a daily basis is crucial for a bottoms-up analysis of social complexity in the Late Classic period. Throughout the course of this thesis, I outlined a few points that summarize recent theoretical perspectives aimed at studying craft-production archaeologically. Furthermore, I presented a number of ethnographic accounts documenting the production of manos and metates by contemporary Mesoamerican groups. I then compared and contrasted these ethnographic accounts to archaeological findings at a structure known as Mano Mound. As a result of my investigations at this structure located in the periphery of Pacbitun, Belize, I conclude that Mano Mound represents a ground-stone tool workshop geared towards exchange.

However, the research documented within this thesis only represents a small fraction of the work needed to fully understand the ground-stone tool industry at Pacbitun. Based on local accounts, and surface finds at the Tzib Group, it is highly plausible that this production is not limited to Mano Mound. Further sampling of the Tzib Group, and nearby groups is needed to determine if this production is occurring at the community level. Additionally, further excavations within the Tzib Group and nearby structure will provide insight into the socio-economic status of the *metateros* of Pacbitun. As noted by Cook (1982), Hayden and colleagues (1987), and Searcy (2011), producers of manos and metates tended to be economically impoverished. Sampling of residential structures associated with production sites will be required to delve into the lives of the actual producers themselves.

The geologic data referenced in this thesis does a great deal to point to a few potential granite sources exploited by the *metateros* of Pacbitun, however, there is more than can be expanded upon. Attempting to source potential granite outcrops must involve a combination of a

more extensive literature review, the use of technologies such as a x-ray fluorescent microscope (XRF), and ground-truthing. Known geologic data must be combined with local knowledge of the region to numerate granite outcrops that the *metateros* of Pacbitun might have accessed. Although an analysis such as the one mentioned here will not be entirely conclusive, it will narrow down our focus.

Overall, the findings at the Tzib Group expand upon previous research at Pacbitun regarding its centrality as a production hub within the Belize River Valley. This thesis also represents one of the few indicators of the production process of manos and metates within the ancient Maya area. There is a great deal of research left to be conducted at Pacbitun to understand the *metatero* within Classic Maya society. However, this thesis hopefully acts as a tool for future research projects at Pacbitun, and across the Maya area.

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APPENDICIES

Appendix A: Ceramic Counts – Mano Mound

Appendix A.1 Unit 1, Level 1

| Ceramic Type | Count |
|----------------------|--------------|
| Alexanders Unslipped | 1 |
| Cayo Unslipped | 6 |
| Dolphin Head Red | 10 |
| Garbutt Creek | 5 |
| McRae Impressed | 2 |
| Minanha Red | 8 |
| Negroman Punctated | 1 |
| Roaring Creek Red | 1 |
| Vaca Falls Red | 1 |
| Uncategorized Sherds | 564 |
| Total | 599 |

Appendix A.2 Unit 1, Extension A

| Ceramic Type | Count |
|---------------------|--------------|
| Belize Red | 1 |
| Cayo Unslipped | 2 |
| Garbutt Creek Red | 11 |
| McRae Impressed | 2 |
| Uncategorized Types | 155 |
| Total | 171 |

Appendix A.3 Unit 1, Extension B

| Ceramic Type | Count |
|----------------------|--------------|
| Garbutt Creek Red | 1 |
| Uncategorized Sherds | 148 |
| Total | 149 |

Appendix A.4 Unit 1, Level 2, Southeast Quad

| Ceramic Type | Count |
|----------------------|--------------|
| Garbutt Creek Red | 2 |
| Uncategorized Sherds | 15 |
| Total | 17 |

Appendix A.5 Unit 1, Level 2, Southwest Quad

| Ceramic Type | Count |
|----------------------|--------------|
| Garbutt Creek Red | 2 |
| Uncategorized Sherds | 11 |
| Total | 13 |

Appendix A.6 Unit 1, Level 2, Northeast Quad

| Ceramic Type | Count |
|----------------------|--------------|
| Garbutt Creek Red | 2 |
| Uncategorized Sherds | 2 |
| Total | 4 |

Appendix A.7 Unit 1, Level 2, Northwest Quad

| Ceramic Type | Count |
|---------------------|--------------|
| Garbutt Creek | 3 |
| Uncategorized Types | 14 |
| Total | 17 |

Appendix A.8 Unit 1, Level 3, Southeast Quad

| Ceramic Type | Count |
|---------------------|--------------|
| Uncategorized Types | 111 |

Appendix A.9 Unit 1, Level 3, Southwest Quad

| Ceramic Type | Count |
|---------------------|--------------|
| Uncategorized Types | 11 |

Appendix A.10 Unit 1, Level 3, Northeast Quad

| Ceramic Type | Count |
|---------------------|--------------|
| Uncategorized Types | 33 |

Appendix A.11 Unit 1, Level 3, Northwest Quad

* Unit 1, Level 3, Northwest Quad was not excavated due to time constraints.*

Appendix B: Ceramic Counts – The Plazuela

Appendix B.1 Unit 1, Level 1

| Ceramic Type | Count |
|---------------------|--------------|
| Achote Black | 6 |
| Belize Red | 2 |
| Chunhuitz Orange | 2 |
| Garbutt Creek Red | 12 |
| Mt. Maloney Black | 6 |
| Vaca Falls Red | 2 |
| Uncategorized Types | 1381 |
| Total | 1411 |

Appendix B.2 Unit 1, Level 2

| Ceramic Type | Count |
|----------------------------------|--------------|
| Achote Black | 9 |
| Belize Red | 1 |
| Garbutt Creek Red | 10 |
| Meditation Black | 1 |
| Partial Anthropomorphic Figurine | 1 |
| Uncategorized Types | 52 |
| Total | 74 |

Appendix C: Measurements for All Manos and Metates

| Mano | Width | Length |
|-------------|--------------|---------------|
| 1 | 11.1 | 18.3 |
| 2 | 7.2 | 11.2 |
| 3 | 8.7 | 16.5 |
| 4 | 7.9 | 12.8 |
| 5 | 8.9 | 10.7 |
| 6 | 9.4 | 15.2 |
| 7 | 7.3 | 11 |
| 8 | 9.9 | 10.4 |
| 9 | 7.9 | 8 |
| 10 | 9.1 | 11.5 |
| 11 | 7.6 | 6.2 |
| 12 | 9.5 | 15.7 |
| 13 | 9.9 | 5.6 |
| 14 | 7.1 | 4.7 |
| 15 | 8.5 | 7.5 |
| 16 | 10.4 | 15 |
| 17 | 9.7 | 14.3 |
| 18 | 7.6 | 7.8 |
| 19 | 7.8 | 9.5 |

| Mano | Width | Length |
|-------------|--------------|---------------|
| 20 | 7.5 | 8.5 |
| 21 | 7.7 | 8 |
| 22 | 8.8 | 12.1 |
| 23 | 8.5 | 9 |
| 24 | 8.8 | 11.8 |
| 25 | 8.8 | 15.3 |
| 26 | 8.8 | 11.4 |
| 27 | 9 | 12.5 |
| 28 | 9.5 | 16 |
| 29 | 9 | 16.8 |
| 30 | 8.4 | 13.9 |
| 31 | 9.4 | 15.6 |
| 32 | 9.2 | 13.2 |
| 33 | 8.9 | 16.1 |
| 34 | 10.5 | 15.4 |
| 35 | 9.4 | 10.5 |
| 36 | 9.7 | 10.3 |
| 37 | 9.3 | 16 |
| 38 | 9.2 | 18.5 |

| Mano | Width | Length |
|-------------|--------------|---------------|
| 39 | 11.5 | 17.5 |
| 40 | 9.9 | 15.8 |
| 41 | 10.8 | 16.5 |
| 42 | 10.3 | 15.2 |
| 43 | 9.7 | 13.5 |
| 44 | 9 | 13.3 |
| 45 | 8.5 | 14.4 |
| 46 | 9.6 | 15 |
| 47 | 9.8 | 12.3 |
| 48 | 8.4 | 18 |
| 49 | 10.5 | 16.8 |
| 50 | 8.3 | 7.6 |
| 51 | 9.5 | 15.5 |
| 52 | 7.8 | 12.1 |
| 53 | 9.2 | 13.2 |
| 54 | 9 | 12.2 |
| 55 | 6 | 9.5 |
| 56 | 8.6 | 11.6 |
| 57 | 7.5 | 15.4 |

Appendix D: The Tzib Group Maps

Appendix D.1 Mr. Tzib's Pasture



Appendix D.2 The Tzib Group in Relation to Pacbitun's Core

