Sitting on the Dock of the Bay: Ceramic Connections between Lamanai and the Chetumal Bay Area over more than Two Millennia

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Based on their work on Cozumel Island, David Freidel and Jeremy Sabloff (1984:185-193) painted a vivid picture of everyday trading and market activities in the Postclassic northern Maya Lowlands, where villages and urban centers situated on riverine highways and shorelines were connected to distant regions of the Caribbean coast and various parts of the interior. They invoked images of canoes laden with goods destined for market being unloaded on docks just as others pushed off, provisioned and headed for home or additional destinations along a well known route. Merchants, middlemen, artisans, tradesmen, consumers, dignitaries, festival goers, pilgrims, and visiting relatives departed and arrived, attending to their business and conducting their affairs in seamless daily routines in bustling waterfront communities.

Finding jadeite, marine shell, obsidian, igneous rocks, and metal objects at lowland Maya sites up to several hundred kilometers from their natural sources provides direct evidence that exotic commodities circulated over long distances. This activity has been documented in multiple areas from at least the time of the earliest settled villages. It was pan-regional in scope, and required long term maintenance of social relationships that facilitated access to distant desirable materials.

The image of coastal communities as busy interconnected hubs of commercial activities also illuminates more qualitative characteristics of trade, such as the integrative character of exchange and the potential vastness and interconnectedness of the network of localities through which goods and people moved. These characteristics are challenging to investigate, as the mate-

rial record offers only static and piecemeal evidence of a complex, fluid, and dynamic constellation of actions, interactions, and ways of doing. Movement of nonperishable goods and associated raw materials is seen archaeologically through points of origin in the natural world (geologic source areas) versus terminus points in the cultural world (archaeological sites). What went on as the distance between the two was traveled, such as the choice of paths taken, directionality, speed, and constancy of movement leaves little trace. The iconographic and epigraphic record suggests that Classic Maya elites, together with a sometimes sizeable retinue, traveled considerable distances to meet other elites, and that materials were transported and changed hands on these occasions (Tokovine and Beliaev 2013).

Ethnohistoric descriptions of Spanish Colonial commercial activity in the northern Lowlands provide abundant evidence of lively market economies, where merchants traveled specific routes that included stops at multiple communities and moved with groups of other people who were visiting neighboring and distant settlements for other reasons (Freidel and Sabloff 1984). Whether they were one way, roundtrip or multiple stop voyages, these economic pursuits likely involved overnight stays along the way, given the logistical constraints of travel in ancient Mesoamerica and the time needed to complete the journey. These stops would have presented opportunities to engage with residents of other communities, and it is difficult to imagine that such opportunities were not planned in advance.

In this chapter we examine interregional exchange networks that structured the flow of exotic goods and investigate how these networks changed through time. We focus on the movement of pottery across short distances between Chetumal Bay and our study site, Lamanai. The large, long lived urban center is situated 80 kilometers inland on the New River Lagoon, part of a major river system that linked inland areas to the Caribbean coast (Figure 1.2; Walker Chapter

1). Rather than exotic goods, we isolate the movement of "redundant" material goods (Masson and Freidel 2013), which are presumed to have had less intrinsic and social value since they were produced locally in abundance. These can be examined across comparatively short distances to measure the connectedness of neighboring communities participating in the same interregional networks that facilitated the flow of exotics.

A focus on "redundant" materials provides insight into the regularity of intercommunity interaction on a microregional scale. These changes are most obvious during ceramic transitions, that is, when local ceramic production is in flux, in terms of materials, form, style and production. Specifically, we compare evidence for the movement of pottery between Chetumal Bay and Lamanai during three transitional periods when changes were most evident: 1) the Late Preclassic to Terminal Preclassic, 2) Terminal Classic to Early Postclassic, and 3) Late Postclassic to Spanish Colonial periods. Investigation of the factors that contributed to changes in the material record during these transitions has been a main focus of research at Lamanai. Consequently, the related ceramic inventories are particularly well studied. Additionally, this diachronic view of the evidence for the movement of material objects across short distances enables us to explore how patterns of socioeconomic interaction between nearby communities changed over the 2000 years Lamanai was occupied.

The Long and the Short of Exchange and Interaction between Lamanai and the Chetumal Bay Area

Lamanai and sites in the Chetumal Bay area were hubs in an exchange network that circulated materials from distant natural sources to various communities throughout the Maya Lowlands. These goods ultimately derive from geological formations in Mexico, the Guatemala

Highlands, Honduras, and both inland and coastal areas of the southern and northern Maya Lowlands. Waterborne travel between the Caribbean coast and southern interior regions would have brought travelers to Lamanai. Travelers in the opposite direction would have passed by river and bay fronting communities on Chetumal Bay on their way to the Caribbean coast and offshore Cayes. The participation of Lamanai and Chetumal Bay communities in long distance exchange networks is evident in the presence of artifacts made from a broad range of geological materials that do not occur naturally in the limestone dominated landscape of northern Belize. Potential source areas for many exotic materials are located several hundred kilometers away, and derive from the igneous, metamorphic and metasedimentary rock formations of the Maya Mountains and Sierra Madres (Graham 1987a; Shipley and Graham 1987). These geologically nonlocal raw materials include, but are not limited to, granite, basalt, vesicular basalt, obsidian and other volcanic rock types; quartzite, slate, jadeite and other metamorphic rock types; and precious metals such as copper, silver and related metal alloys, native mercury and cinnabar (for Lamanai see Graham 2004, 2011; Pendergast 1981, 1982a, 1982b, 1984, 1985, 1986; Simmons et al. 2009). As several researchers interested in the movement of exotic goods have pointed out (Graham 1987a; Shipley and Graham 1987), the determination and discrimination of raw materials sources requires detailed microscopic and/or chemical analysis, and few such studies have been conducted at sites in northern Belize. Possible exceptions to this are provenance studies of "true" jadeite (Hammond et al. 1977) and obsidian, which have been shown to have a very specific and limited geologic distribution and whose identifying characteristics are comparatively well defined.

Objects made of geologically exotic raw materials have a widespread and lengthy history of use at Lamanai and sites on Chetumal Bay. They constitute a comparatively rare category of

artifacts during all time periods, however, even when taken together as total assemblages. Their rarity would seem to imply that either access to or distribution of these items was fairly restricted, or that interregional exchange connections operated on a relatively limited scale.

By contrast, nonlocal material goods deriving from less distant source areas appear to circulate freely through regional exchange networks. For example, marine shell occurred in significant quantities during all time periods at Lamanai, located 80 kilometers from the Caribbean coast. Similarly, chert implements from inland source areas near Colha are also abundant at Lamanai. Regionally specific architectural similarities among sites in northern Belize provide additional evidence for the exchange and flow of ideas between specific communities, and further suggest that interaction and communication between at least some communities was fairly regular. Indeed, stylistic similarities between ceremonial buildings at Lamanai and Cerro Maya during the Late Preclassic period suggest a shared set of aesthetic ideas and preferences concerning material culture developed during early occupational periods.

The ceramic record offers additional evidence of shared preferences, norms, and values at the regional level and supra-regional scales. Despite discontinuities in the occupational histories of individual sites in northern Belize, temporally equivalent site assemblages are often strikingly similar. Stylistic commonalities among the ceramic assemblages at Lamanai and sites on Chetumal Bay are apparent from at least Late Preclassic times and continue through to the Spanish Colonial period, although Lamanai is the only site in the area with an uninterrupted history of occupation.

Sustained stylistic similarities across the region suggest several straightforward inferences about the flow and exchange of information among geographically separated communities. They suggest that information and ideas flowed between communities as a result of interactions,

and that ideas and values circulated widely enough that both producers and consumers shared them. Nonetheless, the widespread geographic distribution of vessel styles, especially those numerically predominant in local assemblages, has meant that such pottery is often viewed as constituting a category of "redundant" materials that likely did not circulate widely due to an abundance of locally made equivalents. As a consequence, pottery conforming to stylistic conventions shared regionally has seldom been the focus of studies seeking to quantify the movement of material goods among geographically separated communities to characterize patterns and networks of socioeconomic interaction and exchange. As with other material goods made from geological resources, however, pottery fabric can be linked to broad geographic source locations, which allows its origins to be discriminated and its movement quantified. Since pottery often forms the most abundant category of the materials characteristic of particular periods of occupation, it offers different and complimentary information about socioeconomic interaction, particularly among communities in the same region.

Trends and Connections in Pottery Styles

<second level heading>Preclassic to Terminal Preclassic. As with sites on Chetumal Bay, Lamanai's Late Preclassic ceramic inventory is dominated by Chicanel wares (Powis 2002, 2004, Powis et al. 2006). These table and service wares, which exhibit remarkable stylistic homogeneity on the regional level, are characterized by waxy textured monochrome slips applied to a restricted suite of vessel forms, which include flat based, flaring sided dishes, bowls, plates, and buckets with horizontal everted rims and labial flanges. At Lamanai, the majority (over 70%) belong to the Sierra Group (Table 9.1). After 100-50 BCE, this ceramic uniformity began to break down with the appearance of a broad series of ceramic attributes including true red on orange dichromes, polychromes, high gloss orange wares, Usulutan wares, trickle line decoration,

mammiform feet, bridge spout jars, and ring bases. This period of increasing stylistic heterogeneity, generally referred to as the Terminal Preclassic, is considered to mark an interval of significant technological experimentation and innovation in artistic expression.

<second level heading>Terminal Classic to Early Postclassic. The Terminal Classic to Early Postclassic ceramic inventory at Lamanai is characterized by a striking shift in stylistic tendencies (Graham 1987; Howie 2006, 2012). Like the Late Classic, the Terminal Classic inventory comprises a range of visually distinct vessel styles including polychrome, dichrome and monochrome serving wares with a variety of bowl, jar, dish and vase forms represented. Prevalent Type-Variety designations include, for example, Achote Black, Daylight Orange, Roaring Creek Red and Kik Red. By Early Postclassic times orange to reddish-orange slipped vessels with or without post-slip incised decoration predominated. The transition to exclusively orange-red slipped vessels (Zakpah Group, Walker 1990:80-86) is accompanied by the introduction of a range of new vessel forms, including pedestal-based jars, drums, chili grinders and frying pan censers, and vessels are often embellished with hand-modeled appliqués, effigy handles and feet, segmented basal flanges and high pedestal bases. The loss of stylistic diversity that accompanied the onset of the Postclassic period at Lamanai is consistent with a general trend toward stylistic uniformity observed at contemporary sites (Colha, Valdez 1987; Cerro Maya, Walker 1990; also see Aimers 2007; Masson 2000:43-57; Masson and Mock 2000). A shift towards more standardized production, perhaps due to a reduction in the number of operating pottery producers, has been proposed as a contributing factor, although the petrographic evidence indicates this is not the case at Lamanai (Howie 2006, 2012). Rather, multiple local producers who made very different-looking pottery during the Terminal Classic period started to make pottery that looked exactly the same by Early Postclassic times.

<second level heading>Late Postclassic to Spanish Colonial. The Terminal Postclassic to Spanish Colonial ceramic inventory, which has been described in detail by Graham (1987b, 2010; 2011; Wiewall and Howie 2010), is dominated by Yglesias phase pottery, with a number of slipped, unslipped and washed vessel forms represented. The pottery styles at sites in northern Belize with equivalent periods of occupation overlap with Lamanai. A regional style of pottery which has a particularly widespread distribution during this era is Chen Mul Modeled system censers (Howie et al. 2014; Milbrath 2007; Milbrath and Walker Chapter 10; Milbrath et al. 2008). This style of censer, which can be described as a large pedestal-based vase with an elaborately costumed humanoid figure attached to its side, was used in public and private calendrical and ancestor veneration rituals. Because the vessels are generally found in a fragmentary state, they are believed to have been shattered and the fragments scattered on or near previously abandoned ceremonial structures, where they are interpreted as having been used in pilgrimage activities.

Ceramic Petrography in a Mineralogically Homogeneous Landscape

Before turning to the petrographic evidence of the movement of pottery from Chetumal Bay to Lamanai, it is necessary to comment on the geological characteristics of the local region and intraregional variation in raw material resources for pottery production, such as the clayey soils and tempering materials,that make such distinctions possible. From a purely mineralogical perspective, raw materials are relatively homogenous, predominated by a limited range of carbonate rock deriving (calcite and dolomite) and siliceous (quartz, chert) minerals. This reality has led to a misconception that compositional studies of pottery are of limited value. There is, however, considerable intraregional variation in the compositional characteristics of the clayey soils,

rock formations and sedimentary deposits found at specific geographic locations within the region despite the mineralogically homogeneous character of this area (Angelini 1998; Bartlett et al. 2000; Howie 2006, 2012). These local differences not only reflect events that happened during specific geological eras, but also the different conditions and processes at work in specific environmental contexts.

We can add to this variation potters' choices of the kinds of clayey soils and tempering materials they habitually used, the identification of which was undoubtedly based on learned knowledge of sources and appropriate physical and sensory characteristics. For example, ancient potters likely did not know that finely and coarsely crystalline calcite are the same "mineral", and could be used interchangeably as a temper to achieve similar results. They could have differentiated, however, between a transparent, colorless, coarsely textured tempering material (coarsely crystalline calcite) and a white, sugary textured one (finely crystalline calcite), and made a choice based on learned knowledge. In fact, the petrographic evidence of the development of pottery traditions at Lamanai from the Preclassic to the Spanish Colonial periods indicates that local potters operating within the same tradition of pot making did make specific choices. They did not use these mineralogically equivalent but visually different tempers interchangeably, even though both types of calcite were available locally and were used by other potters working in the area (Howie 2012). Perhaps most significant, specific choices are identifiable and they remained consistent over a 2000 year period, even though pottery styles changed constantly, sometimes quite radically. It is also evident that potters working near other communities made the same choices and distinctions as Lamanai potters with regard to raw material selection. However, geological differences reflecting the specific geographic source of particular raw materials still permit important distinctions in provenance or origin of manufacture.

Petrographic discrimination of the pottery produced using raw materials deriving from different geological sources, both at some distance and in close proximity, requires us to look beyond basic mineralogy and consider a wider range of physical, compositional and morphological characteristics of rocks and soils. As we demonstrate below, there is considerable interregional and even local variation in the raw materials available to potters working in the area encompassing Lamanai and Chetumal Bay.

The method of petrographic analysis and description employed in the analysis of the pottery assemblage at Lamanai follows the descriptive system developed by Whitbread (1986, 1989, 1995:365-396, 1996) specifically for the examination and characterization of "ceramic fabrics." As used by Whitbread (1995:368), the term ceramic fabric refers to "the arrangement, size, shape, frequency and composition of components" of a ceramic material, and therefore encompasses both microstructural and compositional characteristics of ceramic bodies. This conceptual approach represents a significant methodological advancement in ceramic petrography, expanding the focus of analysis and characterization beyond a basic description of the rock and mineral content of a ceramic body based on a statistical estimate of the relative frequencies of the different rock and mineral inclusions present (point count analysis). Whitbread's analytical framework considers a broader range of physical criteria that not only characterize inclusion content, but also examine the nature of the clay matrix, the character, spatial distribution and frequency of voids and pedofeatures (features of the clay matrix distinguishable from adjacent material by a difference in concentration in one or more of their components), and the interrelationships of these different components.

This ~~comparatively~~ holistic approach to the examination, characterization and description of ceramic bodies acknowledges their inherent compositional complexity and composite nature.

Fabric properties not only reflect geological characteristics of the raw materials used to create them but also reflect distinctions in the fabrication process. The strength of Whitbread's framework is that it enables a simultaneous assessment of provenance (the source of raw material ingredients) and technological characteristics (the specific way a pot was made). Another important advantage of the system is that it permits examination and comparison of multiple aspects of technology, including the selection and treatment of raw materials, paste recipe (the choice and proportions of raw material ingredients), forming techniques, and firing strategies (Freestone 1991; Whitbread 1989, 1995, 1996). Another advantage is that it permits examination of the association of rock and mineral inclusions and textural criteria, which enables fabrics to be subdivided or discriminated based on their geological characteristics even when they are mineralogically similar.

Our research on the technological and provenance characteristics of Lamanai pottery also incorporated a detailed systematic study of local raw materials available for pottery manufacture. This comparative geological baseline for identifying locally produced pottery includes over forty clays from different geological and environmental contexts and over twenty mineral, rock, sascab and sand samples (see Howie 2012). This detailed level of geological information has enabled the following: 1) discrimination of pottery manufactured using local raw materials from pottery produced elsewhere, 2) discrimination of local pottery produced using different sets of raw material ingredients, and 3) the identification and characterization of local traditions of pottery manufacture, particularly as concerns their first appearance within the ceramic sequence and their developmental history. The distinguishing characteristics of the local fabric types at Lamanai that span multiple time periods encompassing the Preclassic through the Spanish Colonial period are summarized in Table 9.2.

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The Regional Geology

The geology of northern Belize, extending into adjacent inland and coastal areas of the Yucatán Peninsula of Mexico, is characterized by a series of limestone formations and overlying sediments that decrease in age from the Cretaceous formations of dense marine limestone, which occur immediately to the north of the Maya Mountains and at a few specific locations in the central part of Northern Belize, to the Pleistocene-Holocene formations of the northeast coast and offshore Cayes (Figure 9.1). Apart from the specific localities where the older Cretaceous Formations crop out, the central part of northern Belize is underlain by Early Tertiary (Paleocene to Eocene) limestones of the Cayo and Dubloon Bank Groups (Flores 1952; King et al. 1992; Wright et al. 1959). The older Cayo Group contains limestone and dolomite and is the common rock type found west of the New River drainage system. Both the Cretaceous and Cayo Group limestones are overlain by a horizon containing limestone at various stages of weathering and ferromanganiferous concretions, and often deep deposits of calcareous clay (King et al. 1992:222). The Dubloon Bank group, which contains limestone with chert, is more typical of land areas east of the New River drainage system. Subsurface, the Dubloon Bank limestones are soft and interbed with clays, whereas the outcropping limestones are hard, suggesting that the group may have had a thick carapace. Chert is ubiquitous in both the limestone and the overlying sandy clays (King et al. 1992:28, 244-247), and is commonly referred to as the chert bearing zone (Chiarulli Chapter 12).

<insert Figure 9.1 near here>

By contrast, the geology of the northeast coast and offshore Cayes is characterized by younger Pleistocene-Recent limestones and dolomitic limestones. These are dense coral limestones formed through reef building processes that are consequently rich in bioclasts (Flores 1952; King, et al. 1992:29). Around Chetumal Bay, these bioclastic limestones are often gypsiferous (contain a significant quantity of gypsum) and are overlain by either shallow, fine textured calcareous deposits rich in sodium and magnesium (King et al. 1992:188) or calcareous sand (sand consisting of calcium rich carbonate rock and mineral grains). In the Chetumal Bay area, this calcareous sand consists mainly of cryptocrystalline grains composed dominantly of micrite (microcrystalline calcite), which were produced through a variety of processes (High 1975; Pusey 1975; Reid et al. 1992). The specific composition of the sandy deposits that have accumulated at the mouths of drainage systems (Rio Hondo, New River and Northern Lagoon) that outlet into Chetumal Bay varies, reflecting the contribution of transported materials deriving from formations and deposits further inland, as well as mollusk populations that flourished in specific environmental conditions (High 1975; Melgar Chapter 11; Pusey 1975; Reid et al. 1992). By contrast, the coral limestones of the off shore Cayes are overlain by fossiliferous sand (Purdy et al. 1975; Pusey 1975).

Regardless of their different ages and geological characteristics, the limestones and dolomitic limestones of the mainland are commonly overlain by deposits of unconsolidated calcareous material that have been termed variously as chalky marls (Flores 1952; Ower 1926, 1928a), unconsolidated chalky rubble (Wright et al. 1959) sandy chalks (Versey 1972) and *sascab* (Darch 1981; Darch and Furley 1983; Pusey 1975). It is generally agreed that these deposits formed through *in situ* deep weathering of the underlying limestone bedrock (Cornec 1985; Darch 1981; Darch and Furley 1983). Consequently, the lithological and compositional characteristics of

these deposits vary regionally and reflect those of associated bedrock formations. Terrigenous sand deposits (siliceous sand consisting mainly of quartz) are confined to specific areas of northern Belize and constitute highly conspicuous geological features in an otherwise carbonate dominated landscape. The position and alignment of the main deposits, which are situated between the New River and Northern Lagoon, suggest that this transported material was brought down by north trending rivers that once drained the upland area (Wright et al. 1959:25). As with the unconsolidated calcareous deposits described above, the composition of the terrigenous sand deposits varies locally and includes contributions from underlying limestone formations and recent transported material. The transportation of material along the principle north tending drainage systems contributes ultimately to the compositional characteristics of the sedimentary deposits that occur where these rivers outlet into Chetumal Bay, producing localized differences in the composition and relative frequency of clast (inclusion) types.

In the analysis of the pottery assemblage from Lamanai, the four main petrographic markers of pottery deriving from Chetumal Bay clays which clearly distinguish it from pottery made near Lamanai are the following: 1) presence of bioclastic limestone (containing bioclasts and/or fibrous calcite) either as naturally occurring inclusions in the clay component or as an additive (temper), 2) presence of sascab deriving from bioclastic limestone, as a naturally occurring constituent of the clay component or as an additive (temper), 3) presence of carbonate sand (rounded to well rounded inclusions predominantly of calcite, microcrystalline calcite), either occurring naturally in the clay component or as an additive (temper), and 4) an abundance of chert, in combination with any of the above markers.

The Petrographic Evidence of Pottery from the Chetumal Bay Area at Lamanai

Pottery vessels displaying petrographic markers of raw material resources that can be linked to formations and deposits that occur near Chetumal Bay were identified in all three occupational periods examined. Among the Late Preclassic to Terminal Preclassic pottery sample (N=127), ceramic bodies made from Chetumal Bay area materials comprised approximately one third of the assemblage (47/127). In contrast, Chetumal Bay vessels are comparatively rare in the Terminal Classic to Early Postclassic assemblage (18/646). Although not as rare as in the prior period, vessels consistent with a Chetumal Bay provenance are also comparatively infrequent in the Late Postclassic to Spanish Colonial pottery assemblage (23/258), although they represent nearly half (19/43) of the Chen Mul system censer fragments examined by Howie et al. (2014).

<second level heading>Late Preclassic to Terminal Preclassic. Vessels dating to this era that were assigned a Chetumal Bay area provenance form a highly variable group of fabrics, with many examples of petrographically distinctive fabric types represented by three or fewer specimens (Table 9.3; also see Powis et al. 2006). The vessels linked to Chetumal Bay display a broad range of individual and combined petrographic markers. Some of this variation is due to differences in tempering practices, with examples of tempering with fossiliferous limestone, crystalline calcite, grog, grog in combination with limestone or calcite and perhaps, in some instances, a small amount of sand. In fabrics where the choice of temper is the same, differences in the nature, abundance and types of naturally occurring inclusions, as well as features relating to soil formation processes, strongly suggest different clay sources. For example, quartz, crystalline calcite, and cryptocrystalline grains occur in distinctive relative frequencies in different fabrics. Similarly, while chert and chalcedony inclusions are completely absent in some fabrics, they are present in varying frequencies in others. Elsewhere, the clay components of fabrics containing different tempers appear to be highly similar, suggesting the use of geologically similar clay in

combination with a different choice of tempering material. Alteration in raw material processing, particularly of clays, could also have contributed to some of this variability. Each of these variations could be interpreted as reflecting the activities of potters, who chose different raw material ingredients or processing techniques. When compositionally different clays appear to be represented, different and perhaps geographically separated production localities within the greater Chetumal Bay area might be inferred. In fabrics with sandy textured clays containing abundant rounded to well rounded inclusions, differences in this sand component might relate to the geographic location of the clay source within the Chetumal Bay area, and may reflect compositionally distinct sand resulting from the incorporation of transported material in drainage systems.

The compositional variation present among Chetumal Bay area vessels is mirrored in the range of stylistic and functional categories of vessels represented. Vessels deriving from this area include both serving and utilitarian vessels with a broad range of stylistically distinct types represented. Significantly, stylistic and functional equivalents of these vessels were also produced locally at Lamanai.

<second level heading>Terminal Classic to Early Postclassic – Chetumal Bay area vessels were comparatively rare during this transitional period and only slipped serving vessels were present. There are at least three petrographically distinct fabric types represented in the assemblage, but only two of them include multiple examples (Table 9.3). One of the predominant fabrics types, represented by seven examples, can be characterized as a sandy textured highly calcareous marl, likely untempered and perhaps highly processed to achieve a uniform fine texture. A distinctive characteristic of this fabric is the abundance of cryptocrystalline grains composed dominantly of micrite, which are consistent with sand deposits typical of the Chetumal Bay area. This fabric type also contains a grog tempered variant. The majority of vessels with this fabric

type are red and orange slipped jars, but it also occurs in an orange slipped bowl, a tripod dish and a stand or raised base “cake plate” with incised decoration.

A second predominant fabric type, represented by eight vessels, can be characterized as a calcareous clay containing carbonate sand (rounded inclusions of calcite and micrite) tempered with a medium textured crystalline calcite. The majority of vessels containing this fabric type are monochrome black bowls and dishes comparable to Achote Group, but an orange slipped bowl, a red slipped jar and a polychrome vase also contain it.

A final fabric type, represented by just one red slipped jar, can be characterized as a calcareous clay containing quartz and tempered with limestone. This fabric is distinguished by a large amount of iron oxides in the form of nodules, staining, and segregations, in addition to the presence of silicified limestone. These inclusions suggest a connection to the Orange Walk Group formation prevalent in areas north of the New River Lagoon and just inland from the coast, which characteristically contains a lithified carapace. With the exception of the monochrome black pottery, stylistic equivalents of the Chetumal Bay area pottery were produced locally at Lamanai.

<second level heading>Late Terminal?? Postclassic to Spanish Colonial – Chetumal Bay area vessels during the final period examined are represented by at least eight petrographically distinguishable fabric types (Table 9.2). Six of these fabric types contain fossiliferous limestone inclusions, which can be interpreted as a tempering material based on roundness (sub-angular to very angular), the uneven distribution of the rock fragments, and the occurrence of polycrystalline mosaics and their terminal grades. Two of these limestone tempered fabric types also contain grog temper. The compositional and textual characteristics of the clay component, including variation in naturally occurring inclusions, is distinct in each case, suggesting they represent discrete

clay sources and are the products of different potters. Another fabric type can be characterized as a sandy clay containing abundant, rounded carbonate and quartz inclusions, tempered with fossiliferous sascab. A final fabric type also comprises a sandy clay containing a mixture of carbonate and quartz inclusions, although the carbonate inclusions are comparatively abundant and it appears to be untempered.

The majority of Chetumal Bay related fabrics are Chen Mul system censers (N=19) that contained two predominant fabric types. One of these types, identified in five examples, can be characterized as a clay containing carbonate sand that was tempered with fossiliferous limestone. The second fabric type, represented by seven samples, comprises a sandy clay tempered with sascab which contains grains of dolomite. This fabric type also contains fragments of fossiliferous limestone. Differences in the nature and prevalence of inclusion types present in the clay component of the Chen Mul system censer fabric suggests that they represent geographically separated production localities. As with the other time periods examined, this style of vessel was also locally produced at Lamanai by multiple local potters (Howie et al. 2014).

Conclusion

Petrographic evidence for pottery excavated at Lamanai that derives from Chetumal Bay, and differences in the abundance and kinds of pottery from this area across time, permits several observations regarding the nature of interaction and exchange in northern Belize.

Vessels deriving from sites on Chetumal Bay are more numerous during the Late to Terminal Preclassic period then in later eras. This may be a function of population size around the bay at that time depth. Some bay sites do not have occupational histories that extend much beyond the Early Postclassic period, and all but a very few (Santa Rita Corozal, Caye Coco) were not occupied into Spanish Colonial times. Nonetheless, the high proportion (33%) of Preclassic

pottery at Lamanai that derives from this area is significant. This pottery includes a range of functionally and stylistically diverse vessels that represent the products of many different potters, as indicated by the presence of a range of petrographically distinctive fabric types. It is also significant that local equivalents existed. This evidence suggests that socioeconomic interactions between Lamanai and Chetumal Bay communities were more intensive during the Preclassic than they were later on. The compositional variability that characterizes the Chetumal Bay component suggests connections to multiple different production localities. The picture that emerges during this transitional period is therefore one of highly interconnected communities engaging in fluid socioeconomic interactions involving many participants. The influx of bay area vessels could also reflect a directional influence from cultural and political activities at sites on the bay, such as Cerro Maya, associated with maintaining control of major Late Preclassic trading routes on the river systems of northern Belize (Walker Chapter 3, Robertson Chapter 7, Chiarulli Chapter 12).

Frequencies of Chetumal Bay area vessels decrease dramatically at Lamanai during the Terminal Classic to Early Postclassic transition, when they comprise only 3% of the assemblage and are exclusively identified with serving ware vessels. The prevalent fabric type associated with monochrome black pottery (Achote Group) represents a style of serving vessels that was not produced regularly by Lamanai potters (Howie 2012:139-178, Howie et al. 2010), although the red and orange slipped jar, bowl, and tripod forms are similar to vessels produced in abundance by local potters. The contrasting pattern that emerges for this era suggests that socioeconomic interaction between Lamanai and Chetumal Bay communities was less intense and comparatively infrequent in comparison to earlier times. Another factor, however, might have been that socioeconomic interaction became less fluid or more regulated, perhaps as a result of a greater concern

for the maintenance of both geographic and economic boundaries. In addition, it may be that the direction of influence was reversed, and that Lamanai related materials were more commonly traded at bay area sites. This would require further testing at Chetumal Bay sites to confirm.

The majority of Chetumal Bay area vessels dating to the Late Postclassic to Spanish Colonial transition that have been identified in the Lamanai assemblage are Chen Mul Modeled effigy censers. Many of these vessel fragments derive from scatter deposits associated with previously abandoned ceremonial structures, and have been interpreted as relating to pilgrimage activities based on petrographic evidence for multiple nonlocal manufacturing locales. The occurrence of multiple examples of two distinct fabric types indicates the use of several vessels deriving from specific production localities in these activities. The presence at Lamanai of a range of compositionally different censers deriving from the Chetumal Bay area might be due equally to pilgrimage or the widespread circulation of censers through trade, market systems, or some other mechanism of exchange. The Late Postclassic political seat at Santa Rita Corozal probably played an important role in generating pilgrimage on the river systems, possibly spreading its influence as far as Lamanai. Lamanai's ties with the Chetumal Bay region in the later Postclassic and colonial period are strong and argue against the idea that Lamanai belonged to a province (Dzuluinicob) that tied it to Tipu (Graham 2011: ??? *I have to look up page numbers)* What is clear, however, is that by the Spanish Colonial period the quantity and kinds of pottery originating on Chetumal Bay had changed dramatically.