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Pottery and People: Reassessing Social Identity in Pacific Nicaragua

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ABSTRACT

Archaeological reconstruction of social identity in pre-Columbian Pacific Nicaragua has traditionally been based on ethnohistoric sources that suggest Chorotegan-speaking groups replaced local indigenous culture with new people, language and material culture ca. A.D. 800. Support for this reconstruction is typically based on the introduction of a white-slipped polychrome tradition that appeared around this time. However, recent research demonstrates that these "new styles" were likely not the result of aggressive population replacement and far-flung external influences. Instead, these changes seem to be the result of incremental internal development influenced by increased contact and exchange with more northerly groups of the Mesoamerican southeast periphery, particularly from Honduras and, possibly, El Salvador.

INTRODUCTION

Archaeological reconstruction of social identity in pre-Columbian Pacific Nicaragua (Figure 1) has traditionally been based on ethnohistoric sources that suggest that migrant groups from Mexico replaced local indigenous culture with new people, language and material culture ca. A.D. 800. Support for this reconstruction is typically based on the complete replacement of existing indigenous red wares with a wide-spread and presumably foreign white-slipped polychrome tradition that appeared around this time.

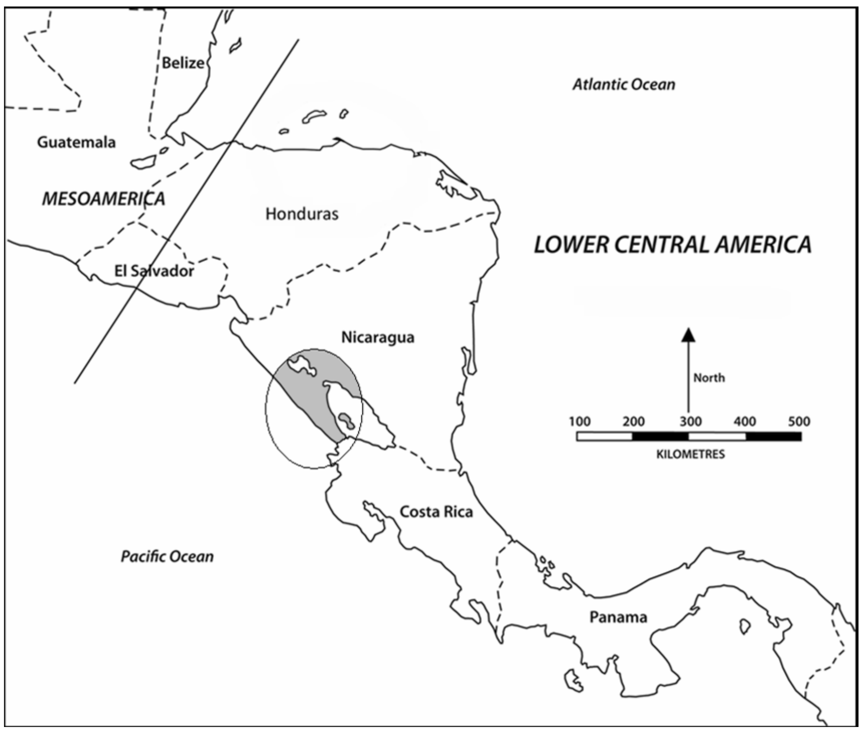

Figure 1. Map identifying the general location of the Pacific Nicaraguan archaeological region.

Ethnohistoric accounts relate the migration to and colonization of the Greater Nicoya region by Mesoamerican groups, likely from Mexico, beginning at roughly A.D. 800 (Figure 2). Traditionally, changes in settlement patterns and material culture—particularly ceramics—in the region have been interpreted as evidence for two punctuated "waves" of migration. The first migratory "wave" (and focus of this paper) was supposedly by Chorotegan-speaking Oto-Manguean groups sometime around A.D. 800, followed by a second "wave" of migrant Nahua-speaking Nicarao groups sometime around A.D. 1350. Spanish records indicate that both these languages were spoken in the region at the time of contact (Figure 3).

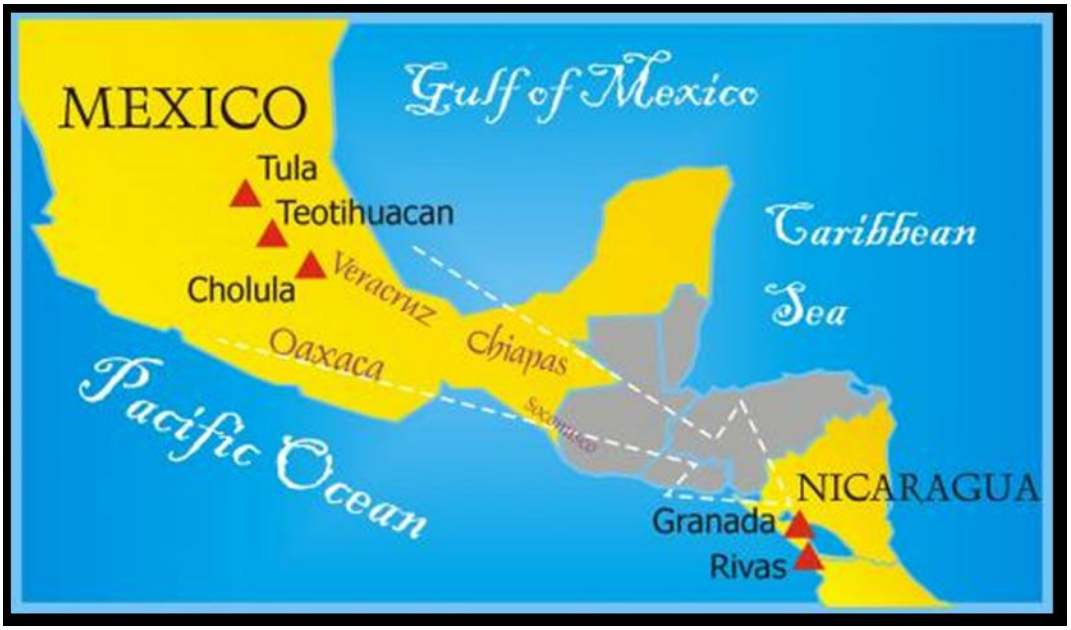

Figure 2. Map showing hypothetical migration route of Mexican (Chorotegan-speaking) populations to Pacific Nicaragua.

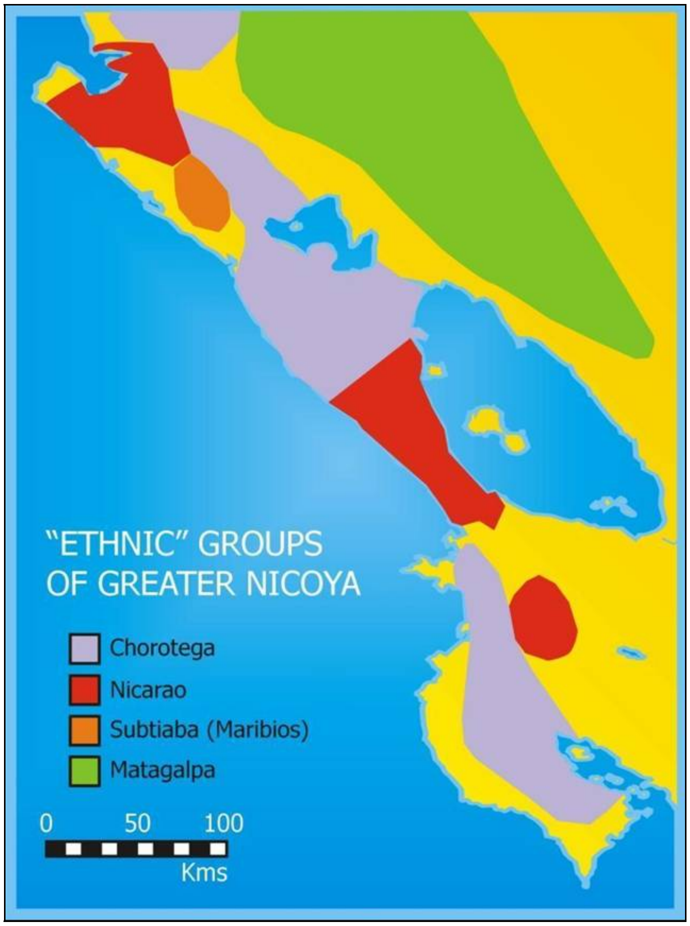

Figure 3. Hypothesized linguistic identity groups in Pacific Nicaragua at Spanish contact.

Because the majority of archaeological evidence from Pacific Nicaragua is of a ceramic nature, and the majority of arguments revolving around social identity and ethnic affiliation are as well, it seems particularly important to garner a more thorough knowledge of this class of material culture. Toward this end we are currently engaged in an analysis that contrasts and compares ceramic typology and ceramic paste composition to better understand the diachronic development of ceramic economy in pre-Columbian Pacific Nicaragua. We hope that by exposing how this facet of society was organized and operated across time we can begin to engage with questions of broader social organization and, ultimately, identity.

In the following paper we outline some (very) preliminary results with the hope of teasing out testable data regarding pre-Columbian ceramic economy. We also believe that by looking at the transition from the Bagaces to Sapoá periods at El Rayo, the first well-excavated multicomponent site in Pacific Nicaragua, we can better understand change and/or continuity related to aspects of social identity.

Reassessing Social Identity in Pacific Nicaragua

Perspectives on identity structure in pre-Columbian Pacific Nicaragua have never been lacking. From the earliest ethnohistoric accounts to the most recent archaeological publications, identity has always been—whether directly or indirectly—of primary concern. Attempting to understand pre-Columbian diachronic sociocultural development in Pacific Nicaragua, however, is a difficult task for any and all researchers working in the area. Due to a lack of extensive and/or intensive research coupled with cultural groups who left an oddly-sorted minimum of material culture, and thus hints or points of departure from which to work with, a great deal of what we currently "know" is based on conjecture and comparison with external surrounding (and even far-flung or distant) regions. There is no finger of blame to point—everyone who has contributed to modern archaeology in the region has done their best to flesh out whatever clues exist and make sense of them within a broader framework of understanding. This effort has provided us with much knowledge and is certainly commendable. However, the vast difficulties we have collectively faced in recent times with plugging Pacific Nicaragua into a pre-existing cultural framework (whether Mesoamerican or Chibchan) suggest we are potentially approaching our object of query in a counterproductive manner. Instead, we alternatively suggest that it might prove beneficial to begin our investigations from the premise that Pacific Nicaragua may have represented a uniquely autonomous region in the pre-Columbian past. Simply put, we need to understand the region for what it was before we tie it to anything else. We are not the first to forward this idea. In 1993, Fred Lange wrote regarding the state of archaeology in Greater Nicoya: "The most important problems for future research have dearly to do with internal development and not external influence."

We do not want to prematurely abuse theoretical themes such as agency, causation, or cognition in this paper[1]. We believe these all to exist, inherently, in every aspect of human society. Instead we want to explore aspects of how these human individual and collective traits might have been tangibly exercised in the past. We want to grasp a better understanding of how *external* realities such as migration, influence, economy, and connections may have affected identity development and been utilized (or engaged with) *internally* to deal with an ever-changing existence at the geographic nexus of a multitude of unique and—sometimes competing—cultural worlds. To do this we must first address how pre-Columbian groups of Pacific Nicaragua were structured "on the inside". It is from this starting point that we can, perhaps more productively, look at how these groups articulated (themselves) with "the outside."

ACCESSING IDENTITY IN THE ARCHAEOLOGICAL RECORD

Identity exists along a continuum ranging from the individual to the group, and even groups subsumed within broader groups. It also relates, at one level or another, to every aspect of human existence. Importantly, identity is complex and context specific in nature and it is the interrelationship of individual and group identities that results in the phenomenon of social world-making—on both tangible and intangible levels. What something "is" is only definable by what it is "not" and it is the concept of categories of difference and/or similarity that grounds identity (Voss 2005). This categorization ("us vs. them" or "right vs. wrong," in terms of behavioural and mental choice) is *necessary* for the construction, organization, legitimation, and maintenance of identity (Reicher 2004). Much of identity is a "lived" experience. Only symbols of identity remain when the "living" are gone and their meaning morphs over time between individuals and groups. It is these "symbols" of identity that we, as archaeologists, seek to illuminate in the past. Because they are a fundamental part of identity construction and maintenance, our understanding of past cultures rests wholly on our competency in interpreting the durable symbolic media of the archaeological record.

[1] I am not suggesting that these do not need to be engaged with—they most certainly do. However, for the purposes of this paper I believe we need to more effectively demonstrate archaeological patterns of behaviour before we can expound on them at this "higher" level of interpretation.

Traditional archaeology throughout much of southern Central America (alternatively the Intermediate Area, Lower Central America or, more recently, the Isthmo-Colombian Area) has been geared toward establishing culture history, a necessary precursor to more refined, bottom-up research. This top-down approach, however, is designed to establish broad group identities in the past—a largely unavoidable etic category designed by archeologists attempting to understand a previously unknown region. Much of our identity construction for this broad "culture area" has been based on its relationship to better known and understood areas, especially Mesoamerica. Easily recognizable "symbols of identity" have allowed us to create etic archaeological regions, supposedly related to emic group identities, within the culture area. Examples include flying-panel metates from the Atlantic Watershed of Costa Rica, pecked stone spheres from the Diquis area of Pacific Costa Rica, and Pataky polychrome effigy vessels from Greater Nicoya.

Unlike Mesoamerican researchers, we do not have the luxury of abundant ethnohistoric and historic documentation or pre-Columbian codices, a decipherable hieroglyphic record, and a plethora of artifacts with iconography that details individuals performing various roles with direct information about religion, ritual, day-to-day activities, and social organization working in southern Central America. However, we argue that we need to move beyond simply stating that "these are the people who make flying-panel metates" or, even more importantly, the generalized passive acceptance that major changes in symbolic media are the direct result of external influence or in-migration of "foreigners." So, how then can we more effectively access identity in the archaeological record?

Things are not truly as dim as the last paragraph makes them seem. Recent (and some past) research focuses on more bottom-up approaches to understanding the past. More intricate and complex understandings of social identity are being developed through examination and interpretation of ethnohistoric records—although these often seem to be a source of confusion rather than clarification—and origin and cultural myths, as well as foodways, mortuary practices, and material culture. One of the most originally fruitful avenues for investigating aspects of social identity is the analysis of ceramic iconography, since ceramics represent the most abundant humanly-constructed and symbolically-imbued class of archaeological artifacts. Major advances in our understanding of chronology, organization and social interaction undeniably derive from these types of iconographic and vessel form analyses. However, we also believe that further advances and/or clarification of our understanding of social identity are stymied by iconographic and vessel form research alone. Increasingly well-established typologies, the lynchpin of culture historical categorization, are now in place and require substantiation along different lines of analysis to move forward.

The true "Rosetta stone" for accessing social identity in the archaeological record will come from thorough and well-directed research focusing on entire archaeological assemblages—of this we are convinced. However, that cannot be achieved in this single conference paper. Instead, we offer one of the first attempts to establish an understanding of ceramic economy from the bottom-up—looking at ceramic paste composition as a way to corroborate (or question) typological categories and actual production and distribution patterns that may be indecipherable or blurred by extant categories and interpretations. We argue here that the composition of ceramic pastes—including clay source, temper, and overall "recipe" choices—represent identifiable symbolic activity manifest in material form. A more detailed understanding of ceramic economy, we believe, will ultimately allow us to address aspects of social identity and diachronic population change and/or continuity.

Herein we report on recent and preliminary petrological analysis of ceramics from El Rayo—a truly unique multicomponent site—that demonstrate important aspects of ceramic economy from the Bagaces through Sapoá periods and, particularly, the transition in between. We believe that this research affords us a glimpse into the active choices and actions taken by both local potters and the ever-evolving community groups within which they operated. Ultimately, a better understanding of categories of decision-making and choice (or perhaps even tradition, see Steinbrenner 2010) will also help us better understand change and/or continuity related to aspects of social identity in Pacific Nicaragua.

EL RAYO, PACIFIC NICARAGUA

The site of El Rayo is located on the Asese Peninsula, which tapers out into Lake Nicaragua on the outskirts of Granada city (Figure 4). The Asese Peninsula (and Las Isletas) is a relatively new geological portion of the Pacific Nicaraguan landscape. The actual peninsula is made up of large volcanic avalanche debris, which piled up[2] following the collapse of the northeastern flank of the Mombacho volcano some time in prehistory (Global Volcanism Program 2010; Shea et al. 2007; Vallance et al. 2001). The volcano itself is largely basaltic to andesitic in compositional

[2] Physical resistance presented by the lake water caused the landslide of massive rocks to slow at a "front," where the faster falling rocks built up on top, thus creating the peninsula landscape.

structure[3] and is considered “inactive,” meaning there are no known *explosive* events recorded—only massive flank collapses like that which created the Asese Peninsula.

The site, nestled in a plantain plantation, was likely a second-tiered centre in the local settlement hierarchy, of which Tepetate—now mostly buried beneath modern day Granada City—was the primary centre (see Figure 4) and the area has never been disturbed by extensive modern development. What we found at El Rayo, with excavations taking place in the summers of 2009 and 2010, was a multi-component site containing both domestic and mortuary areas in largely undisturbed contexts which date from the Late Bagaces through Sapoá periods (A.D. 500–1250) (McCafferty and Steinbrenner 2008; Salgado 1996). It is, arguably, one of the most important archaeological discoveries to date in Pacific Nicaragua.

Figure 4. Map showing modern day Granada City (pink area in upper left) and the location of El Rayo (red polygon located at bottom right).

[3] According to Shea et al. (2007:901) “The rocks originating from Mombacho show discreet variations in composition, from porphyric olivine basalts to hypersthene–augite andesites.”

Excavations focused on three distinct loci at the site. Loci 1 and 3 represent mortuary and ritual areas, respectively, and will not be discussed in any detail here (McCafferty et al. and Wilke discuss these in their papers, this session). Locus 2, on the other hand, seems to represent domestic/residential space. Initially divided into four operations in the 2009 field season (Figure 5), Locus 2—the main focus of this research—appears to have two unique occupational areas over a relatively small physical space dating from roughly A.D. 500–1250 (Dennett and McCafferty 2009). The first (Operation 1; see Table 1, Appendix A) is a Late Bagaces to early Sapoá period component. The second (Operation 3; see Table 2, Appendix A) represents a "Sapoá only" component located on a naturally-occurring and possibly culturally-altered raised mound. This later Sapoá period occupation area was likely delineated by a cobble-built retaining wall discovered in the 2009 Operation 4 (see Table 3, Appendix A) excavations (which demonstrate a relatively short span of transition both spatially and temporally between the Bagaces and Sapoá phases). Continued excavations in 2010 (with alpha Operation codes seen in Figure 5) demonstrated similar ceramic sequences and distributions, depending on their location, to the original 2009 Operations and the extent of the actual site has not yet been determined.

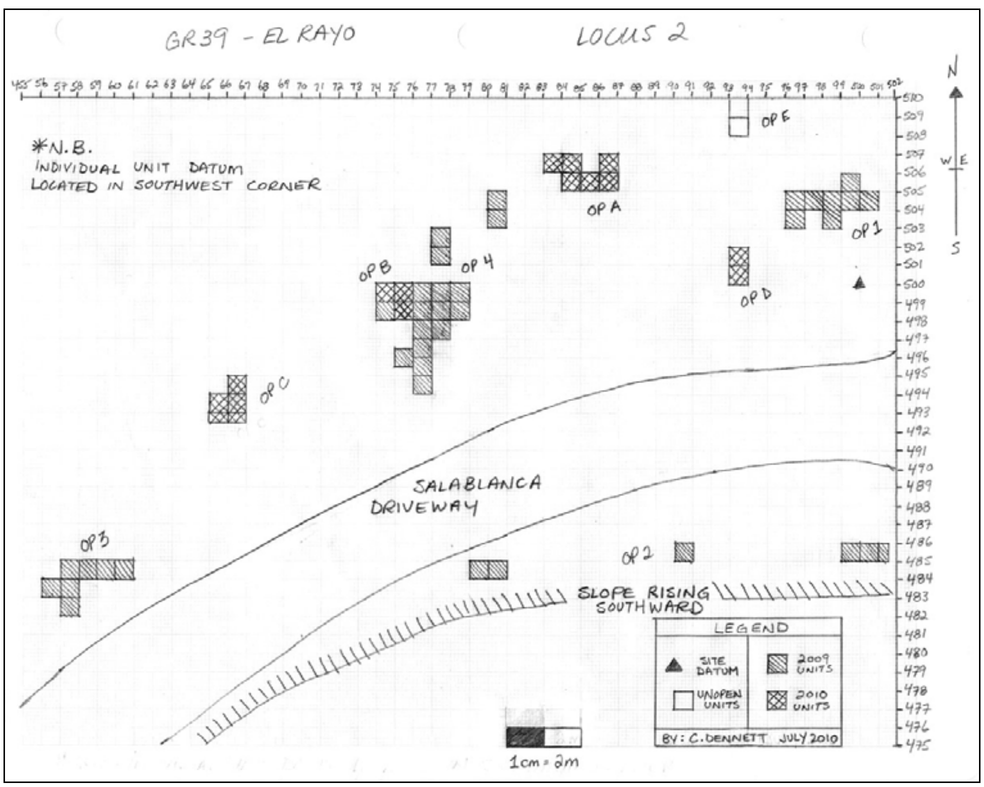

Figure 5. Field sketch of the El Rayo Locus 2 excavation units dug in: (a) 2009 (diagonally hatched squares with numeric OP codes) and (b) 2010 (cross hatched squares with alpha OP codes).

The Ceramic Sample

Over the course of the 2009 and 2010 field seasons—with the unwavering assistance of Lorelei Platz and the generous and invaluable direction of Silvia Salgado[4]—Dennett classified and recorded (including more than 3,000 identifiable rim sherds) the ceramics from El Rayo. In order to examine the transition from the Late Bagaces (A.D. 500–800) to the Sapoá period (A.D. 800–1250), sherds were selected from each of the chronologically diagnostic ceramic types and brought back to the University of Calgary for compositional analyses, with a focus on the Locus 2 component. From this collection Dennett and McCafferty chose representative samples based on macroscopic characteristics such as colour and visible inclusions to obtain "typical" samples, although "outlier" exceptions were introduced for both Vallejo and Castillo types (Table 4).

A baseline for clay composition in the site area is based on a combination of clay samples from the site and surrounding area as well as production waste from excavation contexts at El Rayo. One test tile was created and fired with clay collected from a lens at Locus 3 and the second sample from 700 m north of the site in an area identified as "clay-rich" during modern road creation. We are uncertain if either served as pre-Columbian clay sources for pottery production, but felt they would provide comparative background of the local geology. Production waste included one small ball (replete with fingerprints) of tempered clay that had been incompletely fired and an untempered, and presumably failed, attempted at support creation. It looks very much like a practice piece.

Late Bagaces period samples included sherds of Chavez White-on-Red (n=6) and Tola Trichrome (n=5) types (see Figure 6 for idealized representations).

Figure 6. Bagaces Period: (a) Chavez White-on-Red and (b) Tola Trichrome (photo from Mi Museo, Granada).

[4] Additional assistance with classification of monochrome wares during the 2009 field season was graciously provided by Yesenia Ortíz of the University of El Salvador.

Table 4. Petrological Thin Section Samples from El Rayo.

Thin Section ID	Catalogue #	Type	Variety	Comments
TT4	n/a	Clay Sample		L3 (N505 E303)
TT6	n/a	Clay Sample		700 m N of site
CE48	GR39.09.2.1132.4	Production Waste		
CE49	GR39.09.2.395	Production Waste		Failed support (?)
CE39	GR39.09.2.261	Chavez White-on-Red		
CE40	GR39.09.2.673	Chavez White-on-Red	Chavez	
CE41	GR39.09.2.1155	Chavez White-on-Red	Chavez	
CE65	GR39.09.1.533	Chavez White-on-Red		
CE66	GR39.10.2.104	Chavez White-on-Red		
CE67	GR39.09.1.731	Chavez White-on-Red	Astorga	
CE42	GR39.09.2.261	Tola Trichrome		
CE43	GR39.09.2.812	Tola Trichrome		
CE44	GR39.09.2.292	Tola Trichrome		
CE68	GR39.09.3.1024	Tola Trichrome		
CE69	GR39.10.2.458	Tola Trichrome		
CE36	GR39.09.2.800	Momta Polychrome		
CE37	GR39.09.2.667	Momta Polychrome		
CE38	GR39.09.2.271	Momta Polychrome		
CE77	GR39.10.2.409	Momta Polychrome		
CE78	GR39.10.2.411	Momta Polychrome		
CE79	GR39.09.3.975	Momta Polychrome		
CE30	GR39.09.2.667	Belo Polychrome		
CE31	GR39.09.2. 317	Belo Polychrome		
CE32	GR39.09.2.292	Belo Polychrome		
CE7	GR39.09.2.821	Papagayo Polychrome	Alfredo	
CE8	GR39.09.2.844	Papagayo Polychrome	Alfredo	
CE9	GR39.09.2.1131	Papagayo Polychrome	Alfredo	
CE10	GR39.09.2.685	Papagayo Polychrome	Manta	
CE11	GR39.09.2.324	Papagayo Polychrome	Manta	
CE12	GR39.09.2.326	Papagayo Polychrome	Manta	
CE21	GR39.09.2.410	Banda Polychrome		
CE22	GR39.09.2.823	Banda Polychrome		
CE23	GR39.09.2.202	Banda Polychrome		
CE15	GR39.09.2.367	Pataky Polychrome	Pataky	
CE16	GR39.09.2.366	Pataky Polychrome	Pataky	
CE17	GR39.09.2.412	Pataky Polychrome	Pataky	
CE24	GR39.09.2.209	Madeira Polychrome		
CE25	GR39.09.2.411	Madeira Polychrome		
CE26	GR39.09.2.247	Madeira Polychrome		
CE27	GR39.09.2.212	Vallejo Polychrome		Imitation?
CE28	GR39.09.2.269	Vallejo Polychrome		
CE29	GR39.09.2.403	Vallejo Polychrome		
CE74	GR39.10.2.355	Vallejo Polychrome		
CE75	GR39.09.3.1003	Vallejo Polychrome		
CE76	GR39.09.3.1041	Vallejo Polychrome		Imitation?
CE45	GR39.09.2.411	Castillo Engraved		
CE46	GR39.09.2.209	Castillo Engraved		
CE47	GR39.09.2.408	Castillo Engraved		
CE70	GR39.09.1.732	Castillo Engraved		Imitation?
CE71	GR39.09.1.701	Castillo Engraved		
CE72	GR39.09.1.562	Castillo Engraved		
CE73	GR39.09.1.571	Castillo Engraved		Imitation?

Based on the stratigraphic deposition of ceramic materials at Locus 2 (and as seen in Tables 1, 2, and 3), Momta (n=6) (Figure 7) and Belo (n=3) polychromes seem to represent the transitional link from Late Bagaces to Early Sapoá period pottery types. Belo polychrome, however, has a very different visual and tactile texture. The paint does not adhere as well to the vessel and the paste often leaves a 'dust' on the fingertips when rubbed on exposed surfaces. Both Momta and Belo were originally named and defined by Salgado (1992, 1996) during analysis of ceramics from the Ayala site—a Bagaces period site also located in Granada.

Figure 7. Momta Polychrome sherds (photo by Geoff McCafferty).

Early Sapoá period polychrome types selected for this analysis and hypothesized to be locally produced based on macroscopic paste characteristics include: Papagayo, Alfredo variety (n=3); Papagayo, Manta variety (n=3); Banda (n=3); and, Pataky, Pataky variety (n=3) (see Figure 8 for idealized representations).

Figure 8. Sapoá period polychromes. (a) Papagayo: Alfredo, (b) Papagayo: Manta, (c) Banda, and (d) Pataky (Photos from Mi Museo, Granada).

Other comparative Sapoá period samples were chosen based on the belief that they were imports to the site. This was determined by significant differences in macroscopic paste colour, texture, and visible (or lack thereof) inclusions. These include: Madeira Polychrome (n=3); Vallejo Polychrome (n=6); and, Castillo Engraved (n=7) types (see Figure 9 for idealized representations).

Figure 9. Sapoá period ceramics hypothesized to be potential imports to El Rayo. (a) Madeira: Madeira, (b) Vallejo: Vallejo, and (c) Castillo Engraved.

COMPOSITIONAL ANALYSIS

As noted above, traditional ceramic analyses in Pacific Nicaragua have focused on typological classification typically based on a combination of surface decoration and vessel form (e.g., Healy 1980; Knowlton 1996; Lothrop 1926; Norweb 1964; Salgado 1996; Steinbrenner 2010). Preliminary compositional analyses utilizing a combination of archaeometric techniques—instrumental neutron activation analysis (INAA) and petrology—have provided more in-depth information regarding general geographical manufacture zones and, potential hints toward, distribution patterns (Bishop et al. 1988, 1992). This ongoing research (the focus of Dennett's doctoral dissertation) is geared toward building on and clarifying a localized portion of this earlier archaeometric research through petrological analysis of select site collections from the Isthmus of Rivas. Ideally, as seen in the paper by Platz and Dennett (this session), this approach undertakes a combination of quantitative (point counting) and qualitative (petrological and chemical composition) analyses to achieve more well-rounded interpretations. Unfortunately, this particular project is in the very early stages of development and neither the quantitative point-counting analysis nor the INAA chemical composition analysis is yet complete. We do have, however, preliminary petrological analysis results that seem to provide a better understanding of both local ceramic production and, more broadly, potential evidence for a widening ceramic economy across time.

Methodology

The analyses utilized in this project involves a qualitative, petrological (examination of lithic and mineral inclusions utilizing optical microscopy) technique for describing and interpreting the composition of archaeological ceramic fabrics. The analysis was completed by Dennett using standard petrological optical microscopy procedures designed to identify and describe the different types of mineral[5] and lithic inclusions present in the fabric (Bishop et al. 1982).

Results

The following are summary compositional paste descriptions for each type (and variety) analyzed. Individual paste composition descriptions have not been included but will be accessible in Dennett's forthcoming doctoral dissertation (or available on special request).

<u>El Rayo Baseline</u>

The combination of clay samples (TT4 and TT6) and production wasters allowed for an especially rich understanding of the basic local geology and clay types. Preliminary petrological analysis indicate an iron-rich clay matrix with infrequent but naturally occurring silt-sized fragments of altered, heavily weathered, and brown (iron-stained) glassy materials, including frothy and vesicular pumice and welded glassy tuff. Also infrequently occurring is weathered and rounded basaltic tuff to basalt inclusions with plagioclase feldspar microliths and, in trace amounts, silt sized andesitic lithics. Mineral inclusions include well-weathered silt- to sand-sized plagioclase feldspar fragments, and trace amounts—in decreasing order—of orthopyroxene,

[5] Different characteristics observed under polarized light to aid in the identification and description of mineral inclusions include aspects of pleochroism, extinction angle, relief and/or cleavage, and birefringence, among other optical properties.

olivine, clinopyroxene, opaques, ferrous oxides, quartz, and bits of andesite. Taken together, these inclusions seem to represent a very old, altered and highly weathered assemblage of lithic and mineral inclusions naturally occurring in the parent clays of the area. Production wasters both contained additional angular mineral inclusions and fragments of clear frothy pumice, which suggests they had been added as tempering.

Of particular importance is the presence of two unique mineral types which we have not witnessed in samples from other areas of the region such as Granada (Tepetate), Rivas (Santa Isabel), or Managua (La Arenera). The first is a very pale yellow to colourless (in XPL) orthopyroxene mineral, called *enstatite*. The second is plagioclase feldspar (herein called *yellow plagioclase*) whose birefringence under crossed polar light, which is always low and typically with 1st order white to grey interference colours in twinning, demonstrates 1st order white to pale yellow interference colours. While this is not unheard of, it is uncommon. We feel these are highly diagnostic components of the local geology and may play a particularly important role in the designation of local paste types.

Late Bagaces Period Ceramics

Chavez White-on-Red **–** All of the Chavez White-on-Red samples demonstrate a poorly-sorted, iron-stained matrix with heavily stained, altered, and weather devitrified and/or brown glassy lithic inclusions, including pumice and tuff, and several contain infrequent rounded fragments of basalt and gabbro-like materials (CE40, CE41, CE65, and CE66). The primary basic constituents are heavily altered lithic materials. Most examples, however, also contain moderate amounts of fairly clear (or clean) and frothy pumice inclusions, suggesting they have been added as temper. Plagioclase feldspar represents the largest (silt- to sand-sized) mineral inclusions but they are generally either heavily weathered or altering and angular fragments typically have a brown-stained glassy rind suggesting they are dislocated phenocrysts from some parent lithic material. Mineral inclusions also seem to make up, overall, less than 15–20% of the paste composition. While some samples are relatively “mineral poor” (CE39, CE41, and CE67) and others “mineral rich” (CE40, CE65, and CE66), they all contain a combination of (in decreasing order) plagioclase feldspar, pyroxenes (particularly ortho), opaques, round lumps of ferrous oxide (ochre?), olivine, biotite mica, and quartz. Notably, several demonstrate examples of enstatite and yellow plagioclase under XPL (especially CE 39, CE65, and CE66). Overall, these samples seem to reflect a strong association with the baseline materials from El Rayo.

***Tola Trichrome* –** Two examples of Tola Trichrome are almost identical in composition to the Chavez samples (CE43 and CE 68). The remaining examples, however, have a moderate amount of currently unidentifiable inclusions. These inclusions are pumpkin orange in colour and appear to be some sort of altered glass (or lithic). However, they have little to no relief or cleavage and, most importantly, no extinction angle under XPL. They are truly quite confusing, but seem to be diagnostic of this type. Otherwise, they are not significantly different from the Chavez and baseline samples, with brown stained, weathered, and altered basaltic lithic and mineral (mafic) inclusions, as well as frothy grey-to-clear pumice inclusions that appear to have been added as temper.

<u>Bagaces-Sapoá Transition Ceramics</u>

***Momta Polychrome* –** Momta polychromes are similar to, in many respects, Bagaces period ceramics just discussed. The main difference, however, is far less emphasis on pumice as temper. All samples demonstrate a relatively fine and moderately-sorted paste with small weathered, altered, and brown-stained glass fragments, tuff and frothy pumice materials. It is notable that two examples (CE78 and CE79) have a glassy ash-like matrix with randomly occurring (either natural or minute fragments of crushed pumice?) straight and curved glass fragments. It seems, however, that there is no "set" recipe as all examples show quite different amounts of pumice. However, it may simply be that this varies with vessel wall thickness. Where the amount of pumice in the overall recipe decreased from the traditional Bagaces pots (the pots in the Bagaces period have much thicker walls and, thus, room for temper), the amount of mineral temper has, alternately, increased somewhat.

In most cases the mineral inclusions are small (silt-sized) and often stained and weathered or altered. The larger silt and especially sand-sized inclusions are typically plagioclase feldspar (many demonstrating a stained glassy rind suggesting they are dislocated phenocrysts), opaques, and round lumps of ferrous oxide. Smaller, often weathered and altered, mineral inclusions include pyroxenes, olivine, and biotite mica. Of particular importance, are the occurrence of unidentifiable orange glassy inclusions (CE38 and CE79) also noted for several of the Tola Trichrome samples. Overall, there is nothing about this paste that seems remarkably different from Bagaces period ceramics at El Rayo.

***Belo Polychrome* –** While macroscopic observation suggests that Momta and Belo are possibly different products, petrological examination suggests they are alike. The main difference seems to be that Belo presents a much finer paste with fewer overall inclusions, although the composition is basically the same. Here we see a glassy matrix (similar to Momta samples CE78 and CE79) with small, clear and infrequent brown-stained silt-size frothy pumice inclusions, suggesting that at least *some* of the pumice was likely finely ground and added as temper. The largest inclusions are naturally occurring opaques and round lumps of ferrous oxide. Infrequent and small, silt-sized mineral inclusions (often with glassy stained rinds indicating they were likely phenocrysts) are plagioclase feldspar, pyroxenes, and trace amounts of altered quartz and biotite mica. Importantly, sample CE 30 demonstrates the occurrence of enstatite, while CE31 contains minor amounts of the orange glassy inclusions described for Tola Trichrome. Generally speaking, there is nothing to suggest that these samples were produced in a different location.

<u>Sapoá Period Ceramics</u>

***Papagayo: Alfredo* –** Overall these ceramics demonstrate a well-aligned matrix—perhaps the result of more proficient and/or expedient production—but inclusions are still, generally speaking, relatively poorly sorted. Two samples (CE7 and CE8) present an iron-rich matrix with what appear to be naturally occurring stained and weathered bits of pumice, stained brown glassy fragments, round lumps of ferrous oxide, and opaques of all sizes. Lithic inclusions are primarily rounded/weathered basalt fragments with plagioclase microliths. However, sample CE8 also contains basaltic scoria with clinopyroxene phenocrysts, tuff, and fragments of basaltic andesite. Both contain plagioclase feldspar, pyroxenes, orthoclase feldspar and minor amounts of olivine and quartz. The occurrence of enstatite in sample CE 7, as well as the basic general production and compositional properties, suggest that these samples are related to—or a continuation of—local area production (as is one example of Banda Polychrome, see below).

Sample CE9 appears to present a slightly different compositional profile. Here we see a heavily iron-stained matrix rife with bits of well weathered glassy fragments, pumice, and olivine which appear very small and well sorted in the paste. Larger inclusions, however, are infrequent and poorly sorted—these include zoned plagioclase feldspar and quartz. Overall it seems as though this paste represents production at a different (though still geologically basaltic to andesitic) general location. While not included in this analysis, it is notable that this sample is identical in all respects to site samples of Papagayo, Cervantes variety, and two instances of Banda Polychrome (CE21 and CE22) from El Rayo (see below).

Papagayo:Manta **–** This petrological composition, as well as the "recipe" used, is quite different than those discussed thus far. These samples present a very well-sorted, mineral-rich, glassy matrix. Lithic inclusions are few and are mainly glassy tuff, altered pumice, and round lumps of ferrous oxide. The paste is *heavily* tempered with silt-sized minerals, which make up roughly 80–90% of the inclusions, and include predominantly quartz with lesser amounts of clinopyroxene, zoned and twinned plagioclase feldspar, notably microcline feldspar (some altering), and olivine. There appears to be relatively strong inter-sample consistency in the recipe used to prepare this paste. More importantly, it is virtually identical to Pataky polychromes sampled at El Rayo. Recipe and composition suggest that this is not a local product.

Banda Polychrome **–** As noted above, two samples of Banda polychrome (CE21 and CE22) are almost identical in description to sample CE9 in the Papagayo:Alfredo section above. All demonstrate a heavily iron-stained matrix rife with bits of well weathered glassy fragments, pumice, and olivine which appear very small and well sorted in the paste. Larger inclusions, however, are infrequent and poorly sorted—these include zoned plagioclase feldspar and quartz. Production was likely at a different site, though in the same general geological location.

The remaining Banda sample (CE23) is almost identical to Papagayo:Alfredo sample CE7, presenting an iron-rich matrix with what appear to be naturally occurring stained and weathered bits of pumice, stained brown glassy fragments, round lumps of ferrous oxide, and opaques of all sizes. Lithic inclusions are primarily rounded/weathered basalt fragments with plagioclase microliths. Minerals include plagioclase feldspar, pyroxenes, orthoclase feldspar and minor amounts of olivine and quartz, as well as the diagnostic presence of enstatite that suggests local production.

Pataky Polychrome **–** As noted above, samples of Pataky polychrome are almost identical, in terms of composition and recipe, to Papagayo:Manta pastes. Samples present a very well-sorted, mineral-rich, glassy matrix. Lithic inclusions are few and are mainly glassy tuff, altered pumice, and round lumps of ferrous oxide. The paste is *heavily* tempered with silt-sized minerals, which make up roughly 80–90% of the inclusions, and include predominantly quartz with lesser amounts of clinopyroxene, zoned and twinned plagioclase feldspar, notably microcline feldspar (some altering), and olivine. There appears to be relatively strong inter-sample consistency in the recipe used to prepare this paste. Again, recipe and composition suggest that this is not a local product.

Madeira Polychrome **–** Macroscopic observation suggests Madeira has the darkest—dark reddish-burgundy wine coloured—paste of all Pacific Nicaraguan pottery. Microscopic analysis, however, belies the belief that this is a heavily iron-stained fabric. Instead, these samples present a, relatively speaking, moderately iron-stained (some samples contain more iron than others) matrix dominated by mineral inclusions. It is, indeed, a very colourful paste in thin section. Infrequent lithic inclusions are glassy to andesitic-basaltic in nature with large clots of clay that match the “underslip” (a thick clay slip presumably employed to anchor the white surface paint/slip). Mineral inclusions are well formed, suggesting a relatively young parent geological environment, and include many opaques, round lumps of ferrous oxide, plagioclase feldspar, microcline, a lot of olivine, clino- and orthopyroxene (some zoned), augite, and quartz. Somewhat confounding (though not necessarily problematic) is the infrequent occurrence of enstatite. It is likely that these samples represent an import and the production locale in a somewhat more active volcanic area than we see at El Rayo.

Vallejo Polychrome **–** These samples, with the exception of two, present and iron-poor matrix absolutely dominated by volcanic ash temper. Infrequent lithic (glassy fragments/pumice, often with plagioclase or quartz phenocrysts) inclusions appear to be native to the clay and mineral inclusions (sand-sized subangular plagioclase and/or quartz) likely represent phenocrysts which have been dislodged from glassy parent sources. They are definitively not locally produced wares.

The two exceptions (samples CE27 and CE76), while similar in form and decorative appearance (we chose to include these samples because they “didn’t look quite right”) seem macroscopically different in terms of paste. This macroscopic distinction was borne out in petrological analysis. These sherds appear to represent local imitation or “knock offs” of these otherwise imported wares. Both look quite similar in composition to both Momta and Belo polychromes. Notable is the appearance of yellow plagioclase in the CE27 sample, suggesting a local origin.

Castillo Engraved **–** This type, believed to have been an import to the site, is the most chaotic—in terms of "recipe"—of all the types discussed in this analysis. Samples CE 70 and CE73 were introduced into the analysis because we believed them to be local "knock-offs" and our macroscopic intuition appears to be correct. Both present an iron-stained matrix with small, well-weathered, and altered fragments of brown pumice. Overall they match the baseline profile for El Rayo outlined above. Perhaps more importantly, CE70 contains yellow plagioclase and CE73 presents small amounts of enstatite. Of interest, is the fact that both locally-produced samples are derived from mortuary, rather than domestic contexts at the site.

Samples CE71 and CE72, which we believed to be "authentic" (the geographical production location of this type currently eludes archaeologists) are different, especially in terms of "recipe" used to prepare the clay. In both cases there is very little matrix apparent and the fabric is dominated (roughly 80–90%) by clear frothy pumice tempering. Overall, other lithic and mineral inclusions are rare. However, the three main inclusions present are large fragments of well-weathered and altered plagioclase feldspar and minor traces of small gabbro-like lithic materials and olivine. Importantly, sample CE72 contains small amounts of enstatite, calling into question whether all Castillo Engraved samples are local to the geological area, if not El Rayo.

Analysis

Results of the petrological compositional analysis provide some potentially intriguing information regarding ceramic economy. It appears that ceramics were locally produced at El Rayo throughout the Late Bagaces period—particularly Chavez White-on-Red and Tola Trichrome red ware types—and into the transition, marked by the development of polychrome pottery traditions as seen in Momta and Belo polychrome types. It is not until the Early Sapoá period that more varied production locations make their way into the ceramic assemblage at the site.

Chavez, Tola, Momta, and Belo types are all dominated by a composition of old, weathered, altered, and highly stained basaltic to andesitic geological materials. This is not surprising given the fact that the peninsula is formed from the collapsed flank of the nearby Mombacho volcano. However, given the largely inactive nature of the volcano, it becomes imperative to explain the ubiquitous presence of volcanic clastic inclusions—primarily pumice. Hints toward developing an explanation may come from excavations conducted at the Sapoá period site of Tepetate in 2008. There we found what appear to have been caches of non-local pumice associated with clay wasters, production moulds, burnishing stones, and pigments—all artifacts associated with ceramic production (Dennett 2009). As an extension, we believe the idea that pumice may have been imported as a ceramic production resource is not unrealistic and forward it as a possible explanation for what we are seeing in the current analysis.

Types that we believed to be potentially locally produced—Papagayo:Alfredo, Papagayo:Manta, Banda, and Pataky—have been called into question by the present analysis. Some samples of Papagayo:Alfredo (CE7 and CE8) and one sample of Banda(CE23) *likely* represent local development of new polychrome types, as we see general continuities in clay sources and "recipe" styles. The remaining Papagayo:Alfredo and Banda (as well as Papagayo:Cervantes) samples suggest non-local products based on variation in their petrological composition. However, the variation is not significant enough to suggest they are from a completely different geological area (the basaltic to andesitic nature of the inclusions suggests some degree of areal proximity). Based on these findings, the next step in our research will be to compare these samples to comparative ones (yet to be analyzed) from the site of Tepetate, located on the northern outskirts of modern day Granada City (see Figure 4).

Papagayo:Manta and Pataky polychromes, also originally hypothesized to be potentially locally produced, appear to have been produced at (quite possibly) the same—but not local—location using the same paste preparation recipe. Given the felsic nature of this paste and its inclusions, it seems to represent parent geological materials of andesitic to dacitic (felsic) volcanic activity characterized by a matrix dominated by quartz and glassy, altered lithics. This is quite different than the basaltic to andesitic (mafic to intermediate) geology of the El Rayo area. We would argue that these represent imports to the site, although their point of origin is currently unknown. In some respects they are similar to the Usulutan Red Rimmed pastes discussed by Platz and Dennett (this session), although we are not suggesting they are from the same location—merely that they share characteristic felsic parent geology.

Regarding the hypothesized polychrome "imports" to El Rayo, the petrological composition analysis has managed to both confirm and confound our original assumptions. As anticipated, Madeira samples likely represent an import and a production locale in a somewhat more active volcanic area than we see at El Rayo. The andesitic to basaltic (or mafic) nature of the inclusions, particularly the mineral inclusions, are highly reminiscent of the "colourful" pastes seen in the "imitation" Usulutan believed to be locally produced in the Managua area, but lacking the iron-rich matrix diagnostic of those pastes.

Vallejo polychrome, as expected, is definitively an import to the site (with notable exceptions). Petrographic analysis of Vallejo samples from other sites including Santa Isabel, Rivas, and Tepetate, Granada suggest that these imports all originate from the same location and none of them local to the Isthmus of Rivas. These, as well as INAA analyses of Vallejo from a variety of other sites (see Bishop et al. 1988, 1992) indicate that we currently have absolutely no idea where they were being produced (Bishop, personal communication 2011) only that they were being imported/exchanged into Pacific Nicaragua on a relatively intense scale. The results of the current analysis suggest, however, that Vallejo was also being locally emulated (and poorly at that). It is apparent that the technology required to produce Vallejo in a realistic way (ash tempering, unique white-slip, and pearl-gray paint) was beyond the capabilities of local potters. Two potential hints toward production location, or at least technological knowledge of ash-tempered pottery, come from Nicoya, Costa Rica, and throughout Honduras. Ash-tempered pottery was produced in the southern portion of Greater Nicoya. We have witnessed samples of ash-tempered Murillo imports at the site of Santa Isabel. Vessel form and decorative techniques, however, show no association between Vallejo and this type. Alternatively, another ash-tempered import known from the site of El Rayo is Tenampua Polychrome, a widely produced and distributed (from the Ulua Valley in the north to the Comayagua Valley, in the south) ceramic type (see Figure 10).

Figure 10. A Tenampua Polychrome sherd from El Rayo (photo by Carrie Dennett).

Finally, results of the Castillo Engraved analysis have presented us with a unique and potentially exciting glimpse into its potential production locale. The analysis suggests that local versions of Castillo were being produced at El Rayo, but also that what appears to be “non local” to the site may in fact be local to the general area. Dennett has briefly re-reviewed thin sections from the sites of Santa Isabel, Rivas, and Tepetate, Granada, where the Castillo samples found there are similar to one another and distinct from the local paste types. They do, on cursory investigation, look quite similar—in terms of composition—in many respects to all the samples from El Rayo. While we are loathe to draw any general conclusions at this time, we hypothesize for future investigation that they may have been produced in the immediate area of the Mombacho volcano or, potentially, nearby Zapatera Island.

DISCUSSION

While ethnohistoric sources suggest a punctuated cultural transition in Pacific Nicaragua sometime around A.D. 800, following the in-migration of Chorotega-speakers to the region, this analysis suggests a far from punctuated transition from the Bagaces to Sapoá period in terms of both stratigraphic deposition of cultural materials and pottery production strategies. In that El Rayo presents one of the first and scientifically excavated multicomponent sites in pacific Nicaragua, we have the first opportunity to examine traditional understandings of the shift from the Bagaces to Sapoá period from an archaeological point of view. Figure 11 demonstrates, in a static way, the actual cultural transition, based on identifiable ceramic types, between periods.

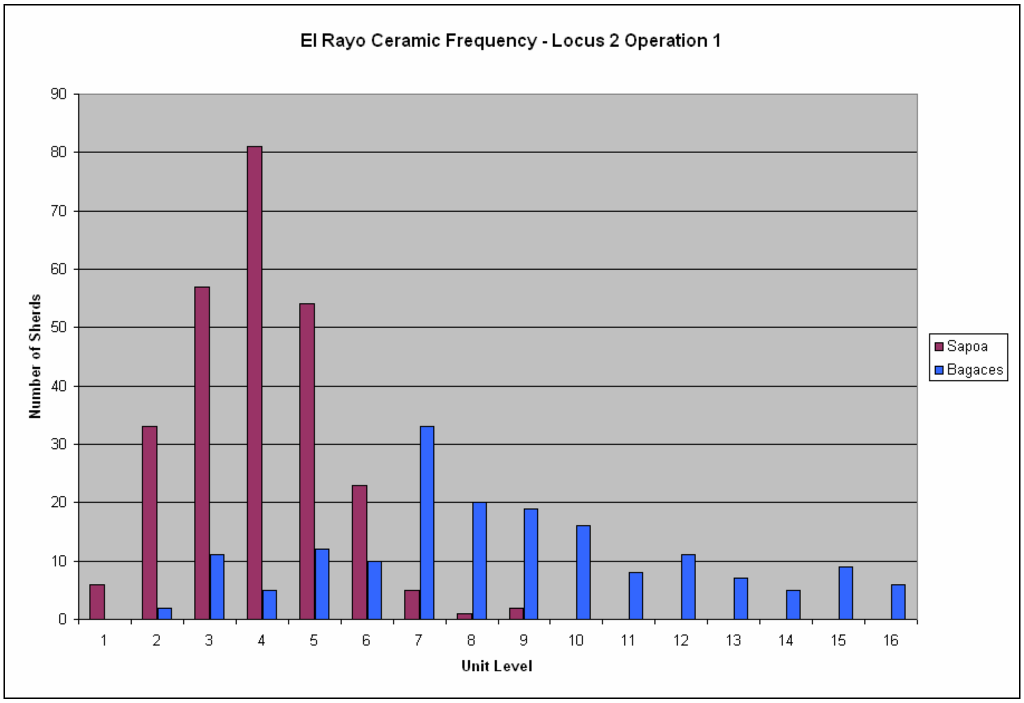

Figure 11. Stratigraphic Ceramic Frequencies from Operation 1, Locus 2, El Rayo.

What we see is a transition from dominant Bagaces types to dominant Sapoá types over (what appears to be) a roughly 200 year period (see Table 1, Appendix A for associated radiocarbon dates). Rather than a punctuated population replacement, we see a relatively smooth (although the two authors have differing opinions of the degree of "smoothness") transition. New Sapoá styles are being, at first, slowly introduced and Bagaces red wares slowly fading out across the transition. Increasing ceramic frequencies across time are both an artifact of excavation limits (we did not get to dig as deep in as many places due to time constraints) and, likely, population increase. If this population increase was, in fact, real, it seems reasonable to argue that the organization of the social structure would also change in response to never-before-encountered social configurations and circumstances. One potential, and we believe reasonable, explanation is that the changes we are witnessing at El Rayo across time might better be understood as reflecting local internal, intraregional development and sociopolitical reorganization.

Connections with external, neighbouring regions were occurring in Pacific Nicaragua at least as early as the Tempisque period (250 B.C. to A.D. 250) (see Platz and Dennett, this session), when both materials (e.g., obsidian) and ideas (e.g., Usulutan wares) were to some degree ushered into the region. We also have witnessed that some degree of connection continued into the Sapoá period based on obsidian and ceramic imports from Honduras and, potentially, El Salvador at El Rayo. Platz and Dennett (this session) argue that local/regional emulation of Usulutan ceramics from the Mesoamerican southeast periphery may have served as a prestige good that was somehow gifted or exchanged between leaders from different sites or political-economic zones (allied territories) in a social setting designed to foster new, or maintain existing, alliances and/or affiliations.

We believe, then, that it is reasonable to assume that pre-Columbian groups of Pacific Nicaragua had continued insight into the workings of neighbouring cultures well into the Sapoá period. What we may be witnessing at the transition is the development of indigenous power-gathering strategies—based on the creation of new unique, local, and symbolically powerful symbols—designed to internally consolidate and share power within the region, rather than directly emulating elite symbols of prestige from external social structures (many of which were faltering during the Classic and Terminal Classic periods in Mesoamerica). The increased focus on intraregional exchange of ceramics such as Papagayo polychrome varieties witnessed in this analysis, for example, or the possible exchange of Castillo Engraved vessels between the El

Rayo area and Santa Isabel or Tepetate, may serve as support for this hypothesis. While we are not suggesting that the migration of Chorotegan-speakers did not happen, we are suggesting that these migrations may not have had the *type* of impact we once believed them to have had. Rather than a complete replacement of the indigenous population by migrating groups, we may instead be seeing the negotiation, blending and, ultimately, consolidation of distinct ethnic groups into a singular, unique, and inclusive group with—at least at the sociopolitical level—a coherent and unified social identity.

Obviously, these are tentative/provisional ideas which need to be fleshed out through more intensive research. We believe, however, that the research and potential interpretations presented in this paper serve as a good starting point from a relatively fresh perspective.

Final Thoughts

Ethnohistoric records are invaluable resources. They have played a huge role in successfully directing our investigations and formulating the research questions we collectively test today. They were, for some time, our richest resource. The tide, however, seems to be turning. We now need to be open to approaching our investigations and interpretations in a way that does not rely or build on ethnohistory but, rather, is enriched by it.

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Table 1. El Rayo Ceramic Type Frequencies: Locus 2, Operation 1[1]

Level	I	II	III	IV	V	VI*	VII	VIII	IX*	X	XI	XII*	XIII	XIV	XV	XVI
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Main Decorated Types																
Unclassified	1 (5)	9 (10)	7 (6)	9 (7)	3 (4)	11 (23)	6 (13)	6 (22)	3 (12)	3 (11)	1 (11)	5 (31)	6 (33)	--	--	--
White Slipped	12 (60)	30 (34)	35 (28)	25 (20)	13 (16)	3 (6)	1 (2)	--	--	--	--	--	--	--	--	--
Papagayo	6 (30)	16 (18)	29 (23)	43 (34)	26 (32)	16 (33)	4 (9)	1 (4)	--	--	--	--	--	--	--	--
Pataky	--	2 (2)	5 (4)	15 (12)	2 (2.5)	3 (6)	--	--	--	--	--	--	--	--	--	--
Madeira	--	--	4 (3)	--	4 (5)	4 (8)	1 (2)	--	--	--	--	--	--	--	--	--
Vallejo	--	4 (5)	3 (2)	5 (3)	3 (4)	--	--	--	--	--	--	--	--	--	--	--
Castillo Engraved	--	8 (9)	6 (5)	7 (5)	2 (2.5)	1 (2)	--	--	--	--	--	--	--	--	--	--
Sacasa Striated	1 (5)	15 (17)	16 (13)	6 (4)	--	1 (2)	1 (2)	--	2 (8)	--	--	--	--	--	--	--
Combo Colander	--	--	5 (4)	1 (<1)	--	--	--	--	--	--	--	--	--	--	--	--
Banda (Francisca?)	--	3 (3)	6 (5)	10 (12)	16 (20)	--	--	--	2 (8)	--	--	--	--	--	--	--
Belo	--	1 (1)	--	--	--	--	2 (5)	1 (4)	--	--	--	--	--	--	--	--
Ayala	--	--	--	1 (<1)	--	--	2 (5)	3 (11)	1 (3)	1 (4)	1 (11)	--	--	--	--	--
León Punctate	--	1 (1)	2 (1)	--	--	2 (4)	2 (5)	2 (7)	2 (8)	4 (15)	--	2 (12.5)	3 (17)	1 (20)	2 (22)	3 (43)
Momta	--	--	1 (<1)	1 (<1)	3 (4)	6 (12)	7 (15)	4 (15)	4 (15)	9 (33)	2 (22)	1 (6)	--	4 (80)	4 (44)	1 (14)
Tola Trichrome	--	--	8 (6)	3 (2)	7 (9)	1 (2)	15 (33)	9 (33)	8 (31)	10 (37)	5 (56)	6 (38)	9 (50)	--	3 (34)	2 (29)
Chavez W-O-R	--	--	--	--	1 (1)	1 (2)	4 (9)	1 (4)	4 (15)	--	--	2 (12.5)	--	--	--	--
Potosí Aplique	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 (14)
Subtotals (*n*=680):	20	89	127	126	80	49	45	27	26	27	9	16	18	5	9	7
Trade Wares																
Galo (CR)	--	--	--	--	--	--	--	--	--	1 (50)	--	--	--	--	--	--
Marimba (Hon)	--	--	--	--	--	--	--	--	--	--	1 (100)	--	--	--	--	--
Tenampua (Hon)	--	--	--	--	--	--	1 (100)	--	--	1 (50)	--	--	1 (100)	--	--	--
Subtotals (*n*=5):	--	--	--	--	--	--	1	--	--	2	1	--	1	--	--	--
Totals (*n*=685):	**20**	**89**	**127**	**126**	**80**	**49**	**46**	**28**	**26**	**29**	**10**	**16**	**19**	**5**	**9**	**7**

[1] Units: N505 E500, N505 E499, N504 E500, N504 E499, N504 E498, N504 E497, N504 E496, N503 E498, N503 E496

***VI = C14 A.D. 680–890**
***IX = C14 A.D. 660–970**
***XII = AMS A.D. 680–890**

Table 2. El Rayo Ceramic Type Frequencies: Locus 2, Operation 3[2]

Level	I	II	III	IV	V	VI	VII	VIII	IX*	X*	XI	XII	XIII	XIV	XV	XVI
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Main Decorated Types																
Unclassified	3 (7)	2 (4)	6 (7)	4 (7)	5 (11)	--	5 (23)	6 (19)	1 (4)	--	7 (22)	2 (13)	1 (12)	3 (17)	--	--
White Slipped	14 (31)	22 (45)	28 (33)	10 (19)	14 (32)	--	2 (9)	5 (16)	2 (7)	--	1 (3)	1 (6)	3 (33)	6 (33)	--	--
Papagayo	11 (25)	15 (31)	20 (23)	17 (32)	7 (16)	--	5 (23)	4 (13)	10 (36)	1 (25)	7 (22)	3 (19)	2 (22)	1 (5.5)	--	--
Pataky	3 (7)	5 (10)	6 (7)	4 (7)	5 (11)	--	--	1 (3)	1 (4)	1 (25)	--	--	--	2 (11)	--	--
Madeira	2 (4)	--	1 (1)	4 (7)	3 (7)	3 (50)	2 (9)	3 (10)	4 (14)	--	3 (9)	3 (19)	--	--	--	--
Vallejo	--	1 (2)	4 (5)	1 (2)	1 (2)	--	2 (9)	4 (13)	--	--	--	1 (6)	--	3 (17)	--	--
Castillo Engraved	2 (4)	1 (2)	3 (4)	5 (10)	2 (5)	--	--	3 (10)	4 (14)	1 (25)	6 (19)	1 (6)	--	--	--	--
Sacasa Striated	6 (13)	--	5 (6)	4 (7)	3 (7)	--	3 (14)	2 (6.5)	5 (16)	--	--	--	--	--	--	--
Combo Colander	--	--	3 (4)	--	--	--	--	1 (3)	--	1 (25)	1 (3)	--	--	1 (5.5)	--	--
Banda (Francisca?)	3 (7)	3 (6)	8 (9)	4 (7)	3 (7)	3 (50)	3 (14)	2 (6.5)	1 (4)	--	7 (22)	5 (31)	3 (33)	1 (5.5)	--	--
Momta	1 (2)	--	--	1 (2)	1 (2)	--	--	--	--	--	--	--	--	--	--	--
Tola Trichrome	--	--	1 (1)	--	--	--	--	--	--	--	--	--	--	--	--	--
Chavez W-O-R	--	--	--	--	--	--	--	--	--	--	--	--	--	1 (5.5)	--	--
Totals (*n*=443):	**45**	**49**	**85**	**54**	**44**	**6**	**22**	**31**	**28**	**4**	**32**	**16**	**9**	**18**	**--**	**--**

[2] Units: N485 E460, N485 E459, N485 E458, N485 E457, N484 E457, N484 E456, N483 E457

***IX = A.D. 1010–1170**
***X = A.D. 900–1140**

Table 3. El Rayo Ceramic Type Frequencies: Locus 2, Operation 4[3]

Level	I	II	III	IV	V	VI	VII*	VIII	IX	X	XI	XII	XIII	XIV	XV*	XVI
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Main Decorated Types																
Unclassified	--	2 (50)	4 (26)	4 (34)	1 (17)	1 (7)	1 (7)	--	--	--	1 (3)	2 (14)	--	1 (10)	2 (33)	--
White Slipped	--	1 (25)	5 (33)	1 (8)	--	1 (7)	1 (7)	--	--	--	--	--	--	--	--	--
Papagayo	--	1 (25)	1 (7)	2 (17)	--	--	--	--	--	--	--	--	--	--	--	--
Castillo Engraved	--	--	--	--	1 (17)	--	--	--	--	--	--	--	--	--	--	--
Sacasa Striated	1 (50)	--	1 (7)	1 (8)	--	--	--	--	--	--	--	--	--	--	--	--
Banda (Francisca?)	--	--	1 (7)	--	--	--	--	--	--	--	--	--	--	--	--	--
Belo	--	--	--	1 (8)	--	--	1 (7)	1 (7)	--	--	5 (17)	5 (36)	--	--	--	--
Ayala	--	--	2 (13)	--	--	1 (7)	--	--	--	--	--	--	--	--	--	--
León Punctate	--	--	--	--	--	5 (33)	4 (29)	6 (43)	--	4 (80)	3 (10)	5 (36)	--	2 (20)	1 (17)	--
Momta	1 (50)	--	--	2 (17)	1 (17)	4 (26)	2 (14)	1 (7)	--	--	--	--	--	--	--	--
Tola Trichrome	--	--	1 (7)	--	2 (32)	1 (7)	4 (29)	4 (29)	5 (71)	1 (20)	15 (50)	2 (14)	--	--	--	--
Chavez W-O-R	--	--	--	--	1 (17)	2 (13)	1 (7)	2 (14)	2 (29)	--	6 (20)	--	--	7 (70)	3 (50)	2 (100)
Potosí Aplique	--	--	--	1 (8)	--	--	--	--	--	--	--	--	--	--	--	--
Totals (*n*=156):	**2**	**4**	**15**	**12**	**6**	**15**	**14**	**14**	**7**	**5**	**30**	**14**	**0**	**10**	**6**	**2**

[3] Units: N504 E480, N503 E480

***VII = A.D. 620–690**
***XV = A.D. 560–660**