Mechanisms of Colonial Transformation at the Port of Veracruz and the Northwest Florida Presidios

by

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ABSTRACT

I propose a new approach for the analysis of social transformations within the context of colonialism. Drawing on concepts used by historical sociologists, combined with insights from historians and archaeologists, I forge a synthesis of relational mechanisms that concatenated into processes of categorical change. Within the social sciences, mechanisms are formally defined as specific classes of events or social interactions that are causally linked and tend to repeat under specific conditions, potentially resulting in widespread social transformations. Examples of mechanisms include formal inscription through spatial segregation and adjustments in individual position through socioeconomic mobility.

For New Spain, historians have identified at least three macroscale shifts in the social structure of the viceroyalty. I examine the mechanisms that led to these changes in two distinct contexts. The Port of Veracruz (Mexico), located along the main axis of colonial exchange, offers a shifting baseline for comparison of the long-term trajectory of colonial interaction and categorical change. I undertake a finer grain study at the borderland presidios of Northwest Florida, where three presidios were sequentially occupied (AD 1698-1763) and historically linked to Veracruz through formal recruitment and governmental supply.

My analysis draws on two independent lines of evidence. Historically, I examine census records, maps, and other colonial documents. Archaeologically, I assess change in interaction mainly through technological style analysis, compositional characterization, and the distribution of low visibility plain and lead-glazed utilitarian wares. I document

the active expression of social categories through changing consumption of highly visible serving vessels.

This study demonstrates that colonial transformations were driven locally from the bottom up and through the top-down responses of local and imperial elites who attempted to maintain control over labor and resources. Social changes in Florida and Veracruz were distinct based upon initial conditions and historical contingencies, yet simultaneously were influenced by and contributed to broad trajectories of macroscale colonial transformations.

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CHAPTER 1

COLONIAL TRANSFORMATIONS AND PERSISTENCE OF EMPIRES

Imperial expansions frequently involved colonial agents of diverse cultures who were recruited, conscripted or enslaved into service from previously subjugated populations. This project examines the transformation of social relations in imperial frontier contexts from the vantage point of diverse colonizers. Between A.D. 1698 and 1763, Spanish officials conscripted and recruited hundreds of *castas* (people of mixed Spanish, Indian, and African heritage) from colonial Mexico to serve at three presidios in Northwest Florida.[1] During this period, the Port of Veracruz linked the Pensacola presidios to New Spain, serving as a gateway for military recruitment and governmental supply. A combination of historical and archaeological data from casta neighborhoods in Veracruz forms comparative context to assess continuity and change at the borderland presidios. I ask two principal questions: How did castas maintain or transform social relations and categories of identification at the Port of Veracruz and Northwest Florida presidios? What reciprocal adjustments did administrators and officers make to local and imperial policies in order to maintain control over their colonial subjects? Because the presidios were sequentially occupied over a 65-year period, they offer an ideal case study for assessing the rapidity of change in a frontier setting. Residential contexts in Veracruz provide a baseline and comparative lens for the long-term trajectory of social change over two centuries in colonial New Spain.

The theoretical framework I use for assessing social transformations updates Foster's (1960) concepts of formal and informal selective processes by disentangling social relations of interpersonal interaction from categories of identification (e.g., Calhoun 1997; Stokke and Tjomsland 1996; Tilly 1978, 2001a, 2005; Nexon 2009; White 2008). Formal categories of identification existed both prior and external to interpersonal interaction. Interaction at regional, community, and household scales reproduced or transformed formal categories and, informally, introduced local traditions. Over time, cumulative local changes in social relations could lead to much larger scale transformations in formal categories, influencing local and macro-structural imperial policies (see Deagan 2001; Tilly 1978, 2001a). Large-scale change in the structure of social identification played a key role in the end of the Spanish American empire (Deagan 2001:194; Voss 2015:656). Such social transformations began at the local level. This project presents case studies for examining bottom-up and top-down mechanisms of change in Veracruz and Pensacola.

This dissertation is divided into two parts based on independent lines of evidence, presenting distinct historical and archaeological perspectives. From the historical perspective, I assess shifts in the formal categories used to classify individuals in census records and other administrative documents. I then identify the causal mechanisms that affected social change from multiple levels. From the bottom up, colonists affected change through interactions at the household, community, and regional scales. Encounters, intimate relations, socioeconomic mobility, and coordinated actions all contributed to social change in colonial Veracruz and Northwest Florida. The Crown, church, and colonial administrators, in turn, formalized the colonial social structure from the top down through community spatial organization, positive and negative incentives, and by transferring individuals or groups across categorical boundaries. While extremely valuable, historical analyses are generally constrained by the formal categories used to describe individual and group interaction. Archaeological analyses afford the opportunity to assess the causal mechanisms driving the transformation of formal categories, as well as elucidating change in the social relations that colonial administrators rarely documented in official recordkeeping.

From the archaeological perspective, I assess mechanisms of social transformation through the examination of the production, consumption, and distribution of pottery. Because categorical identities exist apart from interpersonal interaction, they require recognizable behavior and material referents in order to convey group membership at large scales (e.g., Calhoun 1997:44; Cohen 1978; Stokke and Tjomsland 1996). Extensive ethnoarchaeological and ethnohistorical research has shown that highly visible material culture or attribute styles are subject to situational manipulation (e.g., Carr 1995; Loren 2000; Wiessner 1983). In contrast, material culture that is used in low visibility contexts and methods of manufacture that leave behind few visible traces are often more resistant to change (e.g., Lemonnier 1993; Stark et al. 1998; van der Leeuw 1993). Low visibility material culture and attributes result from learned behavior and enculturation, and thus they tend to reflect relational modes of identification based on face-to-face interaction (Clark 2001:12-22; Gosselain 1998; 2000:193; Lemonnier 1993; Sassman and Rudolphi 2001; Stark et al. 1998).

Based on the consistently observed links between material culture and two distinct modes of social identification (relational and categorical), I assess the causal mechanisms of social change in Veracruz and Pensacola. Investment in high visibility imported tablewares signaled formal categories that were recognized throughout New Spain. Concurrently, analyses of low visibility technology and the distribution of utilitarian vessels contribute insights into shifting labor relations, external connections, regional exchange networks, and gender relations. Finally, I consider the potential development of regional categorical identities through the residential consumption of locally-produced decorated pottery that contradicted official ideals about perceived social categories. My research shows that these relational mechanisms interacted dynamically, under conditions of intense competition for resources in culturally diverse communities.

To assess these mechanisms archaeologically, I analyze pottery from residential contexts in Veracruz and Northwest Florida. Approximately half of the pottery categories recovered from these contexts are well understood with data electronically available. The technological styles and provenance of plain coarse earthenware, lead-glazed coarse earthenware, and slipped (or painted) pottery are the least understood and will constitute the main focus of laboratory procedures. Analyses draw upon the inspection of macroscopic attributes, proton-induced x-ray emission spectrometry, x-ray diffraction, petrography, and instrumental neutron activation analysis (INAA). These methods will assist in: (1) identifying wares that were locally produced in Veracruz and Pensacola, and (2) comparing technological styles to discriminate between wares produced by castas and Florida indigenous people.

This research demonstrates that shifts in social relations and categorical identities varied between regions, influenced by initial conditions, location, settlement function, and historical contingencies. Yet, the local interactions of individuals had emergent effects at broad geographic scales. Over time, shifting social relations effected change in the structure of colonial societies. In order to maintain their colonial endeavor, officials shifted their formal policies and contributed to the social transformation of colonial society.

This project represents one of the few interregional studies of changing social relations and ceramic technology in imperial contexts. My analysis of relational mechanisms at the port and presidios – contextualized by a synthesis of research in other regions – reveals common patterns in the concatenation of bottom-up and top-down mechanisms of change. I, therefore, close this study by identifying four causal processes of social change: contact, convergence, mobilization, and site transfer. Each of these processes is made up of sequences of mechanisms that demonstrate the dialectical contributions of diverse colonizers and institutions to social transformations. A better understanding of multiscalar and multilevel transformations offers insights into imperial and colonial persistence, as well as the emergence of new nations during the following century.

Persistence of Empires

Michael Doyle (1986:30) argued that the defining characteristic of empires is the "effective control, whether formal or informal, of a subordinate society by an imperial society." Imperialism, then, refers to the mechanisms for establishing and maintaining control of other societies (Doyle 1986:19). As empires expand, they encompass an increasing number of interest groups and diverse cultures, requiring broadening institutional complexity to maintain effective control (Doyle 1986). If the costs of maintenance begin to exceed the benefits, the empire may contract or collapse (Tainter 1988). Subjugated people also consider the costs of cooperating with an imperial state and may resist if costs become too high (Tainter 1988:200). Resistance increases the cost of maintenance (Fahrenkrug 2006:7; Tainter 1988:200). As a result, colonial transformations and imperial policies tend to co-evolve (Deagan 2001; Doyle 1986:38, 118-119; Stark and Chance 2012:194-195).

Imperial strategies for provincial control involve either negative enforcement or positive incentives. Coercion is an obvious negative enforcement strategy; it is also the costliest (Doyle 1986:41). Positive incentives that increase acceptance by colonial people are far more effective for reducing the cost of maintaining an empire (Doyle 1986; Fahrenkrug 2006:3-4). Political collaboration, institutional coordination, and economic, social, and cultural integration are frequently used to build acceptance of imperial rule (Doyle 1986; Fahrenkrug 2006:11-12).

As with other empires, integration and acceptance by indigenous people and colonists were key to reducing the cost of maintenance and facilitating the persistence of the Spanish American Empire (Deagan 2001:179). This required broad institutional strategies toward the colonies as a whole, but also the ability to adjust to the needs of diverse cultural groups and local settings. The relationship between imperial officials and colonial communities was dynamic. Comparative research in the Old and New Worlds demonstrates that encounters between colonists and indigenous populations had "profound transformative effects on the cultural identities of all groups involved" (Stein 2005:4). Local transformations demanded reciprocal changes in the structure of empire (Deagan 2001:181). Ample historical research has uncovered the changing institutional policies of the Spanish-American empire, but less work has focused on the colonial transformations that provoked formal responses. Deagan (2001:181) argues that an understanding of colonial social transformations requires more than historical data; it requires archaeology and the analysis of material culture, as pursued in my study.

Colonial Transformations

I examine transformations in social relations and categories of identification in frontier contexts from the vantage point of diverse colonial agents. In order to account for cultural diversity among colonial agents, Foster (1960) proposed that a screening process, with formal and informal selection, resulted in a unique "contact culture." Formal selective processes consisted of directed change by institutions, governments, and local administrators. These processes drove social and economic change in a top-down direction from multiple levels within the colonial hierarchy. Formal processes are often recorded in detail in documents, such as the Spanish colonial ordinances of 1573 by King Phillip II of Spain (Crouch et al. 1982; McAlister 1984:134-139). When Spanish sources describe social relations, they tend to document imposed categories of identification -- such as racial classifications -- and omit informal processes based on local community and shared history (Chance 2008:137-141; Restall 2005). Informal processes included the unplanned introduction of traditions by diverse colonizers at community and residential levels, which were rarely recorded in textual sources (Foster 1960:12). Such informal processes introduced traditions and relational modes of identification from the bottom up. Castas manipulated imposed racial systems at the local level for social, political, or economic gain (e.g., Boyer 1997; Cope 1994), but individuals did not necessarily accept official ideals or their imposed categories (Chance 1990:145, 2008:137-141; Restall 2005). Instead, castas reproduced or transformed social categories and traditions through interactions at residential and community scales and through casta involvement in larger economic systems (e.g., military supply system or regional exchange).

Foster's theoretical framework was grounded in an acculturation paradigm, whereby change was functional and unidirectional (for critiques, see Cusick 1998; Lightfoot 1995; Rubertone 2000; Silliman 2005). More recent research has integrated Foster's model with Ortíz's (1947) transculturation framework, which emphasizes multidirectional, complex culture change (see Deagan 1998). Archaeologists used primarily historical and ethnographic data from homeland regions to establish a comparative baseline for colonial archaeological materials (e.g., Deagan 1983, 1995; Ewen 1991; Hoffman 1994; Loren 1999; McEwan 1988). Due to scholarly dependence on historical sources, colonizer culture is often generalized, with an emphasis on the elite perspective and those aspects of culture that are documented historically (Ewen 1991:14). For this study, I use both historical and archaeological data from Veracruz to establish a shifting baseline and comparative context for assessing continuity and change in social relations in Northwest Florida, a frontier setting.

I update models of colonial transformation using social theory to disentangle formal categories of identification from social relations of interpersonal interaction (e.g., Calhoun 1995:193-230; Tilly 2001a; White 2008). In complex societies, formal categories often reinforce social and economic structures (Tilly 2005; Wright 2000). Individuals and institutions recognize categories of identification and their material referents at regional and imperial scales both prior and external to interpersonal interaction. While people generally define social categories as if they have unchanging essential qualities, they are constantly renegotiated within relational settings of interpersonal interactions (Somer 1994; Tilly 2001a). For example, racial categories, imposed through the social and economic policies of Spanish institutions and governments, were recognized locally and often manipulated for social, political, or economic gain (e.g., Boyer 1997; Castleman 2001; Cope 1994). A relational perspective puts the analytical focus on interpersonal interactions for understanding the development and transformation of asymmetrical relations (Tilly 2001a). Interaction between local officials and castas reproduced or transformed formally recognized categories and, informally, introduced traditions and led to changes in social relations. Durable social relations that developed locally could lead to broad transformations in formal categories, influencing macro-structural imperial policies (see Calhoun 1995 and Tilly 2001a; also Deagan 2001). Relational analyses provide a powerful analytical tool for understanding social transformations, while avoiding the danger of reifying formal categories without a consideration of the historical setting and contingencies (Tilly 2001a; Wurst 1999; Wurst and Fitts 1999).

Domains of social identification include class, status, race, rank, ethnicity, and gender (e.g., Anthias 1997; Bentley 1987; Jones 1997; Tilly 2001a). Here, I focus on defining economic class, social status, race, and relevant aspects of ethnicity, as these dimensions of social identification were dynamically entangled in the organization of colonial society (Chance and Taylor 1977; Martínez 2008; McAlister 1963; Restall 2009:95; Schwaller 2016). Specifically, historians have documented at least three large-scale shifts in the social structure of Spanish colonial society. Colonists initially borrowed from the Iberian social structure to categorize populations by *géneros de gente* (types of people), emphasizing socio-religious, socio-geographic, and socioeconomic distinctions (Schwaller 2016:19-49). The shift toward a racialized hierarchy, commonly known as the *sistema de casta*, developed during the seventeenth century and continued as an important organizing force into the following century (e.g., Cope 1994; Mörner 1967). By the eighteenth century, there was growing instability in the sistema, and scholars note a developing incipient economic class during this period (e.g., Castleman 2001; Chance and Taylor 1977, 1979; Frederick 2011; Seed 1982). As this history suggests, while categories can appear static and essential, they do change over time.

Class, status, and ethnicity are not viewed here solely as static and essentialist categories, but also are defined through a continual process of interaction and negotiated identification with and opposition to others (e.g., Barth 1969; Emberling 1997; McGuire 2006; Wurst 1999). Relational analyses advance a mode of thought that unites Marxist views of class (e.g., McGuire 2006; Wright 2000, 2002; Wurst 1999) with theoretical perspectives on ethnicity (e.g., Barth 1969; Tilly 2001a:360; Wright 2000:467). Scholarly approaches to ethnicity have implications useful for understanding the shifting social organization in New Spain. The instrumental view of ethnicity advocated by Barth (1969) emphasizes manipulation of broadly recognizable categories to improve political and economic opportunities (Emberling 1997; Cohen 1978). In contrast, a primordial view emphasizes enculturation and emotional attachments that serve to maintain ethnic identities (Emberling 1997; Geertz 1973; Stark and Chance 2008). Social relations in New Spain included the manipulation of ascribed categories in order to bolster economic position (Cope 1994; Morner 1967; Stark and Chance 2008:34-35), as well as emotional attachments to community and shared history (Chance 2008; Restall 2005; Taggert 2008).

Relational analyses of economic class are deeply rooted in the social sciences (e.g., McGuire 2006; Patterson 2003; Wolf 1999:5), but until recently, most historical archaeologists have employed only gradational approaches, treating class as either discrete categories or as graduated scales of wealth and prestige (McGuire 2006; Wurst 1999). This project incorporates a relational theory of Marxism for examining class and its intersection with other dimensions of social identification (e.g., Thomas 1998; Wurst 2002; see Wurst and Fitts 1999; McGuire 2006). I define class as asymmetrical relationships that develop between those who control the means of production (and distribution) and those who supply labor, leading to gradational inequalities in wealth and income (see Smith 1976; Wolf 1999:65; Wright 1994, 2002; Wurst and Fitts 1999). By labor, I refer to social activities to produce, distribute, or manipulate materials (Silliman 2001, 2006; Wolf 1982:73-74).

In New Spain, labor reproduced or transformed formal categories, while providing an avenue for the continuity of informal traditions that were introduced from the bottom up (see Silliman 2001). Racial categories are often used to legitimize social hierarchies and the exploitation of laborers (Eriksen 2002:6). This was the role of racial categories under the sistema de castas, when administrators and elites attempted to structure society so that native people, black slaves, and their descendants would serve as primary sources of colonial labor (e.g., Mörner 1967; Seed 1982). Although the modern concept of race did not fully develop until after the colonial period, historians have long recognized basic characteristics of race in the sistema (e.g., Schwaller 2016; Restall 2009:92). Scholars generally view social categories as "racialized" once culturally perceived distinctions in physical characteristics are linked to dispositions that are viewed as inherited and immutable (Eriksen 1993; Wolf 1994).

While ethnicity, race, and status are subjective concepts that imply social identity, class can be analyzed objectively (Stark and Chance 2008:34; Wright 2002). The modern concept of economic class was not yet developed under either the géneros de gente or the sistema de castas. Historians typically refer instead to socioeconomic status or position, as social status based upon religious lineage, geographic heritage, and eventually perceived racial membership largely determined, or at least was entangled with, the economic position of individuals and groups within colonial society (see Boyer 1997; Chance and Taylor 1977; Seed 1982; Schwaller 2016). This is not unusual, as categorical identities such as ethnicity or race are often used to structure and justify economic hierarchies (e.g., Bernbeck and McGuire 2011; Paynter 1989). It was not until the eighteenth century that historians identified the early development of an incipient economic class that diverged from the formal categories of the sistema (e.g., Chance and Taylor 1977; Castleman 2001; Seed 1982).

To summarize, while social scientists often view categorical identities as bearing essentialist and static qualities, they were susceptible to local production, reproduction, *and* transformation as seen over the course of 300 years in the Spanish colonial period. Categorical and relational modes of identification are useful distinctions, but they were not simply binary concepts. Social relations were structured by formal categories and interpersonal interaction, but local changes could lead to the large-scale transformation of formal categories. Social relations were dependent upon dynamic factors that operated at multiple scales. Interaction at the household, community, and regional scales informally produced and reproduced local traditions, while transforming social categories from the bottom up (see Restall 2005:10). Imperial responses to local changes modified and formalized social categories at broad scales from the top down.

I adopt a mechanism-based approach, emphasizing changing social relations, for explaining shifts in the structure of colonial society at multiple scales. Social scientists define causal mechanisms as “reoccurring causal sequences of a general scope” (Tilly 2005:72; see also Bunge 1997, 2004; Mayntz 2004; Tilly 2008). Mechanisms can interact at multiple scales and social levels, concatenating to create large-scale transformations (see Tilly 2008:9). Because social relations are historically constituted and based upon dynamic *local* interactions, I situate this project within distinct social and economic histories of Veracruz and Northwest Florida.

Historical Perspectives

There are primarily two historical approaches to social identification and transformation in Spanish America. The first approach involves quantitative methods for studying the social structure of colonial society. Historians using this approach typically focus on censuses, parish registries, tax assessments, and other administrative records with at least semi-systematically recorded data (e.g., Chance and Taylor 1944; Frederick 2011; Schwaller 2016:7; Seed 1982). The second approach generally incorporates qualitative methods, drawing upon Inquisition records, military accounts, *cofradia* (confraternity), and other descriptive documents. The general aim is to examine the ways that individuals and groups mediated formal categories in colonial society (e.g., Palmer 1976; Restall 2009; Schwaller 2009; Germeten 2006). Through the combined application of these document-based approaches, scholars have identified mechanisms that caused large-scale shifts in the social structure of colonial society, from the géneros de gente to the sistema de casta and finally toward the development of an incipient economic class. Historical evidence suggests that a dialectic between local changes and imperial responses were responsible for these changes.

Key to this co-evolution was the Spanish monarchs' casuist approach to colonial jurisprudence (see Mörner 1967:36; Owensby 2008; Schwaller 2016:51-55). Royal judgements were generally issued to address specific local problems and rarely dealt with the colonies as a whole. Even so, legislation created precedents that colonial officials then could apply to other circumstances and jurisdictions based on analogical reasoning. Through this legal process, rulings that reinforced or modified social distinctions and related social categories in a specific setting (such as Veracruz and Pensacola), could have broad consequences, facilitating large-scale social transformations.

In this project, mechanisms of a rather general scope facilitate comparisons between regions, while giving due consideration to historical contingencies. I examine bottom-up and top-down relational mechanisms of social change at the Port of Veracruz and the presidios of Northwest Florida (Figure 1.1). The contexts that I study in Veracruz span 200 years, providing a case study for long-term social change at the only legal port that linked New Spain to Europe during most of the colonial period. In contrast, the Northwest Florida presidios were sequentially occupied for only 65 years, providing an opportunity to study the rapidity of change in a frontier context. Because of the social and economic connections between the port and presidios, Veracruz serves as a shifting baseline for the examination of processes that socially transformed castas into colonizers in borderland contexts.

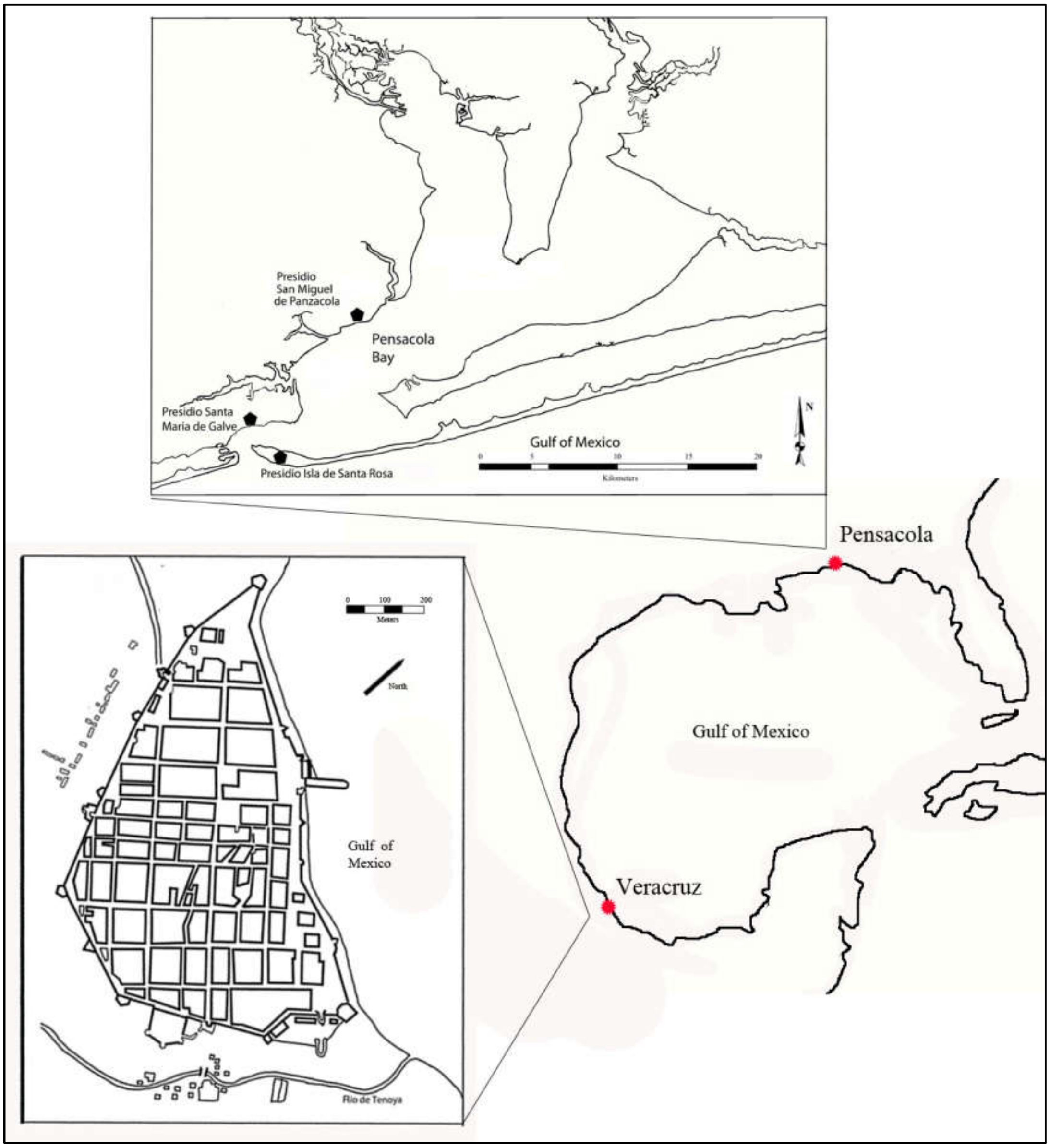

Figure 1.1. Map showing the location of the Port of Veracruz and the Pensacola Presidios

Port of Veracruz

Although Cortés landed in Veracruz in 1519, it was not until 80 years later that the Count of Monterrey officially ordered the transfer of the Port of Veracruz to its present location in 1599 (Blázquez Domínguez and Díaz Cházaro 1999; Gerhard 1972:360–365; Santiago Cruz 1966:9). The colonial occupation of the port spanned the early years and later decline of the sistema de castas. For most of the colonial period, Veracruz served as the central gateway for people and manufactured goods entering New Spain. The port was connected to other colonial urban centers through a system of roads, resulting in the availability of a diversity of Mexican, Asian, and European goods within the port (Lockhart and Schwartz 1983:90; Rees 1975; Eschbach 2009; Hernández Aranda 2006a). Despite the centrality of the port along the main axis of economic exchange, current research suggests that the port was dependent on the surrounding region for food and other goods (Garner 1993:72; García Ruiz and López Romero 2011:138–139; Hernández Aranda 2009).

The steady flow of people entering New Spain through the port created a pluralistic community, consisting of a population of mixed European, native, and African descent. The slave trade and the resulting African descendant population grew as indigenous communities declined in central Veracruz during the sixteenth and first half of the seventeenth centuries. The population of the port reflected these larger demographic trends. European and American born Spaniards were the socially dominant groups occupying the port's central and northern zones, but people of mixed descent – particularly Afromestizos – made up the majority of the city's colonial population (Blázquez Domínguez 1996; Gil Maroño 1996; Hernández Aranda 2006c).[2] This was true for the two neighborhoods that are the focus of my study. The Barrios de Minas was located within the city walls and the Barrios de las Californias was located outside the west gates (Eschbach 2009; Hernández Aranda 2006c).

The majority in Veracruz, castas worked as servants, laborers, and skilled artisans (Booker 1984:19; Carroll 1991:61-78; Hernández Aranda 2006b). Documents describing poor households in colonial Veracruz are rare, but eighteenth-century census data and property appraisals indicate that multiple households occupied single lots (Hernández Aranda 2005, 2006b). Outside the Veracruz city wall, houses were not part of the formal plan and there is currently no evidence of legal ownership (Eschbach 2009). Documents do provide data on social and economic composition of neighborhoods within the port. For example, colonial maps provide information on the changing use of urban space. The destruction of 19 houses in the Barrios de Minas in order to build a military hospital in the 1760s generated detailed appraisals, including occupant names, structural details, and property values (Plano y Presupesto de Nuevo Hospital de Veracruz 1766; see also Hernández Aranda 2005). The house-by-house census of 1791 provides detailed information on the formal application of casta categories, occupation, and marriage patterns late in the colonial period (Padrón de Revillagigedo 1791).

Presidios of Northwest Florida

The Pensacola presidios, meanwhile, were occupied during the eighteenth century when historians note a growing instability within the sistema de casta in New Spain. Between A.D. 1698 and 1763, hundreds of castas were conscripted or recruited from colonial Mexico for service at three presidios in Pensacola, Florida (Bense 2004; Coker and Childers 1998:16-17; Dunn 1917:176; Eschbach 2006). The sequential occupations of presidios Santa María de Galve (1698-1719), Isla de Santa Rosa (1722-1756), and San Miguel de Panzacola (1756-1763) at different locations around Pensacola Bay provide an excellent opportunity to examine the relational mechanisms that transformed casta colonizers within a borderland region (see Figure 1.1).

Colonial maps provide important details on the social use of space within the military settlements (e.g., Bense 1999, 2003; Eschbach and Harris 2006). Military enlistment and rank were clearly relevant for structuring society at the garrisoned settlements (Clune et al. 2003; Eschbach 2006). High status governors and officers from Spain and East Florida were a minority (Chatelaine 1941; Coker and Childers 1998; Eschbach 2006, 2007; Leonard 1932). The majority of the colonists were casta convicts, soldiers, and, eventually, voluntary settlers from colonial Mexico (Clune et al. 2003; Clune et al. 2006). Soldiers were lower in rank than officers, but unlike convict laborers, soldiers drew a small salary in addition to their rations (Bushnell 1994:45; Clune et al. 2003:26). *Situado* (royal subsidy) records of rations and wages provide general information on income and rank throughout the presidios' occupation. A detailed accounting of individuals and families who received only rations (but not salaries) at Presidio Santa Rosa adds important details on the social dynamics of the Pensacola presidios (Reales Listas 1741).[3]

As a frontier garrison, the Northwest Florida presidios relied on the situado, which was often unreliable. Supplies were shipped through Veracruz, often arriving late or not at all (Clune et al. 2006; Swann 2000). Materials that did arrive in Florida were subject to inflated prices (Bushnell 1981; Tepaske 1964). Because of the unreliability of the situado, illicit trade occurred with either the French in Mobile (Johnson 1999, 2003; Eschbach 2005, 2007; Roberts 2009) or the British (Clune et al. 2003:65), with indigenous groups sometimes acting as intermediaries (Eschbach 2007:210; Roberts

2009:135; Worth 2008:10). Traditionally, indigenous groups served a vital role in the Spanish colonies, providing labor and supplementary subsistence (Bushnell 1994; Seed 1982; Worth 1998). Native populations in Northwest Florida fluctuated and generally were not as substantial as in other regions, however (Clune et al. 2003; Dysart 1998). Some Apalachee migrated to Pensacola and eventually settled at Nuestra Señora de la Soledad y San Luís (1718-1740s) and later at San Joseph de Escambe (ca. 1741-1761). A Yamasee town was established at San Antonio de Punta Rasa (1749-1761) (Harris 2007; Worth 2008). Given the relatively small native population, casta colonists contributed essential labor and skilled artisans, receiving wages in addition to their salaries, which presented an avenue for social and economic mobility (Childers and Cotter 1998). It was within these contexts in Northwest Florida and Veracruz that I examine the mechanisms of social change.

Historical Research Objectives

Causal mechanisms of social transformation operated from multiple levels within an evolving multilayered hierarchy. Through a review of community, regional, and synthetic historical studies, I identify multiple drivers of change in New Spain that I reconceptualize as environmental, cognitive, and relational mechanisms of social transformation (for syntheses of historical research see, for example, Martínez 2008, Mörner 1967, and Schwaller 2016). As defined by historical sociologists (McAdams et al. 2001; see also Tilly 2001b), environmental mechanisms are external forces, such as large-scale population changes or resource depletion. Cognitive mechanisms are internal drivers, dealing with change in individual or public perceptions. The Enlightenment movement is an example of a large-scale shift in thought related to science, reason, and progress, which influenced change during the late seventeenth and eighteenth centuries in New Spain (e.g., Thomson 1989:110-112). Both environmental and cognitive shifts had macrostructural impacts on social transformations.

While environmental and cognitive mechanisms were important, my focus is primarily on the relational mechanisms that directly altered durable interactions between individuals or groups (McAdams et al. 2001; see also Tilly 2001b). The two research questions posed at the beginning of this chapter essentially ask about bottom-up and top-down relational mechanisms of change. In the subsections that follow, I describe eight relational mechanisms that I identified through a synthesis of historical research presented in Chapter 3 and which I conceptualized using social science research on social boundary formation, particularly the work of Charles Tilly (2004, 2005). These mechanisms contributed to the transformation of the social structure of New Spain from a hierarchy based on géneros de gente to a racialized casta system during the seventeenth century and eventually toward an incipient economic class later in the eighteenth century. At the local level, relational mechanisms combined with initial conditions and historical contingencies to produce diverse trajectories. In this study, I compare the ways that relational mechanisms caused changes at the Port of Veracruz and the presidios of Northwest Florida from both the bottom up and top down.

Bottom-up Mechanisms of Change

Bottom-up relational mechanisms operated at the microlevel, involving interpersonal interaction between individuals (Bunge 1999:73-76; Mayntz 2004:250). Social scientists suggest that social relations at this level can have emergent effects, capable of explaining transformations at larger social and geographic scales (e.g., Hedström and Swedberg 1998). These specific causal mechanisms include encounter/borrowing, biological and cultural mixing, socioeconomic mobility, and collective action.

Encounter/Borrowing: Charles Tilly (2005:138-140) defines encounter and borrowing as two separate relational mechanisms. I combine them in this study as they tend to co-occur in colonial contexts. Encounter involves the interaction of two unrelated groups that have never directly interacted. This mechanism is rare throughout history, but certainly applies to at least initial contacts between European and America's native populations. Once these groups come into direct contact, they typically develop social distinctions along points of contact. During Spanish colonial encounters, colonists borrowed organizing norms from their homeland contexts to frame social distinctions. In this study, encounters between casta colonists, colonial officers, and native populations in Northwest Florida are informed, at least in part, by examining the changing social structure in colonial Mexico and specific analyses of the Port of Veracruz.

Biological and Cultural Mixing: Interaction through sexual encounters, cohabitation, and intermarriage that occurred across formal social boundaries led to an increasingly diverse population of individuals that did not fit within existing social categories (e.g., Cope 1994; Mörner 1967; Schwaller 2016).[4] As these "mixed" populations grew in number, new formal categories were needed to explain the role of these individuals in colonial society. Informally, this mechanism created local networks that cross-cut the formal colonial social structure. In Veracruz and Pensacola, I examine census data and other administrative documents to assess patterns of intermarriage and other gendered relations.

Socioeconomic Mobility: This mechanism falls within the domain of what Tilly (2005:144-145) calls "site transfer," in which individuals or groups relocate to a different side of a social boundary. Examples given by Tilly include religious conversion and racial passing, both of which were relevant to Spanish colonial society. In this study, socioeconomic mobility refers specifically to movement both up *and* down the colonial hierarchy. Further, socioeconomic mobility is distinct from other forms of site transfer that were purposefully initiated by the Crown or church from the top down (addressed below). In Veracruz and Pensacola, I consider changes in enlistment status and rank, as well as shifting casta designations. More generally, I assess patterns of divergence between casta categories and occupation.

Collective Action: In this study, I use the concept of collective action to broadly denote a range of coordinated behaviors aimed at achieving a common goal (Baldassarri 2009; see also Tilly 1998:206-228). Under this mechanism, I include instances of local rebellion, as well as engagement in guilds and cofradias to achieve collective bargaining power (e.g., Germeten 2006; Schwaller 2016; Smith 1944). These forms of social relations have received little attention by historians interested in understanding the evolving colonial social structure. Instead, historians often address collaborative behavior in descriptive studies about the mediation of formal categories using qualitative data (e.g., Carroll 1991; Restall 2009; Schwaller 2016). Yet, collective action can have important effects on the social structure by emphasizing formal or local categories and potentially eliciting formal responses.[5] I identify and describe specific incidents of collective action that led to either change or maintenance of social relations in Veracruz and Pensacola.

Top-Down Mechanisms of Change

Shifting formal policies were aimed at altering interactions that were unfavorable and reinforcing social relations that served larger imperial goals. In brief, the Crown and colonists had a vested interest in controlling the colonial social structure in order to ensure an ample labor force that was key to exploiting the resources of their American colonies. As Tilly (2001a) notes, categorical identities are often key to lowering the costs of maintaining social inequalities and justifying top-down exploitation and the "hoarding" of resources. These aims often were balanced against ecclesiastical concerns that justified colonial expansion (see Haring 1975 [1947]; Lockhart and Schwartz 1983; McAlister 1984). A review of previous historical research demonstrates that these macrolevel mechanisms have the effect of limiting, reinforcing, or altering social relations and categories of identification from the top down (see Bunge 1999:73-76; Mayntz 2004:251). These mechanisms also can work at intermediate levels of the colonial hierarchy, such as through municipal governance or presidial administration. At this mesolevel in Veracruz and Pensacola, local policies can also have bottom-up effects on the imperial social order.

Formal Imposition: Historical sociologists define imposition explicitly as a form of top-down control of hierarchal social structures. It involves the imposition of new social categories by authorities where they did not previously exist (Scott 1998; Tilly 2005:139). In colonial New Spain, the Crown and imperial agents formalized existing social categories that developed locally but suited their larger imperial agenda. Social categories were often institutionalized and spread broadly through their use in casuist judgments, which were then reapplied through analogical use of precedents. In Veracruz and Pensacola, I note shifts in the application of formal categories imposed by officials in administrative documents and reports.

Formal Incentive Shift: Tilly (2005:141) defines incentive shift as a relational mechanism that may cause a change in social distinctions by creating penalties or rewards for “within-boundary relations, cross-boundary relations, and representations of the boundary zones.” Incentives can be created informally and from the bottom-up, such as to maintain local group cooperation and solidarity. In this study, I define “formal incentive shift” as the institutionalization of penalties and rewards by imperial agents and local governments. For instance, restrictions in the movement and possession of arms placed upon African slaves (and others) in New Spain. Formal incentive shifts often co-occurred with the formal imposition of social categories, which then developed over time as imperial agents sought to maintain control of the colonial socioeconomic hierarchy and corresponding distribution of resources.[6] I consider broad changes in colonial policies, as well as specific shifts in incentives, particularly in Pensacola, where officials sought to maintain a distant garrison.

Formal Individual or Collective Transfer: This mechanism is a form of site transfer that I define as the institutionalized relocation of individuals or groups across categorical boundaries. For example, in the late seventeenth century, the Crown and church officially revised the religious status of native Christians, officially shifting their religious categorical designation from *cristiano nuevo* (new Christian) to *cristiano viejo (*old Christian). This formal action was directed toward a broad categorical group. Forms of formal individual transfer would include, for example, a change in military enlistment and rank that was applied on a case per case basis. This latter example demonstrates how bottom-up socioeconomic mobility based on individual achievement can combine with the formalization of social advancement.

Formal Inscription/Erasure: Often times, the local imposition of formal categories coincide with legal measures that inscribe and emphasize boundaries between groups. A common example of this was through spatial segregation (see Tilly 2005:143). I therefore examine colonial maps to assess the changing use of social space in Veracruz and Pensacola. At the opposite end, local authorities might erase social distinctions based upon formal categories. Voss (2005:465), for example, noted the eventual erasure of casta categories from census records for the Presidio of San Francisco and replacement with regional categories of difference. I likewise consider shifts in the use of social categories that minimize or "erase" formal social categories in Veracruz and Pensacola.

From the historical perspective, I consider the ways that these bottom-up and top-down relational mechanisms combined with unique historical circumstances to cause local social change. The historical perspective, however, is explicitly framed by formal categories of identification. Even research that examines social networks typically segments populations based on formal categories, such as Spaniards, natives, and particularly Afromestizos (see Schwaller 2016:7-8). This is not surprising given that formal categories organized social relations and their documented descriptions in hierarchical societies. To move beyond these constraints, I turn to the archaeological perspective to consider relational mechanisms of change that receive little focus in historical analyses of social transformations. Through the historically contextualized lens of material culture, I examine the effects of exchange networks, the development of local traditions, and the use of material symbols to mediate categorical identification.

Archaeological Perspective

Archaeological data can provide information concerning people and behavior that are rarely mentioned in documents. Material culture reflects behavior that consciously or unconsciously (re)produced or transformed social relations and categories (e.g., Appadurai 1986; Bourdieu 1977; Conkey 1999; Costin 1998; Jones 1997). Pottery offers an excellent source of information on social and economic relations because the materials are nonperishable and ubiquitous. Also, origin of manufacture and relative cost are discernible in Spanish colonial contexts. More importantly, highly visible decorations and pottery vessels that are used in highly visible contexts (i.e., serving vessels) can actively signal categorical identity. In contrast, less visible evidence of pottery manufacture and pottery used in low visibility contexts (i.e., utilitarian wares used in food preparation), can reveal important information about relational connections (Peeples 2018; see also Carr 1995; Clark 2001). That is, because the learned traditions of potters and vessels used in low visibility contexts were more resistant to change through intentional manipulation (e.g., Carr 1995; Clark 2001; Lemonnier 1993; Stark et al. 1998; Wiessner 1983, 1984), they are more likely to reflect direct interpersonal interaction and enculturation – specifically, the traditions of Florida Indians versus castas from New Spain.

Material categories allow individuals to legitimize or signal group membership and social roles based on referents that are external to interpersonal interaction (Calhoun 1995:193-230). Decorative style has been the most studied aspect of pottery, often used by groups (or individuals) to consciously negotiate social categories (e.g., Hegmon 1992, 1998; Jones 1997; Stark et al. 1998; Wiessner 1983, 1984). Pottery categories were not static indices of status or class, but were often manipulated to maintain or transform social relations within particular historical settings (e.g., Jamieson 2001, 2004; Loren 1999; Voss 2008a). Due to active manipulation, decorative styles are more likely to vary according to social contexts than are less visible technological choices (Stark et al. 1998:212).

Technological style reflects choices made during different stages of pottery manufacture (*chaîne opératoire*), from procurement of raw materials to different techniques for creating similar decorations (e.g., Lemonnier 1993; Sillar and Tite 2000; Stark et al. 1998; van der Leeuw 1993). Technological styles are often passed from one generation to the next and are more resistant to change than decorative styles (Lemonnier 1993; Stark et al. 1998; van der Leeuw 1993). Some technical choices (such as post firing methods) are more visible, resulting in socially or economically motivated manipulation. Other techniques (such as primary forming methods) are less visible and are more likely to "reflect those most rooted and enduring aspects of social identity" (Gosselain 2000:193; see also Clark 2001, Stark 1998).

Studies in Spanish Florida lack a bottom-up understanding of the informal contributions made by castas to colonial transformations. Currently, pottery is placed within dualistic categories as either European or Indian (or African) without adequately considering possible production by castas from New Spain. Some aspects of technological styles provide a means for discriminating between wares produced by castas and Florida indigenous people (see Clark 2001:6-22).

Interregional research between the Pensacola presidios and the Port of Veracruz requires comparative pottery data from Mexico. Majolica has been a main focus of prior research (e.g., Goggin 1968; Lister and Lister 1974, 1982), and scholars have employed

INAA to approximate the clay provenance of majolica tablewares (e.g., Blackman et al. 2006; Fournier García et al. 2009; Fournier García and Blackman 2008). Asian and European tablewares also have received ample attention (e.g., Kuwayama 1997; Lister and Lister 1987; Noël-Hume 1969). Lead-glazed pottery was likely produced for regional consumption at lower costs in New Spain, but provenance studies have been limited (e.g., Charlton 1976; Fournier García et al. 2007; Fournier García and Blackman 2008; Iñañez et al. 2010; Reynoso Ramos 2004). Indigenous traditions of unglazed decorated pottery have received varied attention by regional specialists (e.g., Charlton 1968, 1996; Charlton et al. 2007; Charlton and Fournier García 2010; Rodriguez-Alegría 2002, 2005a, 2005b). Plain unglazed pottery has received the least attention, despite its ubiquity in colonial assemblages. Clearly, much of the pottery from Spanish colonial sites requires additional analyses to complement existing data. For this study, I examine the technological style and provenance of pottery categories that have received less attention (i.e., plain, lead-glazed, and slipped/painted pottery), allowing for a better understanding of the transformation of social relations between Veracruz and Pensacola.

Archaeological Research Objectives

I analyze pottery assemblages from Veracruz and Pensacola to assess the mechanisms that transformed social relations and categories of identification, mainly from the bottom up. Given the possible rapidity of changes made in a new environment, such social transformations are best examined as a continuing process that began in an individual's homeland and quickly shifted in a new natural and sociopolitical environment (Lightfoot 1995; Lightfoot et al. 1998:202). Comparative data from Veracruz provide temporal depth in assessing both continuity and subsequent changes in social relations in colonial Florida. I examine six historically contextualized relational mechanisms that are detectable through the analysis of material culture. Social relations are dynamic, and multiple relational mechanisms may have affected change simultaneously under conditions of active competition for opportunities and resources in a culturally diverse society.

Formal Categorical Activation

Tilly (2005:143-144) describes activation as the intentional signaling of a social boundary. Common behavior and material symbols are necessary to convey or "activate" group membership in formal categories that exist at large scales (Calhoun 1997:44; Tilly 2005:143-144). Highly visible material culture could be manipulated to signal association or membership with particular categorical groups (e.g., Bowser 2000; Carr 1995; Hegmon 1992, 1998; Hodder 1982; Wiessner 1983, 1984; Wobst 1977). In the eighteenth century, propaganda in the form of casta paintings reinforced formal casta categories by displaying institutionalized ideals of social materiality. These images included the display of appropriate pottery used by Spaniards, natives, Africans, and castas (Loren 1999:133-140). Despite attempts by imperial agents and the Catholic Church to regulate the colonial social structure, individuals manipulated ascribed categories for socioeconomic advantage. This was particularly common when castas moved to new locations (e.g., Boyer 1997; Parker 1993), and military service was often a path toward social mobility in imperial settings (Sinopoli 1994:166-167).

Archaeologically, the use of material symbols to signal formal categories may be evident through changes in the proportion of European-style or Asian tablewares over time (see Deagan 1974, 1983; Ewen 1991; McEwan 1988; c.f. Voss 2008b, 2012).

Access to imported tablewares may vary according to wealth. In Pensacola contexts, this would be evident if officer-related contexts demonstrate a much higher proportion of European-style and Asian tablewares. Alternatively, colonists may have minimized or "deactivated" distinctions among themselves through a shared identity that mainly emphasized differences from local native people (see Voss 2005; see also Tilly 2005:143-144). Categorical activation is an important relational mechanism because it can both cause and *constitute* social boundary changes (see Tilly 2005:143-144), providing a means to track alterations in categorical identities over time and from the bottom up.

Brokering External Connections

European-style and Asian imports conveyed more than just an abstract symbol of Espanidad, or general expressions of social and economic value (see Voss 2012). They also demonstrated long-distance connections and access to limited resources (see Neff 2014). Social scientists, such as Burt (1992, 2005), define brokerage as the act of bridging a social gap between two or more groups that do not regularly interact. In this case, brokerage is between groups residing in distant locations through interregional exchange. Veracruz was located along a major axis of colonial exchange, which likely made majolica and porcelain readily available, despite their transportation from hundreds or even thousands of kilometers away. In Pensacola, these imports legally entered the presidios through an unreliable situado (Clune et al. 2006; Swann 2000) and potentially through some private and illicit trade as well (e.g., Clune et al. 2003:65-66; Roberts 2009:142; Swann 2000). Consumption of these wares, therefore, indicated long-distance interaction with colonial Mexico and access to finite resources in Pensacola.

Colonists in Pensacola were reliant on the situado for more than just luxury goods. The unequal distribution of even basic utilitarian goods from New Spain could suggest asymmetrical relationships among colonists – particularly when functional equivalents were available locally. Limited research suggests that lead-glazed wares were manufactured regionally in colonial Mexico (e.g., Charlton 1976; Fournier García et al. 2007; Fournier García and Blackman 2008; Iñañez et al. 2010; Reynoso Ramos 2004). Thus, these wares were likely available for intraregional exchange within central Veracruz (although this supposition requires testing). In Pensacola, administrators and officers likely had more control than casta soldiers or convicts over imported resources, acting as intermediaries or "brokers" of these goods (see Burt 1992, 2005; Clune et al. 2003:65-66; Roberts Thompson 2012). Unequal distribution of imported lead-glazed wares or even plainwares in Pensacola would not necessarily represent overt signaling, but it could demonstrate "hoarding" of limited resources and indicate stronger external connections (see Tilly 1998:147-169).

Strength of Regional Connections

I conceptualized this mechanism, in part, based on the work of a growing number of archaeologists who have demonstrated that regional trade networks played a key role in the transformation of material traditions (see discussion in Voss 2008b:866). As a relational mechanism, it is the strength of regional social ties – forged through exchange relationships – that is the key characteristic of this mechanism. Sociologist Mark Granovetter (1973) measured the strength of social ties in terms of time dedication, emotional investment, intimacy, and reciprocal transactions. I measure the strength of regional connections using pottery consumption as a proxy for the strength of regional interaction (see Peeples 2018).

Provenance and technological style analyses provide data on the strength of exchange relationships between the study contexts and their surrounding communities within the region. Historical research suggests that urban centers in colonial Mexico, including Veracruz, were dependent on their hinterlands to supply bulk goods (García Ruiz and López Romero 2011:138–139; Garner 1993:91-99,175-176; Hernández Aranda 2009). As limited provenance studies in Mexico suggest, this included lead-glazed and probably plain utilitarian wares. In Veracruz, the port's location along the main axis of exchange between Mexican urban centers and Europe raises questions about the effect of the town's function and location on their relational connections with communities and colonial settlements in the region. In Pensacola, scholars have shown that convicts, soldiers, and officers occupying the presidios were variably dependent on native populations in Florida and the French in Mobile (e.g., Eschbach 2005,2007; Johnson 1999; Harris 1999,2003; Roberts 2009).

Analyses of the distribution of utilitarian pottery facilitates the diachronic assessment of the strength of regional connections between casta colonists, officers and administrators, and neighboring native and French communities. Numerous studies have found that colonial use of indigenous and African manufactured materials was the result of a settlement's location within regional trade networks (e.g., Charlton and Fournier García 1993; Van Buren 1999; see also Voss 2008b:866). Repeated regional interactions can develop into durable social and economic networks that potentially transform relational identities (see Diani 2007; McAdam 2003; Tilly 2001a, 2001b).

Labor Mobility

Over the last two decades, archaeologists have been increasingly interested in labor's role in the transformation of Spanish colonial society (see discussion and comments in Voss 2008b). From the beginning of the conquest, the colonial hierarchy was organized from the top down to justify the control of colonial resources and labor (Mörner 1967; Seed 1982; Schwaller 2016). Within the idealized structure of the géneros de gente and the later sistema de casta, individuals at the bottom of the hierarchy supplied labor, while those above them reaped the benefits. Labor mobility refers to shifts in labor relations and the position of individuals or groups within the colonial labor system. This may include the ability of an individual or group to move up or down the labor hierarchy. Labor mobility would include (but is not limited to) socioeconomic mobility, which I evaluate using historical data.

Provenance and technological style analyses provide data not only concerning the strength of exchange relationships, but also on the evolving structure of labor relations. Examination of pottery production offers nuance for better understanding shifts in the labor relations that structured colonial Pensacola and Veracruz. In Florida, it is generally assumed that indigenous artisans were the only source for locally produced pottery, using only traditional native technology, with the exception of some alterations in pottery forms (see Deagan 1987:103-104; Melcher 2011:8). Dependence on indigenous labor for pottery production recasts the role of casta colonists. While castas were an important part of the labor force in Veracruz and Pensacola, castas may have invested in learning crafts other than pottery, such as carpentry in Pensacola (see Childers and Cotter 1998;

Eschbach 2007). Such behavior would allow castas to distinguish themselves from local indigenous groups based upon different positions within the local labor system.

Alternatively, castas could have contributed to pottery production in Pensacola, as they had in colonial Mexico. Castas were an important labor force in New Spain, often working as artisans in order to raise their socioeconomic positions (e.g., Carroll 1991; Castleman 2001; Seed 1982). In addition, crafting with certain technologies, such as the potter's wheel, kiln, or lead glazes provided a means for creating distinctions between casta and indigenous potters, such as the Apalachee and Yamasee. Knowledge of diverse manufacturing techniques could have been brought from communities in Mexico and then adapted to Florida resources. Labor relations, thus, also offer an entry point for examining the ways that locally produced materials, technology, and traditions entered colonial households (see Silliman 2001 and Voss 2008b).

In order to assess these labor relations, I analyze the chemical composition of plain, lead-glazed, and painted/slipped wares in order to identify pottery produced in Veracruz versus Northwest Florida. Analysis of the technological styles used to manufacture these and decorated native pottery from a neighboring Florida mission permits the discrimination between local pottery produced by castas and Florida indigenous products in Pensacola.

Gendered Brokerage

Gender brokerage is a relational mechanism explicitly adapted from the seminal work of Kathleen Deagan (1974, 1983) and her students (e.g., Ewen 1991) at St. Augustine and in the Caribbean. In this case, brokerage refers to the role of women (mainly native and African) as cultural brokers who bridged the gap between native or

African descendant communities and colonial households. Because most European colonists were men, Deagan (1983) argued that at the household scale female brokers introduced regionally produced utilitarian wares into low visibility domestic spheres (e.g., Deagan 1974, 1983; Ewen 1991). According to this "St. Augustine pattern," indigenous material culture found in colonial households should *only* be associated with private domestic contexts. Deagan attributed the incorporation of non-European materiality into domestic spheres as a key mechanism for the transformation of Spanish colonial society (Deagan 2001:194, 2003:8).[7] Accumulating data, however, demonstrate that the St. Augustine pattern is not an adequate pan-American model (see Chapter 2 and critique in Voss 2008b). I, therefore, examine this potential relational mechanism of change in Veracruz and Florida as one among several possible mechanisms of change.

Regional Categorical Activation

Regional categorical activation refers to the signaling of social categories that are formed and recognizable at a regional scale. Imperial institutions used formal categories to control populations at very large scales. Yet, these were not the only categorical identities used in colonial New Spain. In central Veracruz, there were a number of native language groups, such as Nahua and Totonac. In the Southeastern United States, native populations, such as the Apalachee and Yamasee, also were clearly distinguished in documents and even occupied separate missions in Pensacola. The relationship between historically documented native groups and pottery styles is complex and debated (see Pigott 2015; Stark and Eshbach 2018:104-105; Worth 2009a). Nevertheless, I suggest overt regional styles were meaningful for activating new or existing categorical identities.

In some cases, indigenous networks provided colonists with highly visible materials, such as decorated serving vessels (Loren 1999; Rodriguez-Alegría 2005a, 2005b; Van Buren 1999). Interpreting individual motives for use of indigenous serving wares in colonial contexts is often problematic, requiring careful attention to historical data and specific social and economic relations (see Charlton and Fournier García 2010). In Pensacola, many indigenous pottery forms required modification in order to make them suitable for the Spanish table (Melcher 2011:8). These modified tablewares have been placed within a broad colono ware category and are relatively scarce in Florida contexts (e.g., Cordell 2001; Deagan 1987; Melcher 2011). Colono wares are handmade, low-fired pottery that takes "European" forms and are either attributed to African slaves or indigenous peoples (Deagan 1987:103; Vernon and Cordell 1993:418) -- although production by castas should not be ruled out. The production and use of colono wares created new stylistic expressions of categorical identity.

Adding to the complexity of regional categorical identities, I argue that it is also possible that casta colonists in Pensacola brought aspects of their own regional categorical identities with them and conveyed those identities through the production and consumption of highly visible stylistic forms of material culture. Regardless of the specific intentions of colonists, their use of regional styles of serving vessels that seemingly ran contrary to official ideals could blur formal categorical distinctions and lend to the signaling of new regional identities.

My objective for this project is to assess the mechanisms involved in transforming relational and categorical identification in Veracruz and Florida using both historical and archaeological data. Through this research, I ultimately identify reoccurring sequences of relational mechanisms that I argue concatenated into four causal processes of colonial social transformation.

Organization of Chapters

In Chapter 2, I provide an overview of my theoretical framework with a review of the relevant literature and a discussion of key concepts. In the two chapters that follow, I examine mechanisms of social transformation historical perspective. In Chapter 3, I review secondary historical sources to elucidate the environmental, cognitive, and relational mechanisms involved in three large-scale social transformations in colonial New Spain. Then, in Chapter 4, I examine social change and the causal mechanisms responsible for those changes for my two case studies: the colonial Port of Veracruz and the Pensacola presidios.

In Chapter 5-9, I turn to the archaeological perspective. Beginning with Chapter 5, I review material approaches for assessing categorical and relational modes of identification, describe pottery categories considered in this dissertation, and outline my framework for analyzing pottery technological styles. In Chapter 6, I discuss archaeological data and laboratory methods used to examine the technological style and provenance of pottery. In Chapters 7 and 8, I present the results of the technological style analysis and provenance study. In Chapter 9, I integrate the results of the technological style and provenance studies, along with electronically available data on categories of pottery that are already well-understood, to assess the relational mechanisms that shaped the transformation of social relations in Veracruz and Pensacola. Finally, in Chapter 10, I synthesize the results of both the historical and archaeological perspectives, identifying the recurring series of mechanisms that make up four explanatory processes of colonial transformation. I end by considering the contributions of this research framework to the study of empires cross-culturally and briefly discuss future research directions.

[1] Most of the convict laborers, soldiers, and settlers were from Mexico, and many, if not most, were castas. There were certainly also some criollos (American-born Spaniards) and peninsulares (European Spaniards) among them. It is likely that some colonists were also "passing" as criollos – a practice that was becoming quite common by the eighteenth century, particularly following movement to a new location. I, therefore, use the term casta throughout this dissertation as a general gloss to refer to the majority of the presidio population that was from Mexico and was culturally, and, in many cases, biologically mixed. I recognize that there were exceptions, however, particularly among administrators and officers, many of whom were from Spain (see Chapter 4 for a full discussion of the presidio demographics).

[2] Mexican anthropologist Aguirre Beltrán (1946) coined the academic term "Afromestizo" to refer to castas of mixed African, European, and Native heritage. Aguirre Beltrán's emphasis in using this term was on the group's African heritage, contra the labels Euromestizo or Indiomestizo, which he also coined. In contrast to its original usage, I use the term Afromestizo to emphasize the *pluralistic* heritage of these individuals.

[3] Don Antonio Dionicio Garrote was the paymaster at presidio Santa Rosa in 1741 and likely the primary author of the Reales Listas (see Royal Order 1741).

[4] Historians, sociologists, and archaeologists frequently use the term "mestizaje" (among other concepts) to refer to biological mixing that produced mestizo populations. I am not using the term here for two reasons. First, I wish to avoid theoretical and political ideas that are often attached to the term both in modern and historical parlance (e.g., Vinson 2017; see also Chapter 2). Second, mestizaje generally sidestep the role of people of African descent in this process.

[5] Tilly (1998:206-228) has highlighted how collective action can reshape asymmetrical relations, potentially leading to changes in categorical identities.

[6] Incentive shift is related to two additional mechanisms of categorical inequality that Tilly (1998; 2001a) terms exploitation and opportunity hoarding. *Exploitation* refers to situations in which powerful individuals and groups draw resources from a population who are excluded from the full benefits of those resources. *Opportunity hoarding* refers to the limitations placed on access to certain valuable resources.

[7] The short-hand for Deagan's theory, coined the St. Augustine "Pattern," reflects a contemporary interest among historical archaeologists in artifact pattern recognition as espoused by Stanley South (1978) during the 1970s and 1980s. South's focus was on general patterns observed among British colonial contexts. The *Frontier Pattern*, for example, documented a high ratio of architectural materials to kitchen related artifacts at British frontier military sites. The idea was that consistent artifact patterns identified for contexts with a historically documented function would assist in identifying the function of historical period sites that were *not* historically documented. Despite the naming convention commonly attributed to Deagan's (1974,1983) framework, the St. Augustine pattern was more than just an empirically observed artifact pattern. Deagan theorized about the causal mechanisms, particularly gender-ethnic brokerage at the household scale, that drove Spanish colonial culture change. She eventually asserted that gender-ethnic brokerage was central for explaining change in all Spanish colonial contexts. In addition, archaeologists studying other cultural contexts, such as ancient Mesopotamia (e.g., Stein 2012)

and Greece (e.g., Hodos 1999), have since adopted her model for studying colonial transformations more generally.

CHAPTER 2

REFRAMING COLONIAL TRANSFORMATIONS IN THE SPANISH AMERICAN EMPIRE

In this chapter, I provide a more in-depth discussion of theoretical concepts crucial for my research. I describe key concepts and a theoretical framework that updates previous approaches to the study of colonial transformations. This discussion is divided into five sections. First, because this project covers two regions and cross-cuts disciplines, I begin with a brief overview of historical, anthropological, and archaeological research on the Spanish American empire in Mesoamerica and the borderlands. Second, I describe insights and critiques drawn from previous conceptual frameworks and middle-range theories of colonial transformation. Because social identity is the central concept underlying these frameworks, in the third section I describe traditional anthropological approaches to ethnicity, race, class, and status. In the fourth section, in order to reframe traditional approaches, I outline key concepts drawn from historical sociology and political science on social identification, transformations, and mechanism-based approaches to explaining social change. In the final section, I use these concepts to update previous frameworks of colonial transformation to develop a model that is the basis for this study.

Research on the Spanish American Empire: Colonial Mesoamerica and the Borderlands

My research spans two regions within the viceroyalty of New Spain that, for decades, were studied in near academic isolation. Investigations of colonial Mesoamerica and the borderlands follow unique trajectories that resulted from distinct colonial and academic histories, which until the late twentieth century rarely overlapped. Geographically, New Spain included all Spanish controlled territories north of the Isthmus of Panama. Academically, the divide between the regions is formed by the border between Mexico and the United States (Weber 2005). Not only does my research cross international borders, but also disciplines. The earliest colonial research in both regions was historical and anthropological with archaeological studies lagging behind until the second half of the twentieth century (see Deagan 1998, 2001; Keen 1985; Gasco et al. 1997; Restall 2003, 2012; Weber 2005). I briefly review historical, anthropological, and archaeological research on the Spanish American Empire in each region, with a specific focus on investigations of the relationship between imperial institutions and colonial transformations.

Colonial Mesoamerica: History, Anthropology, and Archaeology

Historical literature on colonial Mesoamerica is enormous and begins with the Spanish conquest itself and the accounts of sixteenth century conquistadores, such as Hernán Cortés (2010[1519-1534]) and Bernal Díaz del Castillo (1963[1632]). Since the Spanish conquest, historical approaches have progressed through a series of stages, examined in several excellent reviews (Barber and Berdan 1998:23-29; Chance 1996; Cline 1972; Gibson and Keen 1957; Keen 1985; Lockhart 1992:2-5; Restall 2012). Lockhart (1992:2) suggests that the first stage is epitomized by the early nineteenth century work of William H. Prescott (1843), emphasizing epic narratives of conquest and conflict.

The second stage of historical scholarship, often called the revisionist era, began at the end of the nineteenth century and is of more interest because of the shift in focus toward formal institutions and the relationship between Spanish colonists and indigenous people (Keen 1985). Historians used chronicles, law codes, and the reports of officials and priests to study every detail of imperial policies and colonial responses. There was an unfortunate propensity by historians to uncritically accept official documents as accurate reflections of reality (Lynch 1992:69). Interpretive notions developed that indigenous cultures and social structures were simply replaced by European equivalents. Lockhart (1992: 3) traces this "displacement model" to formal accounts by mendicant friars who claimed that they had converted millions of natives to Christianity and brought civilization to the indigenous populations. Based on these accounts, historians assumed that social transformations after the Spanish conquest were unidirectional (e.g., Robert Ricard (1966 [1933]).

Some historians drew further interpretations from Spanish laws that highlighted the two republics of New Spain. One republic was for Spaniards who were living in urban centers. The other was for indigenous towns and villages located in the hinterlands. This perceived geographical and political separation inspired the notion that some native cultures survived unchanged outside the reach of Spanish influence (Lockhart 1992:3). In anthropology, contemporary ethnographers supported these interpretations with reports of "pristine" pre-colonial traditions that persisted in isolated areas (Lockhart 1992:3).

Historiographies of twentieth century scholarship tend to focus on the biased treatment of indigenous peoples who were portrayed as passive agents of colonial transformation (e.g., Barber and Berdan 1998; Chase 1996; Cline 1972; Lockhart 1992:2-4; Restall 2003, 2012). Historians' early dependence on official sources also rendered faulty interpretations of Spanish colonists. Institutionalists assumed that Spanish laws were obeyed and interpretations generally were devoid of any political negotiation between colonists and the imperial state (Lynch 1992:70). Colonial elites were described as passive agents of the Spanish empire (Keen 1985:668-669; Lynch 1992:70). In reality, Spanish officials and other colonists had their own agendas and interests in America, and they obeyed, modified, evaded, or resisted colonial laws (Lynch 1992:70).

The new colonial historiography of the second half of the twentieth century was deeply influenced by scholarship from outside the field, particularly from the social sciences (Keen 1985). For instance, the well-known Berkeley school of demographics and economics brought together the methods of geographers, environment physiologists, and historians to the study of pre-conquest native populations (e.g., Borah and Cook 1963; Cook and Simpson 1948). These scientific studies contradicted earlier population estimates, suggesting that 1492 populations were far greater than previously accepted. Correspondingly, native depopulation estimates following conquest were as high as 90 percent. Such estimates challenged contemporary notions that Spanish colonists were the benevolent bearers of civilization to Mesoamerica (Keen 1985:670).

Anthropology contributed substantially to a new direction in historical scholarship. Franz Boas and his students espoused a cultural relativism that sought to correct revisionist narratives of European superiority (Barber and Berdan 1998:12,25; Keen 1985:671). The later resurgence of evolutionism restored the historical approach to anthropology and paved the way for Spanish colonial studies (e.g., Service 1954; Wolf 1959; Foster 1960). The major turning point in the new colonial historiography was the work of Charles Gibson. Trained in both anthropology and history, Gibson's (1964) work, particularly his seminal book *The Aztecs under Spanish Rule,* shifted focus from Spanish elites to indigenous people. His work also highlighted continuity in native social structures that were essential for the success of the Spanish imperial project (Keen 1985:671; Lockhart 1992:3-4).

During the mid-twentieth century, ethnohistory developed as an interdisciplinary field with roots in cultural anthropology, archaeology, history, and other fields (Barber and Berdan 1998:26-27; Chance 1996:380; Cline 1972). Although ethnohistory has been defined in numerous ways, Barber and Berdan (1998:12) characterize the field by its reliance on documents and other sources, as well as the incorporation of historiography and cultural relativism, in order to study past behavior and cultural interaction. Although this broad definition encompasses a wide breadth of subjects, most scholarship has focused on indigenous people, particularly during contact and the early colonial period (Barber and Berdan 1998:26-29; Chance 1996:381). This trend continued into the late twentieth century with the New Philology, a movement led by historian James Lockhart (1992) to study the past using native language documents (see also Restall 2003, 2012; Terraciano 2001).

Over the last several decades, studies of imperial institutions have been reframed by focusing on the responses of local officials, colonists, and native people (Keen 1985: 679; Lynch 1992). A new generation of historians has drawn on social and anthropological theory and have expanded their textual sources to include notarial records, court testimonies, wills, and other documents (Keen 1985:680). It is now understood that imperial control required constant negotiation between officials located at multiple levels in the imperial bureaucracy, both in Europe and in their distant colonies (Lynch 1992:70). Far removed from the imperial center, colonial agents were influenced by their own agendas and competing interests within their region of jurisdiction or local community. As a result, the phrase "*yo obedezco, pero no cumplo"* (I obey but do not comply) became a common response to the dictates of the Spanish Crown (Stein and Stein 1970:74-75; McAlister 1984:203-204; Miller 1991:173). Moreover, it was not only responses of elites and local officials that influenced changes in the imperial system. Textual research has shown that the social and economic choices of low status castas, African, and indigenous people also could induce change in the structure of colonial society (e.g., Boyer 1997; Carroll 1991; Chance 1978; Cope 1994; Restall 2005; Seed 1982).

Archaeology as a field of study for colonial Mesoamerica developed only over the last several decades. Historical archaeology is typically defined either methodologically or topically (Orser 1996:23-28). Methodologically, one of the unique strengths of historical archaeology is its simultaneous access to two independent lines of evidence: documentary and material. Each provides complementary sources of evidence that vary in their advantages and limitations. For example, textual analysis is often constrained by selective documentation, personal or cultural bias, and motives or competence of the author (see Barber and Berdan 1998 and Howell and Prevenier 2001 for full discussion of textual limitations and interpretive methods). Archaeological interpretations are limited by spatio-temporal scale, site formation processes, preservation of material in the ground, and the field methods used to recover and record data. Although historical and archaeological evidence are quite different, they also are complementary. For example, textual analyses can privilege a top-down perspective from the perspective of the dominate society, a tendency that archaeology can help mitigate (Alexander 1998:479).

As Alison Wylie (1989) has effectively argued, using multiple "cables" of independent evidence bolsters empirical interpretations of the past.

As it has developed in America, historical archaeology traditionally has been defined topically as a subfield that studies the modern world, beginning with the fifteenth century spread of European culture (Deetz 1977:5; Orser 1996:26-28; Schuyler 1970). Under this definition, two major topics have formed over-arching modes of inquiry. The first is the advance of capitalism and industrialization. The second is the concept of colonialism and its role in shaping the modern world. These topics also are important in Eric Wolf's (1982) volume, *Europe and People Without History,* though his work does not incorporate archaeology (Little 1994; Orser 1996:36-38; Schuyler 1988:41).

An emphasis on colonialism and the desire for a broader comparative basis for historical archaeology has led, in recent years, to the rejection of "modern" constraints on colonial archaeology (Gosden 2004:6). There is now a growing interest in empires and colonialism from all regions and time periods (e.g, Gosden 2004; Stein 2005). This is the view taken in this study. As discussed in Chapter 1, I adopt Doyle's (1986:30) behavioral characterization of empires as "effective control, whether formal or informal, of a subordinate society by an imperial society." For colonialism, I employ a broad definition that entails the *process* by which a group of people establishes a settlement in a foreign territory, while maintaining a connection to their homeland (Stein 2005:10-13). Stein's definition of colonialism intentionally removes the presumption of an unequal power relationship (c.f. Given 2004). Colonialism within the context of imperialism infers an unequal power relationship, however.

Research that uses methods from both history and archaeology is advantageous, particularly for understanding the co-evolution of imperial policies and colonial transformations. Historians have provided extensive information on adjustments to imperial policies (e.g., Chaunu 1969; Crouch et al. 1982; Haring 1947; McAllister 1984; Parry 1964, 1966; Vicen Vives 1961, 1969; Zavala 1967) and, more recently, the responses of colonial people (e.g., Chance 1978; Cope 1994; Restall 2005; Schwaller 2016; Seed 1982). Archaeology provides an independent line of evidence on the behavior and social relations that are selectively described in colonial documents (Deagan 1982, 1988; Little 1994). As Deagan (2001:181) has argued, the "local experience in America for the majority of Spaniards and Indians who participated (albeit not always willingly) in the imperial system is encoded primarily in the materiality of that experience -- that is, in the archaeological record."

Yet despite its value, colonial archaeology of Mesoamerica has lagged behind both in textual research and the development of historical archaeology concentrated on contexts within the United States. This delay was due largely to a lack of governmental support and training programs for students (Fournier García and Miranda Flores 1992; Gasco et al. 1997). In Mexico, archaeological research mainly has focused on pre-Hispanic periods and most archaeologists who study the colonial period were trained in "prehistoric" methods and theory.

The earliest colonial period project in Mexico was undertaken by Noguera in 1934 (Noguera 1934 cited in Fournier García and Miranda Flores 1992:76). Noguera examined ceramics to assess stylistic and technological change before and after European contact. Though his work was an important first step, general focus on the colonial period did not become common until thirty years later. Beginning in the 1960s, colonial period archaeology in Mexico increased, but research was characterized by either salvage work or larger projects in which data was collected from all periods (Fournier García and Miranda Flores 1992).

A decade later, architectural restoration added an archaeological component (Fournier García and Miranda Flores 1992:76-77). In these early projects, archaeologists focused on architecture and artifacts with an emphasis on ceramics in terms of classification techniques, change during the contact period, and continuity of indigenous forms (Gasco et al. 1997:3; Fournier García and Miranda Flores 1992:76). New approaches, influenced by processual and post-processual trends in the United States, began to appear in Mesoamerican colonial archaeology during the 1980s and 1990s. Since then, greater attention has been given to such topics as economic exchange, socioeconomic relations, inequality, ethnicity, resistance, acculturation, creolization, transculturation, and hybridity (e.g., Card 2007, 2013a; Charlton 1986; Charlton and Fournier García 1993, 2010; Funari 2007; Funari et al. 1999, 2005; Gasco 1993, 2005a, 2005b; Gasco et al. 1997; Pendergast 1991; Rodriguez Alegría 2002, 2005a, 2005b; Rodriguez Alegría et al. 2013; Sampeck 2010; Zeitlin and Thomas 1997; Zeitlin 2005).

Spanish Borderlands: History, Anthropology and Archaeology

Historian Herbert Eugene Bolton coined the term "Spanish borderlands" in a book of the same title in 1921. As defined by Bolton, the borderlands encompass the region of the Spanish colonial frontier that falls within the boundaries of the United States from California to Florida. The region is, therefore, based on the geography of a nation that did not exist during the period that this study examines. Bolton's aim in defining this region was to highlight the contribution of Spanish explorers and colonists to the history of the United States (Weber 2005:44). His goal was only partially successful as many historians of the United States considered this region under the purview of Latin America, while Latin American historians largely dismissed the borderlands as part of the history of the United States. Although a large volume of historical writing was produced within the borderlands, this work was largely ignored outside of the region. Consequently, the boundaries of the borderlands were academic and political (Weber 1987:7, 2005).

Early Boltonian scholars working in the borderlands subscribed to the biases common of the revisionist era. Spanish colonists were portrayed in an overly positive light as romantic explorers or deliverers of civilization (Keen 1985; Weber 1989:11, 2005). At least some of this bias was a reaction against anti-Spanish prejudice found in much of the American writing at that time (Weber 1987:7). Still, emphasis was placed on institutions and elites, with narrative methods taking precedence over historical analysis. One positive development of this early period was the publication of a large volume of transcribed and translated primary documents. This work was essential for the fledging historiography of the region (Weber 2005:45).

By the 1960s and 1970s, social historians and ethnohistorians also were working in the borderlands, examining the lives of indigenous and other marginal classes of people (Weber 1987:7, 2005:47-48). Yet, much of this work was highly fragmented, both by topic and region. Some ethnohistorians overly sympathized with native people, while social historians continued to emphasize the role of Spanish explorers, settlers, and missionaries in borderland history. This situation had the tendency of reinforcing a dichotomy between the colonized and colonizer (Weber 2005:48-49). Geographically, scholars in the eastern borderlands of Georgia, Florida, and Louisiana worked in isolation, not only from colonial Mesoamerica, but from specialists working in the western borderlands (Weber 1987:7).

A major shift in Spanish borderland research occurred with the approaching Quincentenary of Columbus's voyage to America, the southward drift of population centers, and the growing political power of Latino populations in the United States (Deagan 1998; Weber 2005:44-45). Beginning in the 1990s, increasing attention was given to borderland research from outside the region. Influential historical works, such as Gutiérrez's (1991) *When Jesus Came, the Corn Mothers Went Away* and Brooks's (2002) *Captives and Cousins: Slavery, Kinship, and Community in Southwest Borderlands,* eroded the dividing lines between colonized and colonizer perspectives (Weber 2005:49; see also Lightfoot 2004). The artificial southern boundary of the borderlands, likewise, was already in the process of disintegration as Latin American historians incorporated frontier regions within broader frontier research that extended into North Mexico and the Caribbean (Thomas 1989:3; Weber 1989:11, 2005:49; but also see Weber 1987:342). Meanwhile, John Francis Bannon's (1970) *Spanish Borderlands, 1513-1821* and David J. Weber's (1992) *The Spanish Frontier in North America* attempted to reunite the east and west borderlands by examining the history of both regions within single volumes.

As in Mesoamerica, archaeology offers an additional line of evidence for examining social relations and colonial transformations in the borderlands. Historical archaeology had an early start in the United States, in large part due to Depression era works projects. The Historic Sites Act of 1935 called for the preservation of "historic sites, buildings, and objects of national significance." The result was numerous programs of large-scale excavations oriented toward Euro-American sites, such as Jamestown, Fort Frederica, trading posts, and Spanish missions (Deagan 1982:155). Most of this work was geared toward architectural reconstruction and interpretive tourism. In the early twentieth century, historical archaeologists came from a number of fields, including anthropology and history. The result was a field of study that was more social history than archaeology (Deagan 1982:158).

In the 1960s, historical archaeology reached an identity crisis (Cleland and Fitting 1968; Deagan 1982:156). In the wake of developing processual archaeology, anthropologically trained archaeologists questioned the aims of historical archaeology (Schuyler 1970). A decade later, most historical archaeologists claimed an anthropological orientation that focused on cultural processes (Deagan 1982; Orser 1996). One important development from this shift was an increased concern for "people without history" -- those who were poorly documented in textual sources, such as native people, Africans, and castas (Deagan 1988a; Little 1994; Wolf 1982).

Colonial archaeology of the Spanish borderlands was relatively rare until the 1980s (Deagan 1998:24; 2001:182). Much of the archaeology of the Spanish Empire was inspired by the Columbian Quincentenary (e.g., Thomas 1989, 1990, 1991), and influenced by a long history of textual, anthropological, and sociological research (Foster 1960; Spicer 1961; Tax 1952). As in the field of history, the 500th anniversary of Columbus's voyage brought attention to the borderlands and increased communication and collaboration between the east and west borderlands, and colonial Mesoamerica (Deagan 1998; Fournier García and Miranda Flores 1992; Gasco et al. 1997). Perhaps the best example of this shift was the *Columbian Consequences* seminar series that involved more than 100 archaeologists and historians from the east and west borderlands, as well as scholars working south of the United States border in Mexico, the Caribbean, and elsewhere (Thomas 1989, 1990, 1991).

A central topic of much archaeology research dealt with culture change along the Spanish frontier. In the borderlands, early analyses of culture change were influenced by core-periphery models that were adopted for frontier research (Lightfoot and Martinez 1995; Wallerstein 1974). Core-periphery models conceptualized frontiers as sharp territorial markers that clearly separated colonial territories from outlying native communities (Lightfoot and Martinez 1998:472). Within frontier zones, colonial people were perceived as recipients of cultural innovations from the core, while the role of indigenous people were marginalized (Biersack 1991:11; Lightfoot and Martinez 1995:475; Wolf 1982:23). These models stressed culture change from the top-down and reinforced monolithic perceptions of colonizers and colonized people. Hudson (1969), Lewis (1984), and others argued that discrete boundaries were located along the colonial frontiers and should be distinctly visible in the archaeological record (Lightfoot and Martinez 1995:479). The underlying assumption is that intense competition for "space, resources, and power" will result in tightly bounded social units that are reflected in the material culture of competing groups (Lightfoot and Martinez 1995:478).

The rapid increase in new research inspired by the Quincentenary led to a rethinking of older models of culture change and the introduction of new frameworks for multi-directional colonial transformation (Deagan 1998:25). Ethnographic and archaeological investigations of social boundaries demonstrate that diagnostic material culture that is associated with linguistic, ethnic, or cultural groups tend to merge along the edges (e.g., Cordell and Yannie 1991; DeCorse 1989; Gosselain 1998; Shennan 1989; Stark et al. 1998; Trinkaus 1994; Worth 2009a). In the context of this re-conceptualization, Lightfoot and Martinez (1995) have redefined colonial frontiers as "zones of cultural interfaces in which cross-cutting and overlapping social units can be defined and recombined at different spatial and temporal scales of analysis" (Lightfoot and Martinez 1995:472; see also Schortman and Urban 1992). This view of the colonial frontier recognizes that colonists and indigenous people had diverse cultural backgrounds and agendas and that internal competition existed within colonizer and native groups (Lightfoot and Martinez 1995: 483). Both internal competition and interaction across perceived social boundaries played important roles in colonial transformations. In the following section, I provide an overview of previous frameworks used to examine social transformations in colonial Mesoamerica and the borderlands.

Previous Frameworks for Colonial Transformation

In this section, I briefly review the general conceptual frameworks that colonial archaeologists have adopted for the study of colonial transformations in Mesoamerica and the borderlands. The most influential and long lasting of these frameworks is acculturation. A variety of general frameworks were later adopted in order to address weaknesses in acculturation, such as a monolithic treatment of colonizers and colonized people and unidirectional culture change. I described the differences between these later frameworks and new problems that have developed from their inconsistent usage. Next, I discuss two influential middle-range theories for explaining colonial transformation. These theories were significant because they were easily operationalized and could be tested empirically. As research has accumulated in the borderlands and Mesoamerica, these theories have come under increased criticism. I briefly describe recent critiques and new trends in colonial research.

General Conceptual Frameworks

Liebmann (2013:27) points out that culture change can take place through invention, divergence, and convergence. Invention is the rarest and is defined by the creation of new styles, technologies, or behaviors without an antecedent. Divergence is more common and evolutionary in nature, involving gradual change and branching off of different forms. Though divergence has been the most frequently studied form of cultural change, convergence is historically the most common. Convergence is the recombination of two or more forms in order to create something new and different. Given the sudden encounters between Europeans, indigenous, and African people that began in the fifteenth century, it is not surprising that convergence is the basis for most frameworks used in colonial studies. The breadth of research devoted to the process of colonial transformation is evident in the number of conceptual frameworks that have been adopted. These frameworks include acculturation, syncretization, transculturation, creolization, *mestizaje,* ethnogenesis, and hybridity (Table 2.1).

Acculturation. Acculturation has the longest history in anthropology with many other frameworks only achieving popularity during or after the 1980s. Most later frameworks were adopted in reaction to perceived weaknesses in acculturation approaches, though rarely did models completely depart from the existing paradigm. As Cusick (1998:136) notes "it is questionable whether current scholars can really escape from the historical development of their field." Acculturation, therefore, laid the basis for more than 80 years of anthropological research on colonial transformations throughout the Americas.

Table 2.1. Previous Conceptual Frameworks for Colonial Transformations

Framework	Major Works	Distinctions
Acculturation	Redfield et al. 1936, Lesser 1933; Spicer 1971; Gordon 1964; Linton 1940; Foster 1960	Monolithic cultures; ignores power relations; Assumes preexisting purity of bounded cultures; selection or screening mechanisms; trait lists
Syncretism		Typically focused on religion Assumes preexisting purity of bounded cultures
Transculturation	Ortiz 1947	Multi-directional; diverse colonizer/colonized culture; involves disadjustment, readjustmest, deculturation and acculturation; accounts for unequal power relations
Creolization	Dawdy 2000; Deetz 1996; Ferguson 1992; Loren 2005, 2008; Mouer 1993; Nassaney 2004, 2005	Emphasizes change in diasporic groups; does not ignore change in indigenous population; borrows metaphor from linguistics
Mestizaje	Deagan 1983, 1996	Similar to creolization; specific to Spanish colonies; develops out of historical "criollo"; heavily focuses on diasporic groups; assumes preexisting purity of bounded cultures
Ethnogenesis	Singer 1962; Sturtevant 1971	creation of new social identities by structural transformation; continuing behavioral process, not essential characteristics; studies subordinated groups, but dominant groups not ignored; central role of power relations
Hybridity	Homi Bhabha 1994; Stuart Hall 1990; and Robert Young 1995	Emphasizes that *all* cultures are mixed; emphasis on agency and resistance; reworking, not just a recombination; multi-directional ebb and flow; diachronic, rather than synchronic emphasis

Though mistakenly critiqued as a single body of theory, acculturation models actually follow several formulations (Cusick 1998). Two of the more common criticisms of acculturation are that culture change is interpreted as unidirectional and power relationships are often ignored. This, however, has not always been the case. In an early article, Redfield et al. (1936:149) defined acculturation as "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural patterns of either or both groups." This definition allowed for multi-directional culture change. Subsequent use of the framework, however, focused on the loss of "traditional" indigenous culture and the adoption of European traditions and technologies. Colonized people were frequently described as passive recipients of European culture (e.g., Linton 1940; Quimby and Spoehr 1951; see overviews in Cusick 1998 and Lightfoot 1995).

Archaeologists used trait lists to quantitatively measure the degree of acculturation based on the ratio of European materials recovered from indigenous contexts (Cusick 1998:135; Deetz 1963; Lightfoot 1995:206; Saunders 1998:417-418;). Such measures do not account for the complexity of colonial circumstances. For example, adoption of "European" tools, at times, simply replaced traditional native materials, serving a similar function without any structural transformation (Lightfoot 1995:206-207; Rogers 1990; Worth 2006:201). In other cases, "European" materials were produced in America by indigenous people for use by colonizers, natives, Africans, and castas of mixed ancestry (Lightfoot 1995:207; Voss 2012). Nor do these studies account for the production of new forms of material culture produced by mixed populations or for adoption of indigenous material culture by diverse colonizers (Lightfoot 1995:207; also see Voss 2008b).

The role of power dynamics was not addressed in Redfield et al.'s (1936) definition for acculturation. This neutrality ran counter to earlier conceptions of acculturation by Alexander Lesser (1933; see also Mead 1932). Lesser argued that acculturation was a process that occurred only in contact situations where power relations were equal. He contrasted acculturation with unequal contact in which forced assimilation and resistance are expected (see Cusick 1998:128). The widespread influence of Redfield's definition led to the omission of power relations in the framing of colonial culture change (Howson 1990:84). Indigenous people were treated as the passive recipients of European culture, while colonizers were monolithic and static (Liebmann 2013:27; Lightfoot 1995:200, 206). Investigations of cultural persistence or resistance to change were uncommon (Cusick 1998:135; but see Spicer 1971). Because of these problems, over the last several decades, archaeologists have sought alternate frameworks for analyzing colonial transformations.

Syncretism. In America, syncretism was generally accepted by social scientists in its simplest form as "the combination of elements from two or more different religious traditions within a specified frame" (Stewart 1999:58). Outside of the Americas syncretism typically was not accepted, however. Syncretism’s focus on religion has a deep history in Europe dating back to its pejorative use by the Catholic Church in the seventeenth century (Stewart 1999:46). The negative connotation of syncretism that treats cultures as monolithic wholes and cultural mixtures as "impure" was derided by Africanist scholars who often were trained in British social anthropology (Stewart 1999).

Because syncretism frequently was used in the study of subjugated people, it earned a reputation for being unidirectional. Critiques also point out that syncretism frames peaceful mixing of traditions, ignoring any conflict or resistance that may occur when power relations are unequal (Liebmann 2013:28)

Transculturation. Frameworks that became popular in the 1980s and 1990s were multi-directional and ethnogenetic. That is, they proposed the creation of entirely new cultural forms and traditions from multiple active agents (Deagan 1998:23-25). Further, post-processual critiques led to a shift in archaeological research questions aimed at resistance, inequality, and gender roles (Deagan 1998:25; e.g., Little 1994; Paynter and McGuire 1991). Transculturation is the oldest of the ethnogenetic frameworks, first proposed by cultural anthropologist Fernando Ortiz (1947) as an alternative to acculturation in his study of Cuban tobacco and sugar production. Ortiz described transculturation as encounters between diverse cultures that resulted in the "disadjustment and readjustmest, of deculturation and acculturation -- in a word transculturation" (Ortiz 1947:98). Transculturation was notable for highlighting multi-directional culture change and recognition of the diversity within native, European, African, and Asian cultures. In his framework, it was not only native cultures that broke down in colonial settings, but African and European cultures as well. Ortiz accounted for differences in power relations, particularly for African slaves. The value of transculturation was recognized and adopted by Cuban archaeologists, but the concept did not reach North American or Mexican scholars until the Quincentenary (Deagan 1998:28).

Creolization. More common in the southeastern United States and circum-Caribbean are the concepts of creolization and *mestizaje* (Ferguson 1992; Deagan 1996; but also see Card 2007 for a Mesoamerican example). In a special volume of *Historical Archaeology,* devoted to creolization, Dawdy (2000:1) identifies three distinct definitions for creolization, based in either linguistics, cultural, or biological forms. The original definition was drawn from linguistics and can be traced back to the work of James Deetz (1977:147-148; see Dawdy 2000). It was Leland Ferguson (1992), however, who explicitly formulated the concept of creolization, applying it to African descendant communities in South Carolina. Ferguson (1992:xlii) used creolization as a linguistic metaphor, arguing that "material things are part of the lexicon of culture while the ways they were made, used, [and] perceived are part of the grammar." Creolization builds on the concept of creole language construction, which is the recombining of new and existing vocabulary using a conservative grammar or syntax. Like transculturation, creolization advocates multi-directional culture change, but investigations tend to emphasize diasporic societies such as Europeans and Africans in America (e.g., Ferguson 1992; Liebmann 2013:28). Generally, this involves a recombination of European and African forms and the mixing with indigenous traditions to create new colonial cultures. Colono-ware is a classic example of this type of mixing in which vessel forms and manufacturing technology reflect a combination of indigenous and European traditions (Liebmann 2013:28). Ferguson's (1992) formulation also was important for emphasizing power relationships, particularly the inequity of African slave experiences (Dowdy 2000:2).

Dowdy's culturally and biologically based definitions are more similar to formulations of acculturation, transculturation, and syncretism than the original linguistic framework (Cusick 2000:47; Ewen 2000:36). Dowdy's cultural definition of creolization emphasizes the formation of a new colonial culture through local adaptations that may not necessarily include cultural mixing (see also Cusick 2000). Examples of this application include Ewen's (1991, 2000) research on the "crystallization" of Spanish conquest culture at Puerto Real and Cusick's (1993, 2000) analysis of Minorcan households in St. Augustine. Dowdy's biological definition emphasizes both genetic and cultural mixing. Loren (2000), for example, reserves creolization only for the study of biologically mixed castas.

Mestiizaje. Mestizaje (racial mixing) is very similar to the biological definition of creolization, though unlike creolization, mestizaje refers explicitly to Spanish colonial contexts. Mestizaje alludes to the process of biological and cultural mixing between Spanish and indigenous people that produced *mestizos* in the Spain's American colonies. The earliest archaeological formulation of mestizaje can be found in Deagan's (1974) dissertation, which was further developed in her seminal volume on Spanish St. Augustine (Deagan 1983). This work focuses on the interrelationship between native women and Spanish men, often through relationships that produced a mestizo American culture. Studies that use mestizaje are generally multi-directional and explicitly address power relations (see Liebman 2013:29).

Ethnogenesis. Other scholars, such as Barbara Voss (2005, 2008a), have used the concept of ethnogenesis to explain the "creation of a new ethnicity [or social identity more generally] forged through the experiences of colonization and culture contact"

(Voss 2005:465; see also Hu 2013, Voss 2015, and Weik 2014 for recent critiques). Ethnogenesis, then, refers to a very specific form of transformation in the way people identify themselves or are identified by others. The concept of ethnogenesis dates back to the early nineteenth century (see Moore 2004), but was advanced in North America by Lester Singer (1962) in his study of African American identities as a series of stages from emancipation to the civil right movement. William Sturtevant (1971) further popularized the concept in his study of Creek groups that migrated to Florida and culturally transformed into the Seminoles. Singer and Sturtevant argued that social identities were in a continual process of reproduction and transformation. Ethnogenesis is the point in this process in which structural transformation occurs and, therefore, should not be confused with normal identity maintenance or with political, economic, and religious changes (Voss 2015:658-660).

Power relations are explicitly incorporated into studies of ethnogenesis, treating identities as a shared response to external forces, such as colonialism, social discrimination, military conflict, forced migration, and unequal distribution of resources (Voss 2008a:35, 2015:659). Most historical and archaeological studies have focused on the ethnogenesis of subordinate African or indigenous groups (Voss 2015:664; e.g., Restall 2004; Weik 2012). However, ethnogenesis also occurs among dominant groups as a strategy for legitimization and control of resources. Recently, scholars have called for more research on the transformation of colonizers and other dominant groups (Hu 2013:387-389; Voss 2015:664; e.g., Bell 2005; Voss 2005, 2008a).

Hybridity. The most recent incarnation of the culture contact frameworks is hybridity. This framework has only recently joined the archaeologists' conceptual toolbox, largely inspired by the postcolonial scholarship of Stuart Hall (1990), Homi Bhabha (1994), and Robert Young (1995). Notable is the edited volume by Jeb Card (2013) on *The Archaeology of Hybrid Material Culture* that developed from the 2009 Visiting Scholar conference at Southern Illinois University. As the title implies, most chapters focus on material culture that combines "elements of multiple existing stylistic or technological traditions" (Card 2013:1). Although material objects are the focus, the concept of hybridity is used as an entry point for examining identity and social transformations (Deagan 2013:261). A review of this volume makes clear that hybridity, as yet, is theoretically underdeveloped. In his concluding chapter, Silliman (2013:493) notes that "[c]onsensus on its definition, applicability, and appropriateness does not exist." Only a few of the chapters describe the conceptual framework for the treatment of hybridity. Liebmann (2013:31) and Silliman (2013:497), however, both call for a consistent adherence to the postcolonial usage in order to prevent hybridity from becoming simply a synonym with other forms of social transformation.

Postcolonial scholars in the social sciences employ hybridity as a critique of previous frameworks, particularly acculturation. From the postcolonial perspective, hybridity's key characteristics are resistance, subversion, and agency (Liebmann 2013:43; Silliman 2013:495). Hybridity is not just a mixture of two or more "pure" cultures, but a reworking of traditions, often employed to blur power structures (Liebmann 2013:31). An example is the cultural and biological mixing of indigenous, African, and Europeans in the Spanish American colonies. The combining of cultures eroded elite and institutional attempts to maintain separate "republics" for indigenous and European people. Elites created new racial categories in an attempt to maintain control of casta behavior and limit social mobility. However, by altering their behavior and use of material culture, castas were able to subvert the casta system (Boyer 1997; Cope 1994). Hybridity, then, explicitly incorporates power relations into processes of cultural transformation. In fact, some postcolonial scholars suggest hybridity is best applied in situations where power is unequally distributed (Liebmann 2013:31).

Hybridity also counteracts perceptions of cultures as "pure" or bounded. One of Bhabha's (1994) more useful insights for colonial archaeologists is his reminder that *all* cultures are inherently hybrid. Majolica, for instance, is generally classified in the American colonies as a European tradition. Yet, majolica glazing technology was introduced to southern Europe by Muslim invaders during the thirteenth century. Southwest Asian technology, in turn, was invented to emulate Chinese porcelain (Card 2013:5). Though hybridity was advanced to address problems in previous frameworks of cultural change, it also is not without its critics. If applied uncritically, hybridity actually reifies the colonizer/colonized dichotomy. In addition, hybridity has been applied mostly from the indigenous perspective, even though the framework emphasizes combinations of material and cultures (Silliman 2013:496).

Discussion. Each of these frameworks shares in common an emphasis on change and the creation of new colonial societies. Yet, pre-conquest cultures were not simply displaced. In reaction to older models, colonial archaeologists have increasingly emphasized persistence alongside transformation, particularly for native and African communities (e.g., Charlton and Fournier García 1993; Lightfoot et al. 1998; Loren 1999; Rodriguez-Alegria 2008; see also Panich 2013; Voss 2015). Scholars who study persistence argue that continuity can be recognized, not only in material traditions themselves, but in the use of new colonial forms of material culture to maintain traditional societal structures (Lightfoot 1995:206-207; Panish 2013; Spicer 1962). Persistence has been a central focus of a number of studies and has been explicitly incorporated into existing frameworks of social transformation (Panich 2013; Voss 2015; e.g., Deagan 2010; Loren 1999). In the same vein, resistance also has become a specific topic of inquiry (e.g., Brumfiel 1996; Paynter and McGuire 1991; Liebmann and Murphy 2010), though the concept has proven difficult to define and operationalize for archaeological data (Deagan 2010:44-46; Singleton 1998:179; Spielmann et al. 2009:104).

In sum, most conceptual frameworks of colonial transformation were adopted in response to perceived weaknesses in acculturation models. Critics of acculturation and later frameworks have cited insufficient attention to power relations, overemphasis on unidirectional culture change, use of monolithic abstractions of dichotomous colonized/ colonizer cultures, and an overemphasis on either the indigenous or European side of the colonial divide. A perceived lack in agency within some of these models has further led to an emphasis on persistence or resistance within or in addition to existing frameworks of colonial transformations.

Some attempts to address these criticisms have diluted the original meaning of many of these models and created confusion about their usage. This can be seen in Dawdy's (2000) cultural and biological definitions for creolization, which depart from the model's original basis in linguistic theory. In another example, Voss (2015) recently lamented efforts to incorporate persistence into the study of ethnogenesis, which detracts from the concept's interpretive power. Increasingly, the different models are used almost interchangeably (Liebmann 2013). A lack of conceptual baggage is one of the perceived advantages for the concept of hybridity, though Liebmann (2013:42) warns that indiscriminate usage will relegate the term to yet another synonym for cultural mixture.

Because there is no current overriding paradigm to explain colonial transformations, interpretive frameworks are frequently tailored to specific conditions, leading to ad hoc explanations (Leonard 1993:32). In addition, Liebmann (2013) demonstrates how many of these theoretical "lenses" can be applied to the same situation and thus alter archaeologists' interpretations. Although each model has its critics, sometimes resulting in reflexive adjustments, these conceptual theories are infrequently operationalized in ways that can be tested to determine whether resulting interpretations are wrong. Both of these situations signal the need for middle-range theory and research on the structure of colonial interaction and related social transformations (Alexander 1998:479; see also Smith 2008:101, 2015).

Middle-Range Frameworks

Archaeologists have incorporated aspects of evolutionary theory (e.g., Ramenofsky 1998; Schuyler 1998), world systems theory (e.g., Gasco 1996, 2005; Kepecs 2005; Rice 1998), and practice theory (e.g., Lightfoot et al. 1998; Loren 1999; Peelo 2011), among others, to explain the consequences of culture contact generally and colonial transformations specifically. However, one of the most influential middle-range theories in Mesoamerica and particularly the southeastern United States and Caribbean, was developed by anthropologist George Foster (1960; e.g., Deagan 1998; Charlton and Fournier García 1993). Foster adopted an acculturation framework that explained social change in term of dual screening processes by donor and recipient cultures. Foster's work is particularly relevant for my study as he deals explicitly with the contributions of diverse colonists in the structure of culture change. Deagan (1974, 1983) later incorporated Foster's framework in an influential model, coined the "St. Augustine pattern." The central precept of this model is that mestizaje between male colonists and indigenous women was the primary mechanism driving social transformations in Spanish America. Since the quinquennial, however, amassing research in a growing number of regions has revealed far more complexity than originally indicated by Deagan's early work. Moving beyond the St. Augustine pattern, there is currently no unifying middle-range theory for explaining social change, but scholars have proposed new avenues for consideration (see Voss 2008).

Foster's Acculturation Framework. Foster's (1960) model was developed within the acculturation paradigm and emphasized unidirectional culture change. Foster describes colonial culture change as two screening processes. In the first screening, members of a "donor culture" (such as Spanish colonists and institutions) intentionally or unintentionally select those parts of their culture that they then presented to a "recipient culture" (indigenous people). In the second screening, members of the recipient culture selected, rejected, or transformed traditions that were presented to them by the donor culture. Much of Foster's research focused on the first of these two screening processes.

Although Foster's work had obvious flaws in directionality, he made several key observations about the formation of colonial culture. Unlike many approaches, Foster understood that European and indigenous cultures were not monolithic and that "[t]wo complete cultural systems never come into full contact" (Foster 1960:10). The Spanish "contact culture" that arrived in America was only a partial representation of the breadth of traditions and institutions found in Spain.[1] Although bound together politically, every region and community within Spain held a unique history and character, but not all of their traditions were equally represented in New Spain. For instance, in the early sixteenth century, far more colonists (and their traditions) arrived from Andalusia than any other province (Foster 1960:31). In addition, the social status, class, gender, ethnicity, and occupation of the colonists were not a proportional representation of Spain as a whole or even of a single province. Equally consequential, the process of colonization required new institutions and power structures that did not exist previously in Europe.

Foster identifies two selective processes with formal and informal dimensions that defined Spanish contact culture. Formal processes were directed culture change that involved top-down planning by institutions and administrators. The formal dimension included laws governing commerce and trade, town planning, and local ordinances. These formal processes required extensive recordkeeping. Many documents have survived and provide necessary data for understanding the formal dimension of Spanish contact culture.

Informal processes involved the unplanned introduction of traditions by individual colonists. As colonists arrived in America, they brought unique traditions, agendas, and life experiences from different regions, communities, and social positions within European (and African) society. As Foster (1960:12) states:

> ... "informal process" applies to all those unplanned mechanisms whereby the personal habits of emigrants, their food preference, superstitions, popular

medicine, folklore, music, attitudes, beliefs, hopes, and aspirations are selected and maintained in the new country.

Informal processes are poorly understood, as documents rarely provide direct information on the traditions and choices of individual colonists. In an attempt to fill in this gap, Foster undertook ethnographic research in contemporary Spain and America in an attempt to demonstrate the "stripping" down (or reduction) of Spanish culture in America.

According to Foster, the interplay between formal and informal processes produced Spanish contact culture. The recipient culture then further screened the contact culture to produce a final colonial culture. Foster (1960:228-229) argued that unless forced by the donor culture, the recipient culture accepted, rejected, or transformed introduced material culture based on their perceived usefulness, comparable efficiency to existing native technology, and individual socio-psychological value (e.g., social value). Diachronically, Foster (1960:232) suggested that this process would continue until the colonial culture "crystallized" and became resistant to new donor influences.

Foster's model explicitly dealt with material correlates of culture change that could be operationalized in archaeological terms. As a result, Foster's theoretical framework has been influential in the archaeology of Mesoamerica (e.g., Charlton and Fournier García 1993), Southeastern U.S. (e.g., Deagan 1974, 1983), and the Caribbean (e.g., Deagan 1995; Ewen 2000).

St. Augustine Pattern. Building on Foster's model, the concept of mestizaje, and explicitly working within the acculturation paradigm, Deagan (1974, 1983) formulated what has been commonly coined the St. Augustine pattern. She hypothesized that interaction between Spanish men and native women was the primary mechanism driving colonial social transformations. Because the reduced donor culture consisted mainly of European military men, interaction with native people was primarily through marriage. Thus, the colonial recipient culture was reduced to women in domestic contexts. Like Foster, Deagan acknowledged the unequal power relations between Spanish colonists and colonized people. Accordingly, Spanish material culture should be associated with males in socially visible contexts, such as building construction and military activities. In contrast, native and casta material culture should be found in low-visibility contexts associated with female and domesticated activities.

Deagan first tested her hypothesis through archaeological investigations at five eighteenth century households in St. Augustine that represented a range of historically documented ethnicities, incomes, and occupations (Deagan 1974, 1983). She found that native materials were most commonly related to kitchen activities and concluded that mestizaje was "an extremely potent force in [the] acculturation and adaptive processes" in Spanish American (Deagan 1983:271). Deagan's work was notable at the time for its empirical explanatory power and attention to gender, ethnicity, households, and the role of power relationships in colonial transformations.

Over the following two decades, Deagan and her students tested this model in the Caribbean through excavations at three sites in Hispaniola (present-day Haiti and Dominican Republic) (Deagan 1988b, 1995, 1999, 2004; Ewen 1991, 2000; McEwan 1986, 1995). Since the 1990s, Deagan has explicitly emphasized transculturation and multidirectional culture change as the underlying framework of the St. Augustine pattern (see Deagan 1998). The role of African slaves and their descendants have been added to

Deagan's earlier framework (Deagan 1985, 1991; Deagan and Cruxent 1993). Women, whether they were wives, concubines, servants or slaves, are viewed as active cultural brokers, introducing native, African, and new forms of material culture into colonial households (Deagan 2003; see also Deagan 1996, 2001, 2002; McEwan 1991 and Trocolli 1992). Intermarriage remains at the core of the St. Augustine pattern, leading Deagan (2001:194) to argue that it was "within those households, and in women's domestic activities, that the social transformation of identity in the imperial colonies began, leading ultimately to the end of empire."

Beyond the St. Augustine Pattern. In recent years, the St. Augustine pattern has come into question as the number of colonial archaeology projects have increased in the borderlands, Mesoamerica, and South America (e.g., Charlton and Fournier García 1993; Charlton et al. 2005; Gasco 1992, 1996; Loren 1999; Lycett 2005; Low 1995; Rodriguez-Alegría 2005a, 2005b, 2010; Smith 1997; South 1988; Van Buren 1999; Voss 2005, 2008a). In a critique of the St. Augustine pattern, Barbara Voss (2008b) argued that other mechanisms – beyond mestizaje and the cohabitation of Spanish men and native women – contributed to colonial transformations. Regional social and economic networks, tribute systems, and labor regimes also played important roles in the availability and choices of material culture within diverse colonial communities and households (Charlton et al. 2005; Charlton and Fournier García 1993; Fournier García 1997; South 1988; Van Buren 1999).

For example, at the sixteenth century site of Santa Elena in South Carolina, Stanley South (1988:61) argued that the high percentage of non-local pottery found outside the fort was introduced by Timucua women who were cohabitating with colonial soldiers. Inside the fort, however, native pottery was mostly local Irene types that were provided through the tribute system (South 1988:61). In other regions, the location of a settlement within the broad colonial landscape played a significant role in the production and consumption of indigenous, African, European, and hybrid material culture. In the basin of Mexico, for instance, Charlton and Fournier García (1993; see also Charlton et al. 2005; Fournier García 1997) found that European materials were incorporated more rapidly in urban contexts as opposed to rural settlements. In colonial Peru (Rice and Smith 1989; Smith 1997) and Bolivia (Van Buren 1999), where imported European goods were more difficult to obtain, colonists regularly adopted indigenous manufactured materials, including highly visible tablewares and serving vessels.

Voss (2008b) has made a strong argument for increased focus on colonial labor systems and relations. Here, labor involves all social activities to produce, distribute, or manipulate materials (Silliman 2001, 2006; Wolf 1982:73-74). Voss (2008b:874) notes that household assemblages within most settlements in the circum-Caribbean were more similar than different because of the large volume of locally produced materials, from pottery and diet to architecture. Both documents and archaeological data can provide insights into synchronic and diachronic variability within empires, which were affected by labor drafts, enslavement, and wage labor. As Stephen Silliman (2001) has pointed out, labor can be studied at multiple scales and levels. At global and regional scales, labor can be studied from the top-down perspective of institutions that organized labor regimes. Or, we may study labor from the bottom-up perspective as local relations of "resistance, autonomy, and self-expression, in both conscious and unconscious ways" (Silliman 2001:382). This offers a potential strategy for examining Foster's informal processes for the creation of new colonial cultures. In California, for instance, Silliman (2004) examined assemblages associated with laborers at Rancho Petaluma. He suggests that by their labor, indigenous people created new colonial identities through use of mass-produced European goods and the manufacture and use of traditional technologies, such as stone tools.

At the household scale, economic, social, and political strategies played a role in the distribution of European and indigenous material culture (e.g., Loren 1999; Charlton and Fournier García 2010; Rodriguez-Alegría 2005, 2010). While race, ethnicity, and gender have remained central to Deagan's original formulation of the St. Augustine pattern (Deagan 1974), her later work in St. Augustine demonstrated that economic class was also an important factor in the eighteenth century (Deagan 1983:237-241; see also Shepard 1983). When only considering *criollo* (Spaniards born in America) and mestizo households, income seemed to be more relevant than race or ethnicity in the consumption of European material culture during this period. Among these households, Hispanic ceramics and glass had a positive correlation with income. Indigenous wares and non-Hispanic European ceramics had a negative correlation with income among criollo and mestizo households.

These and other studies raise new questions about the seemingly static and essentialist qualities of social identity (e.g., Boyer 1997; Cope 1994; Loren 1999, 2000; Schwaller 2016; Stoler and Cooper 1997; see also Chance and Taylor 1977; Mörner 1967; Seed 1982). For instance, shifts in identity can be found at Presidio San Francisco, where early residents included castas, natives from Mexico, and españoles (Voss 2005). Despite their racial and ethnic diversity, material assemblages suggest that colonists tried to minimize differences. At the same time, early colonists avoided the use of local native materials in order to maintain distinctions between colonized and colonizers. These choices are significant given that most of the colonists were at least partially descended from colonized people in New Spain (Voss 2005). In other cases, early colonial documents indicate that native elites regularly requested permission from colonial authorities to wear Spanish-style dress and swords in order to legitimize their power (Gibson 1964:155; Rodriguez-Alegría 2010:55; Wood 2003:49). Similarly, Rodriguez-Alegría (2010) speculates that the high proportion of Spanish serving vessels found in non-plaza contexts at sixteenth-century Xaltocan was the result of feasting by lower elites and commoners hoping to raise their position in the social hierarchy.

In other situations, colonists used indigenous material culture in public spaces. At the Presidio Las Adaes, Texas, residents of the governor's house used European style tablewares, but incorporated indigenous elements into highly visible dress (Loren 1999, 2000). Loren argues, based on both household artifact assemblages and extensive textual accounts of presidio life, that mixing some indigenous and European elements in public dress helped colonists to move between social groups and maintain necessary, though illicit, trade relations with their native and French neighbors. Loren viewed this reformulation of official ideals as indicative of creolization, which led to a distinct frontier culture (1999:297).

Similarly, Rodriquez-Alegría (2005b) suggests that Spanish elites in Mexico City incorporated native serving vessels and dietary practices in order to facilitate social and economic relationships with indigenous leaders through shared meals.[2] Based on ceramic analysis, sixteenth century chronicles, potters' production lists, and other textual sources, Charlton and Fournier García (2010) present three alternative explanations that are not mutually exclusive. First, they point out that Aztec Red Ware was similar to red polished pottery found in Extremadura, Spain, and may have simply reminded colonists of home. Second, Europeans could have been interested in acquiring indigenous materials through the market simply because they were fascinated by native cultures. Their third explanation is that criollos used Red Ware to symbolize a growing sense of American identity and even resistance to the Spanish Crown.[3]

A growing body of colonial research demonstrates that "there was considerable variety in how people defined and expressed social identities in the Spanish Americas" (Voss 2008b:866). Deagan's St. Augustine pattern initially was widely accepted for its simplicity and because it was easily operationalized for empirical testing. However, as Voss (2008b) has successfully argued, Deagan's model disguises considerable complexity in the process of colonial transformation.

An additional contention highlighted by Voss (2008b) relates to the use of binary categories, such as European/non-European or colonized/colonizer, that are embedded in not only the St. Augustine pattern, but also much of the research described above. Such categories typically are extended to both the people themselves and the material culture that archaeologists study (Voss 2008b; for detailed discussion on the latter, see Chapter 4). Voss's (2008b) critique is not new and is consistent with criticisms leveled at acculturation and its portrayal of cultures as monolithic. Like previous critiques, Voss points to the diversity of cultures subsumed under these categories, which are obscured by binary categories. This is especially a problem when discussing colonizers (Voss 2008b:868-869; see also Voss 2005). Postcolonial scholars argue that using these categories in our analyses only serves to reify them. Deagan (2013:263) has responded to such critiques, noting that dualistic categories are difficult to avoid when operationalizing colonial transformation because such juxtapositions were socially constructed in the past and are, therefore, justifiable objects of study.

To summarize, the last century of research and debate over colonial transformations has yielded many insights about the mechanisms and variable results of colonization. Since the 1980s, the St. Augustine pattern provided a singular framework for operationalizing investigations of colonial culture change. Despite her criticisms, Voss (2008b:865) has acknowledged that the St. Augustine pattern is "one of historical archaeology's most significant contributions to anthropological theory." Accumulating research, however, demonstrates that colonial transformations were far more complex and varied. As yet, there is currently no unifying middle-range theory to replace Deagan's model. In this study, I argue that we need to look beyond past debates in historical archaeology and update our models using insights from contemporary social theory. This does not mean that we throw out decades of research. Past investigations should continue to inform future work. Many of the observations and arguments made by historical archaeologists complement frameworks developed by political scientists and sociologists, particularly historical sociologists. By looking outside our discipline, we can find a fresh perspective to help reframe our research and understanding of colonial transformations. Before delving into this reframing, I first consider traditional anthropological approaches to dimensions of social identity that are relevant to my study of colonial transformations.

Traditional Anthropological Approaches to Social Identity

A central concept underlying investigations of colonial transformation is social identity. Today, researchers investigate multiple dimensions of social identification, including class, status, race, and ethnicity (e.g., Anthias 1997; Bentley 1987; Jones 1997; Calhoun 1997; Emberling 1997:304-306; Tilly 2001a). Each of these forms of collective identity was important for structuring Spanish colonial society, although they shifted in emphasis diachronically. As previously noted, initial ordering of the colonial social structure was mainly based on the géneros de gente, which subsumed Iberian ideals of socio-religious lineage, socio-geographic identity, and socioeconomic status (Schwaller 2016). The sistema de castas, a social hierarchy of socio-racial categories, did not develop and reach its height until the seventeenth century (e.g., Cope 1994). During the eighteenth century, the casta system began to erode, while incipient economic classes developed (e.g., Chance and Taylor 1977, 1979; Seed 1982). I briefly describe traditional anthropological approaches to ethnicity, race, class, and status because these dimensions of social relations were entangled in the changing colonial hierarchy in Spanish America.

Anthropologists have long studied social diversity and the development of collective social identities, although theoretical and methodological approaches have changed significantly. Under the acculturation paradigm, archaeologists studied social groups in terms of bounded archaeological cultures (Emberling 1997; Jones 1997; Veit 1989). Cultures were defined as "implicit and explicit patterns of behavior which constituted the distinctive achievement of human groups – their material culture, beliefs, myths, ideas and values" (Jones 1997:46; see also Kroeber and Kluckhohn 1952; Singer 1968). Cultures shared similar normative behavior that was passed from one generation to the next (Jones 1997:24, 65-71). Bounded cultures typically were examined in terms of outside forces, such as culture contact, diffusion, and acculturation. Culture change, therefore, was the result of migration, invasion, or other outside forces, rather than the result of internal social processes (Shennan 1989). Wolf (1982:6) likened this model of culture change to billiard balls – bounded and internally homogenous cultures that come into frequent contact, but do not lose their internal coherence. Under this paradigm, archaeological analysis involved artifact trait lists, which were used to define discrete spatial patterns that correlated with modern ethnic groups (Jones 1997:1-14, 46-47; Veit 1989). The distribution of structural forms, pottery, lithics, and other objects and features were used to delineate culture areas and to reconstruct culture histories (Jones 1997:16-17; Trigger 2006:232-241; e.g., Childe 1929; Kossina 1911; Kroeber 1939).

By the 1950s, there were increasing challenges to the essentialist and static formulations of culture and social identity. Edmund Leach (1954) questioned the notion that social groups and cultures could be perceived as interchangeable. He pointed out that the boundaries of ethnicity, language, political systems, and material culture did not always correspond. Members of ethnic groups may not share an essential set of cultural traits. In anthropology, this view was reinforced a decade later in debates between Raoul Narroll (1964, 1968) and Michael Moerman (1965, 1968). Moerman critiqued Narroll's essentialist approach to culture, effectively demonstrating that cultural traits are shared across ethnic boundaries and the specific traits that differentiate ethnic groups can be quite few. In addition, the boundaries between ethnic groups are often difficult to delineate. Moerman (1965:1216) concluded that ethnic groups could only be understood within larger social contexts and through their interaction with other groups. These observations coincided with growing critiques in archaeology, especially by Binford (1962, 1965; see also Clarke 1968 and Renfrew 1972) who argued that patterns in the distribution of material culture could relate to a number of variables besides archaeological culture or ethnic populations, such as site function or material availability.

Frederick Barth (1969) brought about a fundamental shift in the study of social identification. Barth persuasively argued against assumptions that culture, language, race, and ethnicity directly correlated. He also criticized the view that ethnicity is unchanging, contending that social identification was situational. Ethnic categories are best understood through social relations, whereby identification is situationally ascribed and self-ascribed. Barth (1969:15) moved the focus of analysis from essentialist traits that make up culture or ethnicity to the boundaries that define ethnic groups. Groups manipulated social boundaries and in some cases individuals passed between social categories in order to achieve their own political or economic interests (Barth 1969:22-23; Cohen 1974). Ethnicity is not an essential characteristic of an individual, but is created and maintained through interaction and social relations. This approach to ethnicity is frequently referred to as the instrumentalist perspective (Emberling 1997; Jones 1997:72-79).

Over the following two decades, the instrumentalist approach to ethnicity came to prominence in socio-cultural anthropology (e.g., Despres 1975; Hannerz 1974; Hobsbawm and Ranger 1983; Otite 1975; Roosens 1989; Ross 1980). Much of this work heavily emphasized the fluidity of ethnic identification. Ronald Cohen (1978:378) noted that the expression of ethnicity may change depending on the context and scale of interaction. In some instances, ethnicity may even be suppressed in situations where it is perceived as a social liability (Cohen 1978: 395-397). Cohen (1974:xxi) took this approach even further, arguing that the pursuit of political interests and economic resources were the defining characteristics of ethnicity (see also Ross 1980; Vincent 1974). This emphasis led to a growing critique that the instrumentalist perspective did not provide an adequate means for differentiating between ethnicity and other interest groups, such as religious orders or political parties. Critics also point out that the role of culture and emotional attachments are not sufficiently explained by the instrumental perspective (Bentley 1987; Jones 1997:76-79).

These criticisms resulted in a resurgence and development of an opposing primordial approach to ethnicity (Geertz 1963; Issacs 1974; Shils 1957). The primordial approach emphasizes emotional attachments and cultural characteristics (e.g., location of origin, kinship, or language) that were adopted at birth or through the process of enculturation. The primordial approach shifts attention from ethnic boundaries back to internal cohesion and provides an explanation for the persistence of some ethnic groups over many generations (Jones 1997:65-68; McKay 1982:397).

In the ensuing decades, debates between primordialist and instrumentalist approaches to ethnicity reached a consensus. Today, most social scientists would agree that ethnicity entails the active manipulation of social identity for social or political advantage, but that a sense of common heritage and shared culture are what differentiate ethnicity from other forms of collective identities (Bentley 1987; Jenkins 2000, 2004; Jones 1997; Kaufman 2004). Since the 1980s, scholars have recognized that primordialist and instrumentalist perspectives are complementary, and several researchers have attempted to combine their major aspects (e.g., Bentley 1987; Jenkins 2000, 2004; Jones

1997; Keyes 1981; McKay 1982; Smith 1981). Of central concern is the perceived contradiction between a form of identity that is fluid and situational, and, yet, durable enough to be passed from one generation to the next. Keyes (1981) suggested a dialectic approach between primordial attachments and new social patterns that develop through interaction with others. He argued that when social conditions are fixed, cultural mechanisms, such as social sanctions, often are adequate to resolve tensions and maintain stability in social identities. Major changes in social circumstances, however, can result in new forms of social relations, reconstruction of cultural meaning, and adjustments to ethnic identity (see also De Vos 1975; Epstein 1978). Social scientists, such as Cohen (1969, 1974) placed greater emphasis on the active manipulation of identity for societal advantage, but argued that normative values and social pressures constrained individual choices.

Carter Bentley (1987:25) criticized dichotomous models for obscuring important "microprocesses" that create and maintain instrumental or primordial aspects of ethnic identity. Specifically, these frameworks do not address how people are able to recognize those durable commonalities that allow individuals to act together for a common cause (Bentley 1987:26). In his influential model, Bentley (1987) argued that Bourdieu's (1977) theory of practice provides the necessary linking argument between situational and durable characteristics of ethnicity. He suggests that ethnic groups are social units that are created by common experiences (or practice) that produce habitual dispositions (or *habitus*) (Bentley 1987:27-29; see also Bourdieu 1977). The practice of habitual behavior, therefore, produces a distinct social history that individuals can recognize through shared experiences. Yet, changing social or environmental conditions may require adjustments to daily practice in order confront new challenges. Adjustments create new experiences that may lead to modifications in habitus.

Some historical archaeologists, likewise, have turned to Bourdieu's (1977) theory of practice to explain social change in colonial settings (e.g., Lightfoot et. al 1998b; Loren 1999; Peelo 2009, 2011). Practice does provide a general theory for explaining how primordial and instrumental approaches work together, but middle-range theory is needed to bridge the gap between material culture studied by archaeologists and testable patterns of human behavior (see Smith 2015). In any case, advancements in the investigation of ethnicity since Barth's work in the 1960s, have shifted anthropological focus from cultures as a whole to internal dimensions of social identity and relations (Emberling 1997; Wolf 1994).

Ethnicity frequently intersects with other dimensions of social identity, such as race, class, and status (Anthias 1997; McGuire 2006). Modern concepts of race developed explicitly in the nineteenth century, with the work of Linné and Blumenbach who "scientifically" classified human groups based upon a combination of physical characteristics and "inherited" dispositions. During this period, ethnicity and race were perceived as interchangeable. It was not until the mid-twentieth century that ethnicity and race were treated as separate categories with race applying only to physical differences. Of course, today, race is understood as a purely social construct, as inherited characteristics cannot explain social or cultural variability (Eriksen 1993:5-7; Wolf 1994). Because of the historical development of the concepts of race and ethnicity, the two terms tend to blur. However, race places greater emphasis on *culturally perceived* differences in physical characteristics (Eriksen 1993).

Although the modern concept of race was not conceived until the nineteenth century, Eric Wolf (1994) traces the classification of individuals based on physical characteristics to as early as Classical Greece and Rome, where people living beyond the "civilizational core" were considered bar-bar-speakers (barbarians) and, according to Aristotle, were born to be slaves. Similarly, in sixteenth-century Spanish America, theologian Juan Ginés de Sepúlveda argued that indigenous people were beasts of burden and natural slaves (Wolf 1994:3). These types of early colonial arguments, however, were based more on socio-geographic identity than race. Nevertheless, such attempts to justify coercive labor practices, lay the foundation for a later race-based hierarchy (Schwaller 2016).

Although the sistema de casta was based in part on physical characteristics and perceived lineage, socioeconomic status remained important for structuring colonial society. As Weber notes (1958:180-195), complex societies are often organized based on a number of hierarchies. Emphasis placed on different dimensions of identity can vary over time and according to the context of interaction. By the eighteenth century, economic class was becoming increasingly important in New Spain. In the social sciences, there are diverse approaches to class. Erik Wright (1994) partitions these approaches into two major types: gradational and relational. *Gradational approaches* divide populations into strata based on the distribution of resources. In contemporary United States, examples include references to upper-, middle-, and lower-class taxpayers. In these instances, classes "are simply rungs on a ladder of inequality" (Wright 1994:89). Raymond William (1983) further divides the gradational approach into: (1) models that group populations into discrete social or economic categories; or (2) those that socially rank individuals by ascribed positions within society.

Even though historical archaeology has been defined topically as either the study of colonialism or capitalism (Leon and Potter 1999; Orser 1996; Schyuler 1970; see the discussion above), very little of historical archaeology has explicitly addressed class relations (McGuire 2006; Wurst 1999; Wurst and Fitts 1999). When class is addressed, gradational approaches are most common (Wurst and Fitts 1999:2; e.g., Chance 1978; Chance and Taylor 1977; Loren 1999, 2000; Miller 1980:15; Spencer-Wood 1987). Even then, historical archaeologists have typically addressed class indirectly as "socioeconomic status" -- conflating class with social status (McGuire 2006; Spencer-Wood and Heberling 1987:59; Wurst 1999:7). Status is defined as "a graduated scale whereby people's position is determined by the sum of their wealth, income and/or prestige" (McGuire 2006:136). In practice, discrete, often ranked, categories of individuals are associated with specific artifacts. For example, high status individuals and households are associated with exotic or expensive imports, such as Chinese porcelain (Deagan 1983; Fairbanks 1973:165; Wurst and Fitts 1999:2; Stone 1970; Herman et al. 1975; see also Voss 2012 for a critique). In other cases, historical archaeologists have calculated the cost of the materials found in the archaeological record to determine wealth as a proxy for social status (Miller 1990, 1991; Spencer-Wood 1987; Wurst and Fitts 1999:2). Gradational approaches generally involve analytical categories that are created by arbitrarily dividing a continuum of wealth. In this approach, there may be no historical or systemic relationship between different social groups defined by the researcher (Wright 1994:90).

Relational approaches to class rarely have been utilized in historical archaeology (McGuire 2006; Wurst 1999; Wurst and Fitts 1999). Relational approaches focus on social interactions as causal mechanisms that lead to the creation or change in social stratification (McGuire 2006; Wright 1994:89; Wurst 1999). This approach developed out of Marxist and Weberian theoretical traditions, in which a person's class position is defined by their "relationship to specific kinds of mechanisms, which generate inequalities of income and power" (Wright 1994:90). The classic example, of course, is the interaction between capitalists and workers. Contemporary scholars, following both Weberian and Marxist traditions, have expanded beyond the dualistic social categories of capitalists and laborers to include a breadth of "new middle classes," such as professionals, managers, and bureaucratic officials (Wright 1994:92; Wurst 1999). Class is not only grouped by difference in economic resources, but by the means used to accumulate those resources. Because relational classes are based on systematic interaction, they are historically and objectively real, promoting the analysis of collective identities (Wright 1994:90).

Historical archaeologists who incorporate the relational approach rarely have mentioned class specifically, but, rather, focus on power relations and inequality (Wurst and Fitts 1999; e.g., Beaudry et al. 1991; Paynter 1988; Paynter and McGuire 1991; Wurst 1999). Such studies are often framed by relationships of dominance and resistance. Researchers typically use documents to identify physical contexts associated with people of different classes, such as workers and managers. Assemblages are then compared. If assemblages differ, it is assumed that subordinates were resisting the dominate group. If assemblages are similar, then researchers assumed that subordinate groups were emulating the dominate group (see Paytner and McGuire 1991; Wurst and Fitts 1999). Unfortunately, these approaches overly simplified class relations (but see Beaudry et al. 1991).

It can be productive to apply both gradational and relational approaches, provided they are not conflated or applied haphazardly. In fact, the two approaches are complimentary, since gradational inequalities can be considered the result of class relations (Wright 1994:90). My definition of class invokes a combination of gradational and relational approaches. I view class as asymmetrical relationships that develop between those who control the means of production (and distribution) and those who supply labor, potentially leading to gradational inequalities in wealth and income (see Smith 1976; Wolf 1999:65; Wright 1994, 2002; Wurst and Fitts 1999). By labor, I refer to social activities to produce, distribute, or manipulate materials (Silliman 2001, 2006; Wolf 1982:73-74).

Labor provides an important entry point for studies of identity and social transformations (Silliman 2001, 2004, 2006; Voss 2008b). In the colonial period, labor was "colonized, enforced, controlled, exploited, indebted, hierarchical, unequally distributed, often rigidly structured, and simultaneously global and local" (Silliman 2006:147). Labor requirements played a key role in the way that institutions, such as the Spanish Crown and Catholic Church, structured colonialism. At regional and local levels, administrators and elites adapted official policies to local circumstances to achieve their labor needs (Silliman 2006; see Chapter 3). In turn, those that supplied labor accommodated, resisted, or manipulated labor systems for their own survival or to achieve social mobility. A focus on labor, therefore, is well suited for a relational approach to class (McGuire 2006; Wurst and McGuire 1999). Colonial records document changing policies by institutions and local elites, while archaeology can better reveal the reactions by laborers to class structures. The relationship between institutions, local administrators, and laborers transformed class relations and the gradational classes that historical archaeologists have traditionally analyzed.

Scholars have noted that different dimensions of social identity -- such as race, class, ethnicity, and status -- involve similar processes of differentiation. Based on these similarities, some researchers have tended to conflate these dimensions or placed them under an overarching concept, such as ethnicity (Eriksen 1993; Nagel 2003; Sollors 1986; van den Berghe 1983). Others view ethnicity, race, class, and status separately, as multiple social hierarchies that structured complex societies (Chance and Taylor 1977:457; Stark and Chance 2008:34; Voss 2008a:28; see also Weber 1958:180-195). I view these dimensions as separate, but often inextricably linked. To collapse the many dimensions of social identity under a single category would obscure important differences and prohibit the study of how the relationships among dimensions varied over time.

Race and ethnicity are academically entangled concepts due to their shared history, dating back to the nineteenth century. Race is different from ethnicity, however, as racial categories are created to "naturalize" perceived social differences based upon references to physical characteristics and the assumption that dispositions are genetic and immutable (Eriksen 1993), rather than learned and situational like ethnicity (Barth 1969; Jones 1997). Contemporary scholars analyze race as socially constructed categories that are used to legitimize social hierarchies and the exploitation of laborers. In some cases, ethnicity and racial categories may overlap to the point that they become interchangeable. Ethnicities may become "racialized" with the attribution of immutable traits (Eriksen 2002:6). In colonial New Spain, Spanish language documents regularly lumped indigenous ethnic groups under the formal category of *indio* – a classification that became racialized during the seventeenth century.

Despite the formal use of the indio category, diverse ethnic identities continued to be important, particularly at local and regional scales (e.g., Chance 2008; Restall 1997, 2005). The New Philology movement, discussed above, has shifted focus to native language documents that give an alternate perspective on social identification (Chance 2008:138-141). The term indio is rarely mentioned in Nahuatl, Mixtec, or Maya sources (Chance 2008:139; Lockhart 1992:115; Restall 1997:13; Terraciano 2001:2). Authors of Nahuatl and Maya language documents instead tended to emphasize local communities of origin or residence as the most common form of self-identification (Chance 2008:138-141; Chance and Stark 2001; Lockhart 1992:115; Restall 1997, 2005).[4] Social identity, then, must be understood not only through formal categories of identification, but through local construction of collective identities and external interactions at multiple scales (Restall 2005:8).[5]

Race, ethnicity, and status are necessarily subjective concepts. That is, these dimensions typically involve a consciousness of difference. In contrast, class can be either objective or subjective. Marx ([1922] 1978:305) used the expression "class-for-itself" to describe the subjective concept of class. "Class-in-itself" is the objective study of class relations that exists whether actors realize it or collectively act upon it (Wright

2002). The objective characteristics of class allows for the analysis of "class-in-itself" even when other dimensions of identity take precedence in the structure of societies.

Dimensions of social identity may articulate in complex ways. Ethnicity and class sometimes completely overlap in a situation where one dimension will define the other. In other cases, classes may stratify a single ethnicity or multiple ethnicities may be located within a single class. It is also not a given that race, ethnicity, or class are relevant dimensions of social structure in every society. Historians, for instance, have long debated exactly when economic classes developed and took a prominent role in the social structure of New Spain (e.g., Chance and Taylor 1977, 1979; McCaa et al. 1979; Seed 1983). Additionally, recent research suggests that religious lineage was more broadly determinate of the social structure than either race or ethnicity during the earliest years of the Spanish American colonies (Schwaller 2016). Randall McGuire (2006:133) sees the dialectics between dimensions of social identification as a central process of social transformations.

Reframing the Study of Colonial Transformations

Richard Jenkins (1994:218-219) has rightly pointed out that collective identities (characterized by race, ethnicity, class and/or status) are the *outcome* of continuous interaction between external categorization and internal group identification. Social theory offers tools that can help historical archaeologists operationalize the study of the *processes* that led to social transformations in colonial settings. Many of the concepts offered by historical sociologists and political scientists would be recognizable to historical archaeologists. What is new is the reframing of ideas – detached from the baggage of the acculturation paradigm. Through this reframing, social theory offers conceptual tools for the empirical analysis of the causal mechanisms of social transformations that are the focus of this study.

As noted, historical archaeologists already have incorporated a social theory of practice as developed by Pierre Bourdieu (1977, 1990; e.g., Loren 1999; Lightfoot et al. 1998; Peelo 2011; Worth 2016). The theory of practice falls under one of five major social science ontologies that Charles Tilly (2008:6) labels relational realism. This doctrine states, "that transactions, interactions, social ties, and conversations constitute the central stuff of social life." This ontology developed out of the classical work of Karl Marx and Max Weber, and therefore aligns with the relational approach to class. Because a relational ontology centers on dynamic interactive behavior, it is well suited for empirical archaeological study. Although falling within the same ontology, my framework veers away from Bourdieu's theories toward transactional and mechanism-based approaches to explanations of social change. These approaches provide a firmer materialist grounding for archaeological analysis.

Sociologists and political scientists have advanced alternate theoretical approaches for analyzing the connection between identity formation and social transformations. These frameworks focus on two related modes of identification: *relational* and *categorical* (described below). Distinguishing between relational and categorical identification reframes analyses and facilitates the identification of the causal mechanisms of social transformation (e.g., Calhoun 1997:29; Nexon 2009; Tilly 1978, 2001a and 2001b, 2008; see Peeples 2018 for an archaeological application of these concepts). In the following sections, I describe the key concepts involved in relational identification, categorical identification, social transformation, and mechanism-based approaches for explaining change. I then link these concepts to social transformations in colonial Spanish America.

Relational Identification

Relational modes of identification are defined through ongoing processes of interpersonal interaction that form networks of face-to-face relationships. Within these networks, individuals are identified based upon their position in relation to one another. Tilly (2005:7) notes that social scientists do not observe social relationships – such as friendships, kinships, or competitors. Rather, researchers observe transactions (face-to-face interactions) through which they may infer social relations. Tilly (2005:6-7) argues that "interpersonal transactions [are] the basic stuff of social process...transactions compound into identities, create and transform social boundaries, and accumulate into social ties." That is, continuous transactions between individuals form durable ties of shared understanding, rights, and obligation. Similar social ties between three or more individuals form a network (Tilly 2002:80). Within these networks of similar social interaction, some individuals will be more closely connected than others. For example, within a neighborhood network a person may have more direct connection with their immediate neighbor than someone who lives on another street. Alternately within a kinship network, a parent-child would likely be more directly connected than distant cousins. In either case, indirect connections are recognized as structurally similar. If a relationship is recognized as structurally different, then it is part of a separate social network (White 2008:1-2). Individuals create multiple interlocking networks of interactions through different forms of observable transactions (Tilly 2002:80).

The key characteristic of relational identification is that it is formed through regular social transactions and not through membership in a specific category. Relational identification can, however, include recognition of social roles in externally defined categories -- such by race, ethnicity, class, or status. Such categories may influence transactions between individuals. In their everyday lives, individuals engage in transactions to pursue their own aims, which may include the pursuit of resources or social mobility. In order to achieve those ends, people may "reproduce, modify, create, and sever relatively durable material and symbolic exchange relationships" (Nexon 2009:25). These durable interactions make up the social structures in which individuals function. Social categories, such as race, create durable inequalities that promote asymmetrical transactions and social relationships (Tilly 2005:71-73).

Social contexts influence the character of transactions, and thus the identities that are emphasized. Social ties that are commonplace and are activated on a regular basis tend to have a fundamental role in the reproduction and transformation of social structures (Tilly 1978:3-19). Social transactions that are less common may have little influence on social structures, although they may present individuals with important opportunities. These "weak ties" become important when they connect individuals and networks to more socially distant settings, providing access to new knowledge outside their immediate surroundings (Granovetter 1973:1370-1371).

Categorical Identification

Categorical identification refers to the ways that individuals identify themselves and others with reference to larger groups that share similar attributes. Categorical identities may be based on ethnicity, race, class, status, nationality, or gender. A defining characteristic of categorical identities is that they exist outside of interpersonal interaction and members are recognizable without reference to specific social relations (Stokke and Tjomsland 1996). For example, a person could be a Christian regardless of their kinship ties. An individual's membership in the Catholic church was recognizable by others, whether they were a priest in medieval Spain or a missionary in colonial America (Calhoun 1997:42-43). This example reveals another important characteristic of categorical identification. That is, categories can reach much larger scales than relational identities, extending beyond regions or continents. The large scale of many categories requires common behavior or material symbols that can be recognized by all members of the group (Calhoun 1997:44).

Categorical identification is a necessary process for the ordering of the social world, particularly in complex societies. This is true both for the members of a society who are attempting to negotiate everyday social situations, and social scientists who are using categories of analysis to understand society (Brubaker and Cooper 2000:4; Jenkins 2000:8). Categorization is also a tool frequently used by state elites and institutions to socially control members of society and legitimize bureaucracies. Ethnicity, race, class and other categories are reinforced through laws and regulations. Often state policies will allocate resources based on social categories (Jenkins 2000; Tilly 2005; Wright 1994, 2000). Because categories are socially constructed, they are susceptible to manipulation by members of society. For instance, ethnographic research has shown that ethnic categories may be emphasized situationally during periods of intense competition for resources (Hodder 1979, 1982; Kimes et al. 1982).

At times, there may be overlap between relational and categorical identities, such as in the cases of ethnicity and class. Both are collective identities that are recognizable through shared attributes, but locally they are often connected in networks of social relationships (Calhoun 1997; Jenkins 2000; Wright 1994). For instance, because ethnicity is defined in part through a common lineage or shared heritage, members of kin-based relationships are frequently members of the same ethnic group. Yet, when members of one ethnic group come into direct contact with members of another ethnic group, it is the boundaries between categories that become salient. This is particularly the case when ethnic groups migrate to new locations where they are recognized primarily by their shared attributes, rather than through internal social relationships (Calhoun 1997:40-41).

Social Transformations

The concept of social transformation is ubiquitous in the colonial archaeology literature, although rarely is it explicitly or consistently defined. This is due, in part, to the breadth of changes following European contact in America and the variety of frameworks adopted for explaining social change. In most cases, social transformation implicitly refers, in synonymous fashion, to the overarching framework adopted in the analysis – such as transculturation, creolization, or ethnogenesis. I diverge from these concepts and define social transformations – independent of previous frameworks – as changes in the structure of social relationships that can lead to scale shifts in categorical identification (McAdam 2003; Tilly 2001a, 2001b). Tilly (2001b:26) and others (McAdam et al. 2001; McAdam 2003) define a *scale shift* as the process by which a growing number of individuals and social sites engage in coordinated action, leading to the spread of categories of identification (see also Stokke and Tjomsland 1996).

Extending this definition further, I also include the uncoordinated actions of individuals whose emergent effects can also cause broad changes in social hierarchies and potentially alter related categories of identification (see Mayntz 2004:250; Tilly 2001a).

Social transformations occur through processes that include both relational and categorical identification. These modes of identification are not binary or mutually exclusive, but rather two dimensions involved in the process of social transformation (Tilly 1978; see also Nexon 2009; Peeples 2011; Stokke and Tjomsland 1996; White 2008). New categories of social inequality, for instance, emerge through "asymmetrical social interactions in which advantages accumulate on one side or the other, fortified by construction of social categories that justify and sustain unequal advantage." (Tilly 2001a:362). If social inequality already exists, repeated transactions of a different character may create new forms of social ties that change the existing structure. Broad social transformations, therefore, originate in local contexts through durable forms of social relations (McAdam et al. 2001, 2008; McAdam 1999, 2003). Most local transformations never spread to a broader region (McAdam 2003). When a scale shift does occur, it is frequently accompanied by the creation of new categories of identification (e.g., Aunio and Staggenborg 2011; Tarrow and McAdam 2005).

Mechanisms as Explanations

Mechanism-based explanations provide a middle ground between historical descriptions and covering law explanations for phenomena that may occur at multiple levels and scales (Mayntz 2004; McAdam et al. 2001; Nexon 2009). In sociology and political science, mechanisms are basic constituents of middle-range theories – an approach to social explanation first explicitly promoted by Robert Merton (1949).

Despite Merton's early advocacy, there were no sustained attempts to develop a mechanism-based approach until the 1990s (see excellent overviews in Mayntz 2004 and Pickel 2004). Most notable at that time was an edited volume by Hedström and Swedberg (1998) and a seminal article by Mario Bunge (1997). Since these early works, there has been an increased focus on social mechanisms as the basic building blocks of social processes (e.g., Bunge 2004; Elster 1998; Esser 2002; Mayntz 2004; McAdam et al. 2001, 2008; Nexon 2009; Tilly 2001b, 2004, 2008).

Quite a bit of scholarly discussion has focused on how to define mechanisms. In 2001, Mahoney documented as many as 24 specific definitions. Much work, however, has tended to frame what mechanism *do* rather than what they *are.* In terms of what mechanisms *are,* I am partial to Mayntz's (2004:241) definition of mechanisms as "sequences of causally linked events that occur repeatedly in reality if certain conditions are given." Mayntz's formulation agrees with most other social scientists who emphasize the importance of initial conditions that combine with a series of mechanisms to produce a set of recurring outcomes (e.g., Bunge 1997; McAdam et al. 2001, 2008; Nexon 2009; Tilly 2008).[6] Sociologists have further parsed mechanisms into separate types (e.g., Hedström and Swedberg 1996:296-298; McAdam et al. 2001). McAdam and others (2001; see also Tilly 2001b) argue for a tripartite typology that seems particularly useful, dividing mechanisms into environmental, cognitive, and relational drivers of change.

Environmental mechanisms are external forces, such as resource depletion or population growth (McAdam et al. 2001:25-26; Tilly 2001b). Cognitive mechanisms, in contrast, are internal drivers, relating to change in individual or collective perceptions or awareness. For instance, resource depletion or a shift in demographics (environmental mechanisms) can, in turn, lead to changes in the perception of socioeconomic difference (a cognitive mechanism). McAdam and others (2001; see also Nexon 2008; Tilly 2001b, 2005, 2008) are most concerned with the third mechanism of change. Relational mechanisms are alterations in durable interactions between individuals and groups, such as through alliance or exploitation. All three of these broad types of mechanisms played a role in the social transformation of the Spanish colonies, but some mechanisms are better recognized through the examination of historical evidence (see Chapters 3 and 4) and others through the analysis of archaeological data (see Chapter 5 and 9).

As for what they *do,* a mechanism alters social relationships. Series of mechanisms can concatenate into processes that produce social transformations (Tilly 2008:9; see also Nexon 2009; McAdam et al. 2001, 2008; Tilly 2001b, 2005). Processes can then be envisioned as reoccurring and overlapping chains of causal mechanisms that together function in similar ways (McAdam et al. 2001:27; see also Mayntz 2004:241). As a prolific historical sociologist, Tilly's views on social process fall in line quite well with historians and archaeologists who seek to avoid ahistorical explanations, while also providing a framework for comparative and even cross-cultural research. As Tilly (2008:9) writes, "explanatory mechanisms and processes operate quite broadly but combine locally as a function of initial conditions and adjacent processes to produce distinctive trajectories and outcomes." Tilly's work concerns both local history and macroscale phenomena. Mechanisms of a somewhat general scope facilitate comparisons between social processes in diverse settings, while giving due deference to historical contingences.

This raises the question of how general to frame the component mechanisms that make up a particular social process. The framing of mechanisms and processes obviously relies on the research question and the scale and level at which the targeted social phenomena occur (McAdam et al. 2001:24; Pickel 2004:178). In addition, the degree of generality will depend on the relationship between the cases that are being compared. In my study, I am comparing regions within the Spanish colonial empire. These cases are, therefore, relatively close in temporal period and sociocultural setting – at least from the perspective of colonial agents. My level of abstraction will facilitate comparisons between regions throughout the Spanish colonies. The mechanisms that appear in my study, however, are formulated so that further abstraction will allow for future cross-cultural comparisons. My ultimate goal is to begin building a "toolbox" of general mechanisms that will facilitate comparisons of colonial social transformations in multiple settings (see Merton 1967:106; Pickel 2004:179; see also Nexon 2009:64-65).[7]

The parsing between mechanisms and processes is arbitrary and forms a continuum (McAdam et al. 2001:27). That is, a single process can be reformulated as one of several mechanisms that make up an even larger process. Likewise, a single mechanism involved in macro-structural processes can often be reformulated into a process that is made up of other mechanisms. Geographic and temporal scale, as well as top-down versus bottom-up perspectives all impact our ability to identify reoccurring mechanisms and processes (see McAdam et al. 2001:27-30). Accordingly, in this study I investigate change at multiple scales and social levels of analysis. Here, it is important to clearly define the difference between scales and levels.

Sociologists, historians, and archaeologists have all made arguments for multiscalar and multilevel approaches to better understand social processes (e.g., Alexander 1988:257-298; Blanton et al. 1993; Marquart 1992:108; Bunge 1999:72-79; Hauser 2009; Kelly and Hauser 2009; Last 1995; Mathieu and Scott 2004; Nexon 2009:61-63; Orser 1996). By analytical scale, archaeologists typically refer to the geographic and temporal extent and resolution of their research (e.g., Crumley 1995:2; Marquart 1992:107; Mathieu and Scott 2004). The geographic extent is the maximum spatial scope of one's research, which may be a site, region, or macroregion (or larger). Temporal extent is likewise the largest period covered by the analysis. Variable scalar resolution, that is, the smallest spatial or temporal unit of analysis (such as residential structures within a site or identifiable time slices) also can reveal distinct mechanisms and processes (Mathieu and Scott 2004). The geographic and temporal extent and resolution may be expanded or contracted depending on how questions are contextualized. For example, an archaeologist working at a single site might examine multiple scales of external interaction through the residential consumption of imported materials from within the same region or from more distant production locales (Hauser 2009; Schortman and Urban 1992; Voss 2008b).

Geographic and temporal scales are also important to historians and sociologists (e.g., Braudel 1972; McAdam et al 2001:30), but arguably far more theoretical focus has been devoted to social *levels* of analysis (see Alexander 1988, Bunge 1999, Burguiére 2009; Last 1995, and Wight 2006:90-120 for reviews). Within the social sciences, Bunge (1999:72-73) defines levels as "social systems of various sizes," which may include variation in "levels of organization or complexity." The prefixes "micro," "meso," and “macro” are relative terms like rungs on a ladder (Alexander 1988; Bunge 1999:73; Nexon 2009:61). In sociology, the microlevel is typically a reference to individual interactions. A microlevel relational mechanism might include an increase in the rate of exogamy, reflecting the aggregate effects of individual transactions (Mayntz 2004:250). Microlevel mechanisms can be described as “bottom-up” drivers of change (Bunge 1999:73-76). Scholars in the edited volume by Hedström and Swedberg (1998), among others (see overviews in Alexander 1988, Diani 2007, and Mayntz 2004), express explicit bias for microlevel relational mechanisms as key drivers of social transformation. These researchers argue that individual interactions have emergent effects that can explain most social change at multiple scales. A similar historical perspective can be found in the social history literature – traditionally described as “history from below” (Febvre 1932) – as well as among anthropologists and archaeologists who emphasize individual agency (e.g., Dobres and Robb 2000).

I agree, however, with those social scientists and historians who argue that social change and large-scale transformations of complex societies cannot be explained solely in terms of individual agency (e.g., Braudel 1972; Granovetter 1978; Mayntz 2004; McAdam et al. 2001). At the opposite end of the spectrum, macrolevel mechanisms may refer to the role of institutions, states, or even macro-structural processes, such as capitalism, as drivers of social change (e.g., McAdam et al. 2001; Nexon 2009). Even in situations where the aggregate transactions of individuals produce emergent effects from the bottom up, macro-structural processes and institutions may limit, reinforce, or alter those changes from the top down (Bunge 1999:73-76; Mayntz 2004:251). In addition, complex societies include multiple levels within social, political, and economic hierarchies with mechanisms operating between the level of the individual and the state, that is, at the mesolevel (e.g., municipal governments),

Colonial Transformations in the Spanish American Empire

I examine the mechanisms that led to social transformations in Spanish colonial contexts. Social theory suggests that large-scale shifts in social structure began at local settings through repeated transactions that created durable social relations (e.g., McAdam et al. 2001). Historians have documented several social transformations that would qualify as "scale shifts" in New Spain. Changes in the colonial hierarchy from géneros de gente during the sixteenth century to the racialized sistema de castas by the seventeenth century and then to the development of an incipient economic class by the late colonial period represent social transformations at a large scale (Chance and Taylor 1977; Frederick 2011; Schwaller 2016; Seed 1982). In this study, I use historical and archaeological data to examine the causal mechanisms that transformed social relations and formal categories at the Port of Veracruz and three sequentially occupied presidios in Northwest Florida.

The framework that I developed for this project updates Foster's (1960) formal and informal selective processes with social theory that disentangles relational and categorical modes of identification (e.g., Nexon 2009; Stokke and Tjomsland 1996; Tilly 1978, 1998, 2005; White 2008). Foster’s model emphasized the role of formal institutions in directing culture change, but conceptually disconnected top-down processes from informal interactions between diverse colonial populations (see Foster 1960:10-13). My reframing emphasizes the dialectic between bottom-up and top-down mechanisms of change, giving primacy to social transactions and durable interactions at multiple scales (see Mayntz 2004; Tilly 2001a, 2004). Social relations produced, reproduced, and transformed social categories in New Spain. Spanish monarchs and colonial institutions responded by modifying and formalizing existing social categories to impose social order, organize labor, and control colonial resources. Formal categories, with their associated legal privileges and constraints, influenced the structure of interpersonal interactions. Formal categories, in turn, were then further modified in local and regional settings. In sum, shifting social relations between diverse populations caused change from the bottom up, while imperial responses inspired transformations from the top down. This was a process that varied with local historical conditions, yet accumulated changes had large-scale effects that transformed the colonial social structure.

[1] Foster (1960) used the terms "conquest culture" and "contact culture" to refer to the donor culture that initially comes in contact with a recipient culture. Conquest culture, however, specifically refers to situations in which formal political and military control are present.

[2] While Aztec Red Ware was recovered from excavations of elite Spanish households, the interpretation for their use is framed by anecdotal and uncritical analyses of documentary evidence (see critiques by historians Alberro 2005 and Van Young 2005). Aztec Red Ware was used in two zones of Mexico City -- by native people in Tlatelolco and Europeans in La Traza. There is no evidence, however, that Europeans used Red Ware serving vessels to host meals for native elites (Charlton and Fournier 2010:145).

[3] Charlton and Fournier highlight a series of historically documented feasts held by Mexico City elites in 1566 at which native culinary dishes were served on Red Ware pottery. It was at these feasts that a plot developed to crown Martin Cortés king of an independent New Spain. The chronicle by Juan Suárez de Peralta describes an order for Red Ware pottery to be used at the baptism festivities for Cortés. Potters marked the ceramics with an image of a crown and the letter R. This symbol meant "you will reign" (Suárez de Peralta 1990 cited in Charlton and Fournier 2010:141-142).

[4] In central Mexico, Nahuatl documents tend to emphasize the local *altepetl, calpolli-tlaxilcalli,* or more recent pueblos formed through congregación (Chance 2008:138-139); Maya documents emphasize the *cah* (Restall 1997).

[5] This pattern was not exclusive to indigenous pueblos. For instance, in 1796, black militia soldiers founded the town of San Fernando de los Negros near the northeast coast of the Yucatan. Over the next several decades, in and out migration led to a mixed population of Mayas and blacks. Yet, municipal leaders continued to represent the community as a black militia town, not because of its racial demographics, but because of the town's historical identity (Restall 2005:7).

[6] There is disagreement on whether initial conditions should be viewed as actual mechanisms (e.g., Machamer et al. 2000) or if mechanisms are the causal links between initial conditions and outcomes (e.g., Hedström and Swedberg 1996). In either case, initial conditions are considered as essential as other mechanisms.

[7] Bunge (1997:411-412) makes the important point that general mechanism-based explanations are not mechanical, nor are they simply components of universal covering laws. Sociologists suggest that similar durable relations are often produced, reproduced, and transformed by similar combinations of mechanisms and processes. Due to historical contingencies outcomes can vary (e.g., Nexon 2009:64-65; Tilly 2008:9). For this reason, Bunge (1997:411) prefers to describe mechanism-based explanations as “mechanismic” and Nexon (2009:64-65) espouses an “ideal-typical” approach to mechanismic explanations.

CHAPTER 3

HISTORICAL PERSPECTIVE ON MACROSCALE SOCIAL TRANSFORMATIONS IN COLONIAL NEW SPAIN

Historical data shed light on mechanisms of social transformation that are not visible through archaeology alone. In this chapter, I draw upon secondary historical sources to present a macroscale historical perspective on both changing social relations and the multilevel mechanisms that caused at least three broad scale shifts in social categories. This discussion situates colonial Northwest Florida and Veracruz within a larger context of continual change occurring throughout New Spain. As noted in the previous chapter, historians of the Spanish American empire have given enormous attention to imperial institutions, producing voluminous literature on the topic. Royal orders, declarations, cedulas, ordinances, and regulations accumulated rapidly, filling more than 200 books by the end of the sixteenth century alone (McAlister 1984:435). In more recent decades, historians have expanded their focus to include notarial and inquisition records, wills, and other documents (Keen 1985:680; Schwaller 2016:7-13).

Document-based research demonstrates that relationships between the Crown, church, administrative officials, European colonists, black slaves, natives, and people of mixed descent were dialectical. Imperial policies affected social relations across multiple levels of a growing multilayered hierarchy. Contrary to Foster's (1960) unidirectional model, formal policies were not just mechanisms that dictated change from the top down. The actions of institutions and their agents often modified or reinforced *existing* structures of social interaction and formalized changes in categorical identities. Throughout the colonial period formal categories served to structure and justify labor relations and access to both imperial institutions and colonial resources. Formal categories evolved alongside shifting labor relations, which were initially dependent on coercive regimes, but gradually shifted toward a growing dependence on free or semi-free wage labor. The Crown's casuist approach to colonial jurisprudence – issuing judgements on a case-by-case basis – facilitated the co-evolution between colonial transformations and shifting imperial practices. Royal judgments and legislation were typically applied to address local concerns, creating legal precedents and formalizing social categories that imperial agents could then apply to other situations throughout New Spain using analogical reasoning. Thus, imperial responses to local changes in Veracruz, Northwest Florida, or elsewhere could have widespread consequence. Further, historians have pointed to macro-structural changes such as developing capitalism and broad shifts in scientific and religious philosophies as additional environmental and cognitive mechanisms contributing to colonial transformations. Both anticipated and unanticipated colonial responses at multiple levels led to local and regional changes that initiated, in turn, new imperial responses.

I begin by setting the stage with a brief discussion of the Iberian social structure that framed initial encounters in America followed by a review of the colonial political structure and approach to jurisprudence. My subsequent discussion then examines the causal mechanisms of change in macroscale social relations and categories of identification across three centuries: 1) géneros de gente in the sixteenth century; 2) sistema de castas in the seventeenth century; and 3) sistema de castas to incipient economic class in the eighteenth century. Although the focus of my study is on Veracruz and Northwest Florida during the seventeenth and eighteenth centuries, the scope of my discussion in this chapter extends to the beginning of the Spanish conquest and encompasses general trends documented for New Spain. I do this for three reasons. First, earlier periods are important because initial encounters, shifting social relations, and the imperial responses in the sixteenth century had lasting influences on imperial polices during later periods of interest. Second, this discussion will contextualize Veracruz and Northwest Florida within the long-term trajectory of social relations and categories in the viceroyalty. Third, recent historical scholarship has emphasized that the social structure of New Spain was more dynamic and complex than is often generalized by archaeologists. I, therefore, elucidate large-scale shifts in social categories of identification and detail the multi-level mechanisms that historians have documented to explain these transformations. Ultimately, this chapter provides a mechanism-based model, identifying causal mechanisms of change that I will examine locally for the Port of Veracruz and Northwest Florida in the next chapter (see Figure 3.1 for a schematic of the causal mechanisms discussed in this chapter).

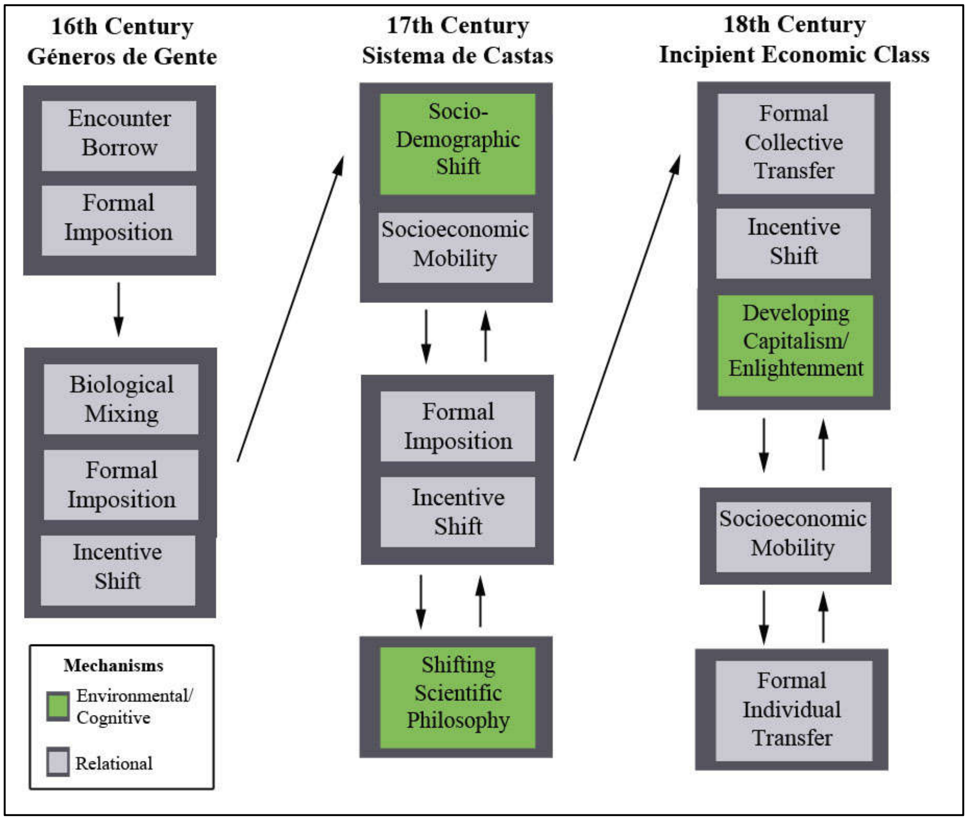

Figure 3.1. Causal Mechanisms of Social Transformation in Colonial New Spain.
Note: Mechanisms are presented in roughly chronologically order from top-to-bottom and from left-to-right. Mechanisms that co-occurred or had a close dialectical relationship are grouped.

Setting the Stage

I first set the stage by briefly outlining Iberian social structure, the Spanish colonial political structure, and imperial approaches to colonial jurisprudence. Each played a key role in the development of social relations and colonial transformations. Conquistadores and colonists interpreted the diverse cultures they encountered in America through the lens of contemporary Iberian social life. Methods of conquest, colonial social relations, and categories of identification were all initially framed, at least in part, in terms of colonists' experiences on the peninsula. As in Iberia, formal social categories reinforced labor relations and access to both power and resources in colonial

America. At the same time, local interactions were contingent upon diverse histories and responses by native people leading to diverse outcomes. The state's casuist approach to colonial jurisprudence and analogical use of precedent became an overarching process through which local changes, such as in Veracruz and Florida, could influence policy and social categories at much larger scales.

Pre-Columbian Iberia

Although we frequently refer to a Spanish conquest in America, the unification of Spain into a single state did not begin in earnest until the late fifteenth century and was not complete until the sixteenth century. The dynastic marriage between Ferdinand of Aragon and Isabel of Castile in 1474 joined the Iberian peninsula's two largest kingdoms. The rest of Spain was consolidated by the Habsburg dynasty in the early sixteenth century under the Emperor Charles V, creating a pluralistic society that reflected millennia of immigration, invasion, and colonization by Phoenicians, Greeks, Carthaginians, Romans, Vandals, Visigoths, and finally Berbers and Arabs. The latter invaded and colonized the Iberian Peninsula between AD 711 and 715. For almost eight centuries, Catholic monarchs sought to recapture Iberia from Muslim rule during a period known as the *reconquista* (ca. AD 711-1492). Catholic rulers justified centuries of conflict and subjugation of Islamic Arabs by declaring a holy war. Reconquest was largely undertaken by *adelantados* (military commanders) who received little support from their royal sponsors. Instead, they were compensated with hereditary governorships of the land that they conquered and rights to the labor of defeated populations. This method of conquest would later play a major role in Spain's expansion in America (for overviews of the reconquista see Kamen 2005; McAlister 1984:3-72; Ruiz 2001, 2007).

Given the complex history of the Iberian Peninsula, Spanish conquistadores and colonists were no strangers to pluralistic societies. Multiple languages were spoken in Iberian kingdoms among a culturally diverse population of Christians, Jews, and Muslims. The peninsula never developed a feudal system like Northern Europe. Instead, devout Catholicism served as an important mechanism of social cohesion that helped structure society (McAlister 1984:39). Historian Robert Schwaller (2016) expands upon this point, recently arguing that Iberia's medieval social structure was organized in terms of three interrelated dimensions of identification: ethno-religious, socioeconomic, and ethno-geographic.

Following centuries of conflict against Muslim overlords, religious affiliation became a dominate mode of categorical identification. Although people were initially identified as *cristano, judío,* and *moro*, religious conversions following cycles of conquests led to the creation of new labels to distinguish between *cristianos nuevos* (New Christians) and *cristianos viejos* (Old Christians) (Martínez 2008:40). Over time, it became accepted that religious belief could be passed from one generation to the next, either sanctifying or tainting a person's lineage. Identities were thereafter linked to *limpieza de sangre* (purity of blood) (Ruiz 2001:103; Schwaller 2016:22). Ethno-religious categories were formalized through ordinances, requiring documentation of lineage and oral testimonies before one could enter guilds, religious and military orders, universities, and hold certain secular positions or receive public honors (Martínez 2008; Schwaller 2016:22-23; cf. Kamen 1997:238-241). Attempts also were made to legislate dress and appearance. Although sumptuary laws were of limited success (Ruiz 2001:97), they served to broadly cement perceptions of recognizable difference.

Ethno-religious identification intersected with Schwaller's (2016:20-21) second domain of social difference; socioeconomic categories encompassed a combination of social status, economic position, and moral valuations. Socioeconomic status thus was not the same as modern concepts of economic class. Broadly speaking, the socioeconomic hierarchy was subdivided into noble and commoner classes. The noble class was further segmented into titled lords and petty nobles (*hidalgos*). The titled nobility was a warrior class that had largely earned their lands and titles through military service during the reconquest (Lockhart and Schwartz 1983:4-7; McAlister 1984:27); thus they were associated with *cristianos viejos.* The petty nobility, similarly, had a lineage that could be traced back to a titled ancestor. All nobles were expected to live Christian lifestyles, demonstrating honor and virtue (Schwaller 2016:20-21). Membership in the noble class was desired not only for social power and prestige, but also for legal privileges such as immunity from taxes and commoner courts (McAlister 1984:27).

Below the nobility were the commoners who made up the majority of Iberian society and labor class. As with the nobility, the commoner class also encompassed a hierarchy based on wealth, social status, and perceived moral character. Commoners were ranked by categories based upon honor and virtue, such as *gente baja* (low born) or *gente vil* (vile people). At the top of the commoner hierarchy was a professional class that received some state privileges, such as exemptions from taxes (Schwaller 2016:20-21). Social mobility within commoner classes and even across the divide between commoner and nobility was possible, particularly through the military or church service (McAlister 1984:32-33). Here again, socioeconomic status intersected with ethno-religious status as legal restrictions based on religious lineage and moral judgments put limits on the social mobility of Jews, Muslims, and even the descendants of "recent" converts.

Schwaller's (2016:23-25) third domain of social identification was ethno-geographical and concerns the *naturaleza* (place of birth) and *vecinidad* (citizenship) within communities. Because of protracted conquest and political fractionalization of the Iberian Peninsula, naturaleza and vecinidad identified a person's responsibilities to specific communities as well as rights and privileges granted by the king to different towns and jurisdictions. Unlike naturaleza, vecinidad was something a person acquired through residence and service to the community. At a broadly recognizable scale, vecinidad was important because it demonstrated respectability and membership to an Iberian town that could mitigate other categories of difference. In contrast, foreigners were distinguished by *nación* of origin, which could be a general locale in Europe (e.g., *francés*) or Africa (e.g., *guinea*). These categories identified people as outsiders and in the case of African slaves, *negros,* a Castilian term that further differentiated them.

This tripartite system of categorical identification was well developed in 1492 when the reconquista ended with the capture of Granada and Christopher Columbus arrived in the American Antilles. Ethno-religious, socioeconomic, and ethno-geographic categories served as an initial lens for classifying the people that Iberian colonists encountered in America. Over time, however, local colonial interactions and reciprocal maneuvers by Spanish institutions combined with macrostructural processes, driving the transformation of social categories and the formation of new social hierarchies in colonial America.

Spanish Colonial Political Structure

In order to contextualize imperial responses and top-down mechanisms of change, I briefly describe the political structure in Spanish America that predominantly developed by the end of the sixteenth century. The colonial bureaucracy was aimed at justifying Spain's colonial expansion and centralizing the Crown's control in America – particularly over labor and valued natural resources. Initially, the Spanish conquest was organized similar to the Portuguese *feitoria* system, a commercial venture in which Europeans established colonial settlements as trade entrepots for exchange with native people. The Crown would benefit from such a system through a percentage of all profits. It soon became clear, however, that this system was insufficient for taking advantage of the resource potential of the Indies. Spain's strategy for conquest quickly shifted to a model adapted from the reconquista (Deagan and Cruxent 2002b; Haring 1975 [1947]; Lockhart and Schwartz 1983; McAlister 1984). The Crown began issuing licenses to adelantados to explore, trade, conquer, and settle as described within their patents and at their own expense. In return for their investments, adelantados were granted native labor (*encomiendas*) and lands in the American colonies. Adelantados, in turn, granted native labor, lands, and other spoils to subordinates and set aside the "royal fifth" for Spain. While the Crown and colonizers shared the goal of exploiting newly discovered lands, they quickly came into conflict about the manner of reaching their aims (Haring 1975 [1947]; Lockhart and Schwartz 1983; McAlister 1984).

Castile's justification for their overseas conquests was based on the Bull of Donation, written in 1493 by Pope Alexander VI, which entitled Spain to new lands for evangelizing indigenous people. In that vein, the Crown viewed the native population as subjects to be converted to Christianity and not foreign pagans to be enslaved (McAlister 1984:78). Conquistadores, in contrast, invested in expeditions to raise their status and wealth. Many initial colonists came from the lower socioeconomic classes and were less interested in moral questions regarding the treatment of indigenous peoples (McAlister 1984:79; see also Mörner 1967:16). At the same time, the Crown was uneasy about adelantados and other colonists achieving too much power. Many of the actions taken by the state were aimed at centralizing imperial control of the Indies, protecting their Indian subjects, while economically exploiting the resources of the Indies for the economic gain of Castile and newly unified Spain (Lockhart and Shwartz 1983; McAlister 1984).

Civil challenges to the Crown's sovereignty originated primarily with adelantados, encomenderos*,* and municipal councils (Haring 1975 [1947]:112,128-138; McAlister 1984:185-187). Complicating matters was the fact that these individuals were often one and the same. The growing power of adelantados and distance between the colonies and Spain became an increasing concern for the Crown during the sixteenth century. Spanish monarchs reacted with new systems of oversight. Royal treasurers accompanied conquests and expeditions to ensure honest accounting of the spoils. Royal magistrates investigated accusations of misconduct and *alcaldes mayores* (deputy governors) were assigned to govern roughly defined provinces and intervene in the decisions of municipal councils (Haring 1975 [1947]:128-138; McAlister 1984:185-187).

As colonization progressed, Charles V took additional steps to centralize power. In 1528, he appointed an *audiencia* (supreme council) with judicial and governing authority over New Spain (Haring 1975 [1947]:110-127; McAlister 1984:188). The first audiencia was problematic as its members became invested in local enterprises, using their powers to defraud the Crown and exploit colonists and native communities. Thereafter, the Crown appointed royal officials that were from Spain or from another region of their American colonies. Royal officials also were forbidden from marrying local women, obtaining lands, or engaging in colonial business within their jurisdiction. These orders were geared to prevent their administrators from developing conflicts of interests and keep them separate from local society and loyal to Spain (Haring 1975 [1947]:129; McAlister 1984:188-189). To further enforce the king's aims, he appointed a viceroy to govern New Spain in 1535. The viceroy was chosen for his noble Iberian lineage and his prior demonstration of loyalty to the monarch. The viceroy was the king's personal representative and generally held the same authority as the king himself (Haring 1975 [1947]:110; McAlister 1984:188-189).

The Crown's early attempts to regulate and limit colonial power culminated in the New Laws[1] of 1542. Among the articles of these laws were directives to outlaw enslavement of indigenous people, prohibit new encomienda grants, end current encomiendas upon the death of the grantee, and transfer terminated grants to the Crown under corregidores. The emperor temporarily suspended the New Laws due to colony-wide rebellions, but in 1549, he came at the encomienda in a different way. He limited the native head tax to commodities that were collected and then disbursed by the royal treasury (McAlister 1984:162-163; Simpson 2008 [1950]:129-132,145). Rights to native labor were legally removed from encomenderos and subsequent labor drafts were instead administrated by a local *corregidor* or *alcalde mayor*. Under this revised *repartimiento*, natives were required to fulfill labor quotas on a rotational basis and received a daily wage. Administrators divided laborers between encomenderos, other agricultural land owners, the church, and public projects (Gibson 1964:230; Himmerich y Valencia 1996:16; McAlister 1984:211). Natives also sometimes were required to sell them commodities, often at below market prices (Gibson 1964:231).

In addition to the civil arena, the Crown also acted to subjugate the Catholic Church under royal authority in America. This process began in Iberia under the *patronado real* that granted to Iberian monarchs administrative privileges over ecclesiastical affairs (Gibson 1966:76; Haring 1975 [1947]:166; McAlister 1984:194). These privileges were extended to the American colonies in a series of papal edicts between 1493 and 1508. Over the next several decades, Spanish monarchs pressed to extend their authority over the colonial church. The Crown obtained the right to define dioceses, collect tithes, and required that all clergy obtain royal licenses and swear fealty to the Crown before traveling to America. The Crown further delegated to viceroys, audiencias, and governors the right to nominate bishops. Through these maneuvers, by the 1560s the Spanish king had gained near total control of the ecclesiastical administration (Gibson 1966:76-80; Haring 1975 [1947]:166-176; McAlister 1984:194-197).

The Church was a valuable mechanism for morally reinforcing the Crown's colonial sovereignty. At the same time the clergy often came into conflict with settlers and colonial officials (Gibson 1966:80), particularly concerning treatment of indigenous populations. Most well-known was the Dominican friar Bartolomé de las Casas who became known as the "Protector of the Indians" (McAlister 1984:83). Las Casas and other Dominican friars successfully advocated for royal supervision and inspection of native labor promulgated through the Laws of Burgos in 1512 (McAlister 1984:158;

Simpson 1960). Charles V sided with Las Casas arguments that natives were fully human, a view that Pope Paul affirmed in 1537 (Hanke 1949:73; McAlister 1984:154). The clergy regularly accused colonists of abusing and corrupting native people, leading to orders that required segregation. Most prominently, in the 1540s and 1550s, the king forbade Europeans and people of mixed decent from living in native towns (McAlister 1984:154-155; Schwaller 2016:38). Over time, ecclesiastical agents came into growing conflict with civil authorities over everything from protocol to personal preference (Gibson 1966:80).

In sum, the colonial political structure developed through the lens of Iberian experiences and by contentious interactions between the Crown, church, and colonists. The result was a colonial bureaucracy that favored the appointment of officials considered loyal to the Crown and with a particular preference for those born in Iberia. This had the effect of creating a competitive stance between royal officials and colonists born in New Spain. At the same time, the Crown consolidated its power over ecclesiastical institutions that were essential to justifying territorial expansion. The clergy simultaneously used their legitimizing role in colonization to push back against the aims of colonists who expected – based on precedents set during the Iberia reconquest – to gain wealth and status in exchange for their colonizing efforts. From the perspective of early colonists, this included rights to the labor of conquered indigenous people. Over time, colonial encounters and subsequent interactions led to changes in colonial relations and development of social categories at community and regional scales. Through the responses of the Crown and imperial agents, local changes could have a broad impact.

Key to understanding the potential spread of local changes was Spain's approach to colonial jurisprudence.

Spanish Colonial Jurisprudence

Spanish colonial jurisprudence played a direct role in the transformation of colonial society. Although the American colonies were initially incorporated into the kingdom of Castile, the Crown quickly recognized the need for separate governmental institutions and laws that collectively became known as the *derecho indiano*. Schwaller (2016:52-55) notes four key aspects of Spanish jurisprudence that are essential for understanding the dialectic between local social relations, shifting imperial policies, and macroscale social transformations.

The first two aspects deal with the Crown's perspective and motivations. First, medieval philosophies held that monarchs were "natural lords" and had a responsibility to mediate the dispensation of justice in a way that recognized social difference. That is, the monarchs were to consider the privileges that came with high status, while protecting those of lower socioeconomic status. Second, as has previously been noted, Spanish monarchs had a vested interest in ecclesiastic concerns because Catholic evangelism provided justification for imperial expansion. This religious interest was regularly reflected in Spanish legislation.

The remaining two aspects deal with how jurisprudence was applied. Third, good governance was generally viewed as casuist. That is, most imperial policies were applied to address specific cases and the state infrequently rendered judgments expansively to the colonies as a whole. This aspect of colonial jurisprudence allowed the Crown flexibility to address evolving circumstances. Established law created precedents, which leads to

Schwaller's fourth point that Spanish law operated on the principle of analogy. Spanish officials, colonists, and jurists could take up laws that were used in other contexts and apply them to similar circumstances. Casuist laws were only periodically codified, first in 1596 and again in 1680 (Schwaller 2016:51-55; see also Mörner 1967:36).

Ben Vinson III (2017:41) points out that because casuist laws were sometimes redundant or contradictory and applied to specific situations, local administrators could choose to enforce them elsewhere, deliberately misinterpret them, or even ignore them. Casuist legislation and the principle of analogy are crucial for understanding the interrelationship between local social relations and the transformation of social categories in New Spain at much larger scales. For instance, changes in local social interaction at the Port of Veracruz or at the Pensacola presidios led to imperial responses, which potentially had widespread ramifications in reinforcing and changing social relations and categories of identification at much broader scales. At the same time, the responses of imperial agents were influenced by imperial judgments made in distant regions of the empire that could be reapplied locally in Veracruz and Florida. In the next several sections, I address the evidence for large-scale shifts in the social structure of colonial America and the top-down and bottom-up mechanisms for these changes across three centuries.

Géneros de Gente in the Sixteenth Century

Most studies of the Spanish colonial social structure have focused on the seventeenth and eighteenth centuries. As a result, research has tended to revolve around the *sistema de castas,* a hierarchy of racial categories (e.g., Boyer 1997; Castleman 2001; Cope 1994; Frederick 2011; Mörner 1967). The concept of "castas" as a categorical system of identification was anachronistic to the sixteenth century, however (Schwaller 2016). Robert Schwaller's (2016) investigation of the evolution of early colonial modes of categorization provides a bridge between Iberian social ideals and the later development of the casta system. The Crown did not plan at the outset to impose the sistema de casta, but rather the initial social order was heavily borrowed from Iberia (Schwaller 2016:55; Vinson 2017:40-41). As discussed above, colonists were accustomed to pluralistic societies. Thus, it is not surprising that colonists initially envisioned colonial society through an Iberian lens. Gradually, colonial encounters and regular social interactions led to new social categories that were mitigated or formalized by imperial responses to local circumstances.

The term "castas" did not appear in documents to describe a group of people for more than a century after conquest. Instead, Schwaller (2016:27-30) argues that early colonial society is best characterized by géneros de gente. While this phrase was never codified, it was a commonly used phrase to describe a diverse colonial society. Scholars typically discuss initial colonial categories in terms of three broad parent groups classified as *españoles, indios,* and *negros.* These categories should not be viewed through the racial lens of later periods, however, as they were not yet racialized and attached to "essential" biological qualities (Schwaller 2016:48-49; see also Chapter 2). Instead, géneros de gente borrowed from Iberian ethno-religious, ethno-geographic, and socioeconomic ideals of social organization (see discussion above).

The initial mechanisms at work in the contact period involved borrowing and imposition of social categories from the Iberian Peninsula (Schwaller 2016; see also Tilly 2005:137-142). That is, during initial encounters social distinctions formed at points of contact and colonists borrowed from social concepts used in Iberia to frame relationships (see Figure 3.1). These relationships were hierarchical, determining access to resources and structuring labor relations in colonial society. During the sixteenth century, labor was mainly coerced through the encomienda and repartimiento labor drafts and the limited importation of African slaves, associating natives and blacks with the bottom of the colonial hierarchy (see Aguirre Beltrán 1944; Gibson 1964:27, 58-59; Himmerich y Valencia 1996; Simpson 2008 [1950]). At least nominally free wage labor only began to grow in importance late in the century (see Gibson 1984:245; Lockhart and Shwartz 1983:142-143; McAlister 1964:211-212). Within this context, the state modified and formally imposed existing colonial categories of identification through casuist judgments and analogical use of precedents. This was not the end of the story, however. From the very beginning of the conquest, biological mixing between colonists, blacks, and natives was extensive, leading to bottom-up change in social categories. New generations of colonial-born mixed descendants did not exactly fit within existing parent groups. Colonists created new categorical labels and then, once again, the Crown and imperial agents formally imposed these labels.

Encounter/Borrowing and Formal Imposition of Ethno-Religious Categorization

Ethno-religious concepts were deeply embedded in early colonial categories. While "español" is a category frequently used by scholars, it was not a common term in the early sixteenth century. Rather, most European colonists were categorized by their ethno-religious classification as cristianos (Schwaller 2016:39-40). This religious categorization was reinforced by royal restrictions placed on the immigration of Muslims and Jews. As Schwaller (2016:40) points out, it was not until the 1520s that the social label “español” appears in documents and then only in combination with cristiano. *Indios* were named thus because Columbus initially believed he had arrived in the Far East. Although colonists quickly realized this was not the case, they continued to use the label. As native people began to convert to Catholicism they were labeled cristianos nuevos differentiating them from colonists who were cristianos viejos (Schwaller 2016:26).

Christian negros also were associated with cristianos nuevos (Martínez 2008:220). The “negro” category has the oldest roots, having developed during the reconquista when most Muslim *moros* in Iberia were from North Africa and had darker skin than European cristianos. The perceived relationship between negros and Islam carried over to early prejudices against black slaves and their descendants in New Spain. In addition, millions of sub-Saharans were imported into Iberia as part of the slave trade. Religious justification for their enslavement came from an inaccurate rendering of biblical text, leading to the myth that blackness was a curse on the descendants of Ham (Noah’s son) and that Africans were condemned to slavery (Schwaller 2016:31-33; Vinson 2017:34). The rationale for African enslavement was not only religious, but environmental – attributed to ethno-geographic perceptions of difference.

Encounter/Borrowing and Formal Imposition of Ethno-Geographic Categorization

Español, indio, and negro all certainly borrowed ethno-geographic concepts from Iberia. Schwaller (2016:41) argues that the label “cristiano español” combines ethno-religious with ethno-geographic ideas common to Iberia. It is likely not a coincidence that “español” was added to the “cristiano” label around the same time that the Crown limited European immigration to citizens from Castile and Aragon (Schwaller 2016:41; see also Mörner 1964:12,55). As time passed and colonists began to have children, ethno-geographic terminology was further broadened to include *criollo* to distinguish first negros and then, more commonly, *españoles* born in America (Schwaller 2016:41-42). The term “criollo” was disparaging and reflected competitive social relations between American-born Spaniards and those from Iberia. Difference based on birthplace was further reinforced by the Crown who came to prefer Iberian-born citizens for appointments to the highest royal offices (Haring 1975 [1947]:117-118,129; McAlister 1984:188-189). Over time, criollos developed their own disparaging categories for European colonists, most commonly *chapetón* by the end of the century. The term *peninsulares* that is so often used by historians did not become prevalent until the eighteenth century (Gibson 1966:130-131; Schwaller 2016:42). Medieval beliefs that climate could have a degenerative effect on the physical appearance and temperament of offspring supported perceived differences between American and Iberian Spaniards (Schwaller 2016:43).

Geographic and environmental explanations for differences were rooted in medieval encounters between Europeans and Africans (Schwaller 2016:43). In Iberia, both Muslims and Christians associated darker skin with a temperament appropriate for enslavement. Contemporary beliefs attributed physical and behavioral differences to African climate rather than to biological relatedness (Cope 1994:17; Schwaller 2016:32). The category “negro” and associated prejudices were transferred wholesale by colonists to New Spain.

Similarly, ethno-geographical meaning was attributed to *indios.* Initial reports by conquerors (such as Columbus and Cortés) and missionaries (such as Fray Toribio de Benavente Motolinía) described native populations in positive terms meant to reassure the Crown that conquest would be easy, that native people would make effective laborers, and would be easily converted to Christianity (Schwaller 2016:36). Epidemics and rapid depopulation of native communities, however, created a shift in the perception of *indios.* Colonists came to assume that natives were naturally weak. As in other cases, colonist attributed indio weakness to the climate. This negative perception was unintentionally amplified by clergy, such as Las Casas, who petitioned the Crown to enact paternalistic laws to protect the declining native population. These laws created "two republics" within colonial society with two sets of laws outlining different privileges, protections, and obligations -- one set for españoles and one for indios (Schwaller 2016:37-28). Negros were left in an ambiguous position outside these republics, but in practice they existed in "attached subordination to Spaniards" (Restall 2009:36-43,91; but see Landers 2006:130).

Encounter/Borrowing and Formal Imposition of Socioeconomic Categorization

Imperial policies adapted from Iberian traditions of conquest conferred additional socioeconomic meaning on colonial categories. Both criollos and peninsular españoles claimed privileges typically reserved for lower nobles in Iberia. In contrast, natives and blacks were identified as commoners by requiring them to pay taxes (Cope 1994:16; Schwaller 2016:26). Labor drafts and an association with slavery further relegated natives and negros respectively with the lower rungs of the socioeconomic hierarchy in America (see Aguirre Beltrán 1944; Gibson 1964:27, 58-59; Himmerich y Valencia 1996; Simpson 2008 [1950]).

In New Spain, socioeconomic hierarchies also existed within géneros de gente. As Max Weber (1958) has pointed out, the social structure of state level societies is typically made up of series of hierarchies. The república de los españoles was at the apex of colonial society, but among Europeans and their descendants there were levels of socioeconomic difference. Encomenderos, adelantados, and owners of large landed estates were economic elites and many of them achieved a reputational status of nobility through claims of pure Christian lineage and appropriate "noble" behavior. In rare cases, colonists were legally recognized as nobles through descent from Iberian hidalgos or through cedulas of *hidalguía* that the king awarded to colonists for extraordinary service to the Crown (Elliot 1987:1-10; McAlister 1984:392-393). Other elites included the members of the "royal estate," made up of high officials and member of the clergy (McAlister 1984:395).

At a lower rung were Europeans and their American-born descendants who, despite some socioeconomic privileges (e.g., tax exemptions), engaged in activities or labor that did not convey honor or nobility. Ranked at the top of the Spanish commoner class were merchants. There was a social stigma attached to commerce during the early colonial period, but potential for wealth and the late sixteenth century creation of the merchant guilds for collective bargaining could allow merchants to overcome occupational blemishes (Chance and Taylor 1977; McAlister 1984:394). In the middle tier of the commoner class were professionals, such as lawyers and notaries, as well as shopkeepers, itinerant traders, small landowners, and artisans. At the very bottom rung were those Europeans who were unemployed and impoverished and whose behavior was socially unacceptable (Chance and Taylor 1977; Cope 1994:21; McAlister 1984:394).

While members of the república de los indios were ranked below españoles, caciques and other indigenous nobles received privileges associated with Iberian nobility.

The native elites served a crucial function as cultural brokers between royal officials, colonists, and their indigenous laborers. In exchange for their loyalty, the Crown and viceroys granted native elites exemptions from taxes and allowed them to ride horses and carry swords and firearms as material symbols of their elite status (Gibson 1964:155; McAlister 1984:180; Mörner 1967:41). Royal privileges differentiated indigenous elites from the native commoners who paid taxes and were required to provide labor in the early years of conquest and colonization.

Similarly, there were status differences within the *negro* population. First, not all blacks were slaves and, even among slaves, there were status differences. Hispanicized blacks (*ladinos*) who worked as domestic servants or skilled artisans held a higher position in colonial society. Slaves newly arrived from Africa (*bozales*) and unskilled laborers who provided hard labor in colonial mines and plantations existed at the very bottom of the Spanish colonial hierarchy (Landers 1997). Yet, despite status differences within the black population, this group was at the bottom of the colonial hierarchy. Fear of rebellion drove the royal policies that restricted their movements and from at least 1535 there were strict restrictions issued forbidding negros, both slave and free, from carrying weapons (Schwaller 2016:63-43).

Bottom-Up Mechanisms of Change: Biological and Cultural Mixing

Although colonists initially borrowed and imposed Iberian concepts of religion, geography, and socioeconomic status to their colonial encounters, categories of difference shifted over time through social interactions at multiple scales. The form of microlevel interaction that scholars most often identify as a driving force for change were the sexual unions between Europeans, natives, and Africans (e.g., Cope 1994; Mörner

1967; Schwaller 2016).[2] From the beginning of the conquest, children were born from both violent and consensual encounters between the major parental groups. Most Europeans arriving in America were men. Between 1509 and 1539, only 10 percent of the licenses granted to European migrants were issued to women (Mörner 1967:15-16). Native elites presented indigenous women as gifts to the conquerors. Encomenderos used their entitlements to native labor to gain access to female servants and concubines (Mörner 1967:22-24).

Intermarriage was explicitly permitted between españoles and indios as early as 1501. Queen Isabella even encouraged marriage between Europeans and natives to facilitate conversion and Christian living among indigenous communities (McAlister 1984:125-126; Mörner 1967:37; but see Konetzke 1946). In 1539, royal policies mandating that encomenderos marry within three years, also indirectly encouraged intermarriage (Mörner 1967:37-38). In later decades, royal opinion regarding native-European intermarriage would lose favor, but late sixteenth century declines in intermarriage were more likely due to increases in the immigration of Spanish woman and a growing number of criollo women (Cope 1994:18; McAlister 1984:125-126,159; Mörner 1967:45-46).

In contrast, the Crown always frowned upon intermarriage between African slaves and their other subjects. This was reflected in early decrees that encouraged endogamy between people of African descent (Mörner 1967:38; Schwaller 2016:67). This policy was related, in part, to the concept of the "free womb." That is, children born to native or European women were legally free even if their fathers were slaves. In addition, Africans were seen as tainted with a Muslim past and thus, even if converted, *cristianos nuevos* (Cardoso 1983:26; Martínez 2008:157; Mörner 1967:38; Schwaller 2016:26, 31-34). Despite concerns expressed by the Crown and other royal officials, the Pope refused to unilaterally forbid intermarriage with Africans. The clergy likewise were non-compliant, following the doctrine of free will concerning marital choice (Mörner 1967:38; Seed 1988:32-46). The ratio of male to female slaves, roughly 3-to-1, and the desire to propagate free offspring further undermined the Crown's efforts (Cardoso 1983:26; Carroll 1991:90–91; Mörner 1967:30). Periodic royal orders against African exogamy suggests that colonial subjects continued to ignore the Crown on this topic (Schwaller 2016:69).

As the number of people of mixed descent grew, colonists added new social categories to the géneros de gente as colonists, local officials, and the Crown grappled with an expanding diversity of people who did not fit within the dual republics. The most common categories for the offspring of mixed parentage used in New Spain were mestizo and mulato. People of mixed African descent were present in Iberia long before the colonial conquest and many immigrated to America beginning with the earliest voyages (Restall 2000; Schwaller 2016:75). "Mulato" was the most frequent term applied to the children of mixed African and European descent. As the sixteenth century progressed, however, it was increasingly applied to children of mixed native and African descent as well (see Schwaller 2011).

The "mestizo" category referred to people of mixed European and native descent and was slower to develop. The earliest appearance of this label dates to 1539 (Schwaller 2016:70). At first, children of mixed European-native heritage were referred to as either cristianos or cristianos españoles if they were raised by their European parent. If these children were raised by their native mothers, they were categorized as indios (Schwaller 2016:47; see also Mörner 1967:27-29). It was not until the 1550s that "mestizo" appears regularly, but even then, it was applied selectively. Children born to a well-off Spanish parent and those who adhered to respectable Spanish norms could avoid the mestizo label. Because of this variation in usage, "mestizo" soon became a derisive term associated with illegitimate offspring and vagabonds (Cope 1994:18; McAlister 1963:355; Schwaller 2016:47-48). Combined with an increasing population of legitimate españoles and several attempts by mestizos to overthrow the colonial government, the standing of those labeled "mestizo" declined in the late sixteenth century (Schwaller 2016:69-72). Free or nominally free wage labor became increasingly important as the century came to a close, employing not only natives and blacks, but also an increasing number of people of mixed descent within a variety of colonial enterprises (see Gibson 1984:245; Lockhart and Shwartz 1983:142-143; McAlister 1964:211-212).

Top-Down Mechanisms of Change: Formal Imposition and Formal Incentive Shift

As individuals and institutions grappled with a growing population of people of mixed descent, imperial policies progressively reinforced categorical distinctions through segregation, penalties, and rewards. Complaints about the presence of negros in native communities and the Crown's desire to limit sexual relations between blacks and natives, lead in 1541 to explicit orders meant to prevent blacks from entering indigenous villages (Mörner 1967:46; Schwaller 2016:57). Colonial abuses described by the clergy reversed the Crown's opinion on the benefits of European-native interaction and marriage. Both Emperor Charles V and then King Philip II issued a series of edicts in the 1550s and 1560s prohibiting Europeans, except for clergy, from living in native communities. These edicts were issued using the common casuist approach, addressing complaints in different regions and creating precedents that could be applied elsewhere (McAlister 1984:159,163; Mörner 1967:46; Schwaller 2016:56,81). Similar laws prohibiting mestizos and mulatos from residing in native communities were added in 1578 and again in 1586 (McAlister 1984:338-339; Mörner 1967:46; Schwaller 2016:57). These laws proved difficult to enforce, however. Many mestizos and mulatos lived in indigenous communities because they were the children of native women (Schwaller 2016:57-58). Regardless, these policies placed mestizos, mulatos, and other mixed descendants legally outside the republic of native people and loosely attached them to the republica de los españoles.

Mestizos and mulatos formally bore the negative assessments directed toward their parents (Schwaller 2016: 45). Mulatos were subject to the same restrictions as their negro parents. In 1566, they were restricted from carrying weapons regardless of their legitimacy or the status of their European parent (Encinas 1945 [1596]: 344-345; Schwaller 2016:75). Because some mulatos were the children of native tributaries, local colonial officials questioned whether mulatos should be made to pay taxes. As with other casuist laws, this case began in 1572 with an inquiry by the authorities in Guatamala and royal responses were directed at that jurisdiction. By 1574, imperial policy was expanded and all mulatos and negros were ordered to pay taxes, making no distinction between mulatos who were the offspring of Europeans and natives. The expanded imperial law made no exemptions for the legitimate children of high-status Spaniards, relegating them to a lower status than the noble lineage of their parent and associating them with conquered natives and free blacks (Cope 1994:16; Schwaller 2016:76-77). Economically, free blacks and mulatos also were frequently excluded from local artisan guilds (Cope 1994:17). Sumptuary laws further distinguished mulatas from other géneros. Mulatas could not wear high-status garb, such as gold, pearls, or silk unless married to españoles (Cope 1994:16; Schwaller 2016:79).

While mulatos were always viewed negatively, the status of mestizos declined over the course of the sixteenth century (Cope 1994:18; Schwaller 2016:69). At mid-century, mestizos still held privileges associated with their Spanish parents. For example, mestizos who were the legitimate children of vecinos could hold encomiendas, and there were no prohibitions against mestizos carrying arms (Schwaller 2016:71-72). However, after several plots to overthrow the colonial government in 1566, a series of laws likewise prohibited mestizos from bearing arms. Because mestizos were the children of españoles and free natives, the laws were modified several years later, allowing mestizos to apply for a license to carry weapons. No such exemptions were applied to mulatos, reflecting the greater social capital of mestizos, which they could materially demonstrate (Schwaller 2016:72-73). Nevertheless, mestizo status continued to decline. In the 1570s, mestizos were prohibited from serving as scribes, their rights to encomiendas were rescinded, and they were barred from religious ordination (Cope 1994:16; Schwaller 2016:74). By the end of the century, mestizos had lost many of their privileges, although they remained exempt from paying taxes (Cope 1994:18; Schwaller 2016:78).

In sum, the sixteenth century represented a critical stage in the development of the colonial social structure, setting the foundation for later changes. Iberian immigrants brought with them beliefs about the proper order of society. The borrowed colonial structure incorporated a combination of ethno-religious, ethno-geographic, and socioeconomic norms for social distinctions. Schwaller (2016:48-49) argues that the dimensions of difference represented in Iberia were thus collapsed under a single categorical system that he refers to as géneros de gente. Spanish monarchs and royal officials further imposed categories by adopting colonial labels into casuist judgments that then spread through analogical use of precedents. Native and African people were associated with coercive forms of labor, particularly labor drafts and enslavement, respectively. As sexual interaction cross-cut colonial boundaries, a new generation of people were born who did not fit within the existing structure. New social categories were imposed and reinforced through imperial policies of segregation, penalties, and rewards. In addition, near the end of the century, people of mixed decent increasingly contributed to colonial labor needs through free or nominally free forms of wage labor. It is important to note that géneros de gente did not yet fit with modern conceptions of race. It was not until the following century that colonists and Iberian scholars would attach "essential" traits to these groups and the sistema de casta would take shape as a racial hierarchy of difference that was relevant in both Veracruz and Northwest Florida.

Sistema de Castas: Seventeenth Century Social Categories

By the seventeenth century, social categories transformed from géneros de gente – which emphasized Iberian ideals of social organization – to a colonial racial schema known as the sistema de castas. The casta system was a hierarchical ordering of people based on their proportion of European blood (e.g., Cope 1994; Frederick 2011; Mörner 1867; Vinson 2017). Historians have not been able to locate any official documents that formally instituted the casta system, and there is debate about the extent to which the sistema can be described as a formal system (see Vinson 2017:39). Likewise, it is uncertain when exactly this social framework fully emerged. Because of unique local histories, the development of socio-racial categories varied between regions. Mörner's (1967:53-56) classic work on the casta system describes it as evolving slowly but he is unclear about the timing. Aguirre Beltrán (1946:163) argues that the sistema fully matured in the seventeenth century, while Chance (1978:126,193) states that it was clearly operating in Oaxaca by the 1630s and Cope (1994:24) suggests it took full form in Mexico City by the 1640s.

In this section, I review the historical evidence for the development of the sistema de casta and describe the causal mechanisms responsible for this categorical shift. Thus far I have only identified relational mechanisms that drove social transformations, but environmental and cognitive mechanisms also played a role in subsequent changes. Sexual relations across géneros de gente in the sixteenth century caused a socio-demographic shift that, by the seventeenth century, could be construed as an environmental mechanism (sensu McAdam et al. 2001:25-26; Tilly 2001b). Simultaneously, there were changes in the perception of colonial categories, representing a cognitive shift. Bottom-up and top-down relational mechanisms were at work within this context. Historically identified microlevel mechanisms entailed the mobility of individuals both up and down the colonial social strata. Seventeenth-century socioeconomic mobility took place as native populations reached their nadir, corresponding with not only the apogee of the African slave trade (Aguirre Beltrán 1944), but also a growing reliance on free or semi-free wage labor and an increase in artisan guilds during the seventeenth century (e.g., Gibson 1964:230-245; Charlton 1986:127-129; Salvucci 1987:105-107; Van Young 1982:23-24).[3] Elites and imperial agents perceived socioeconomic mobility within the colonial hierarchy as a potential threat to their control of the social structure of New Spain. Colonial institutions responded by imposing casta categories, while incentivizing colonial subjects using penalties and rewards to socially control them from the top-down. Finally, a shift in scientific philosophy during the seventeenth century changed colonial perceptions of social categories and racialized the sistema de casta.

Evidence for a Categorical Shift

Historians have used several lines of evidence to identify the formal adoption of the sistema de castas. Schwaller (2016; see also Vinson 2017:38-39) examines the etymology of the term "casta" as a socio-racial category used in colonial documents. The label traditionally referred to purity in breeding and untainted lineage, first to animals and then later to people (Schwaller 2016:21-22; Vinson 2017:38). As late as 1611, Covarrubias's Castilian dictionary defined casta as "vale linage noble" – signifying noble lineage (see also Schwaller 2016:22). It was not until the 1620s that the term "castas" was used in the plural form to refer collectively to colonial people of mixed European, African, and native descent (Schwaller 2016:27).

More commonly, scholars have looked to the changing organization of parish records for evidence that the casta system was formally adopted within a city or region (e.g., Chance 1978:126,193; Cope 1994:24; Martínez 2008:142; Seed 1988:251). Official recordkeeping of the colonial population had a late start, but the earliest perish registers for baptisms, marriages, and deaths were kept separately according to the dual republic system between *libros de españoles* (book of Spaniards) and *libros de indios* (book of Indians). This pattern changed in the seventeenth century as increasing numbers of parishes throughout New Spain began to keep a third set of registers for people of mixed descent. It is likely not an accident that this change in recordkeeping began around the time that the collective category "castas" became common.

In addition, while the term mestizo was increasingly used in sixteenth century ordinances and reports, it rarely appears in early parish records. The situation began to change in the seventeenth century when the category "mestizo" became more consistently applied to people of mixed Spanish and native descent, regardless of the father's status or legitimacy of the offspring (Martínez 2008:144). Historians have identified several causal mechanisms for these shifts in categorization.

Environmental and Cognitive Mechanisms: Socio-Demographic Shift

In terms of socio-demographic mechanisms, interaction between diverse people produce mixed offspring that did not fit into either of the dual republics established during the early colonial period. As already noted, many children of Spanish-native unions were initially absorbed into Spanish families. As the Spanish female population increased through immigration and colonial reproduction, Spanish men were less inclined to claim mestizo offspring. As a result, mestizos become increasingly identified with illegitimacy (Martínez 2008:146-147). Martínez (2008:146) suggests that the more consistent application of the term "mestizo" represented a cognitive shift from a patrilineal basis of social classification to one based on bilateral descent.

Bottom-Up Mechanisms of Change: Socioeconomic Mobility

Microlevel relational mechanisms were largely tied to socioeconomic mobility, both up and down the economic ladder. Despite the social stain of illegitimacy and legal restrictions placed upon them, some mestizos, mulatos, and free blacks were achieving modest economic success. Individuals within these groups were taking advantage of colonial commercial opportunities to infiltrate artisan guilds and retailing, becoming merchants and even small landowners. In addition, the Crown relented and allowed legitimate mestizos to enter the clergy and even awarded some with native governorships (Cope 1994:20-21; Martínez 2008:147). Simultaneously, there was a growing population of impoverished Spaniards, a burgeoning problem reported by Viceroy Velasco as early as 1553. Imperial policies of the late sixteenth and early seventeenth century noted an increasing problem of unemployed vagabonds in New Spain. Royal legislation identified these individuals not only as mestizos, mulatos, and blacks, but also españoles (Cope 1994:20-21; Martínez 2008:147). The colonial social order that envisioned Spaniards at the apex of a socioeconomic hierarchy with natives and blacks as the predominant labor class was showing signs of breaking down.

Cope (1994:22-24) argues that as a result of social mobility, stratification in Mexico City began to reflect a *gente decente-plebe* model (see also Brading 1971:20-21; Chance 1978:127). This model emphasizes economic and some cultural elements rather than socio-racial characteristics and was similar to the Iberian noble-commoner hierarchy. The gente decente were elite "respectable people" and while officials and colonists intended for Spaniards alone to occupy this higher tier, some natives and people of mixed descent (mostly mestizos) also fell into this high status. The plebe, in contrast, were the common laborers that in theory should include mestizos, mulatos, natives, and free blacks. But as noted, some poor Spaniards were falling into this category as well. As in Iberia, elite and official sentiment of the plebe extended beyond their economic condition and characterized them as ignorant, irrational, and debased in character. That many Spaniards were falling in socioeconomic status, while mixed géneros were gaining ground caused anxiety among the colonial elite. The reality of the evolving economic structure of New Spain blurred the boundaries between Spaniards and géneros, eroding colonial justifications for their dominant social position. This situation was made even more stark by the collapse of the native population that colonial officials had envisioned as their primary source of labor and taxes.

Top-Down Mechanisms of Change: Formal Imposition and Formal Incentive Shift

The growing unease among local elites and colonial officials was a major factor in the development of the sistema de casta in Mexico City (Cope 1994:24-25). While socioeconomic realities demonstrated at least some fluidity in social organization, the sistema served to reinforce socio-racial difference. Some Spaniards may hold a low economic status, but within the sistema those Spaniards would still rank socially higher than castas. In addition, colonial officials defined a growing number of ranked casta categories, further dividing the mixed population and creating a buffer between the Spanish elite and lower status castas (Table 3.1). Essentially the sistema was a means to "divide and rule colonial populations" (Martínez 2008:148). Through imperial, regional, and local legislation and practices, the Crown, church, and colonial agents attempted to control the structure of interaction between Spaniards, castas, blacks, and natives (see Martínez 2008:147). Maneuverings by imperial and ecclesiastical authorities represented both the formal imposition of social categories and formal incentive shifts – that is, control through "awards or penalties" (Tilly 2005:141).

Political, economic, and religious control played overlapping roles in the formation of the sistema, as colonial elites and the imperial government saw the mestizo population as a growing threat (Martínez 2008:148). Beginning during the previous century, episodes of rebellion had led to restrictions placed upon mestizos' rights of to bear arms. Further, in 1582 Philip II ordered that no mestizo or mulato hold a position in certain high offices, such as the audiencia. People of mixed ancestry also were excluded from entering the most esteemed guilds and blocked from becoming master artisans. Martínez (2008:239-240) notes that the guilds became an important formal means of regulating and reinforcing the socioeconomic hierarchy (see also Cope 1994:88-89; Gibson 1964:401; Martínez 2008:239-240; Stampa 1954:223-226). Correspondingly, there was a mounting preoccupation with ancestry traced through both paternal and maternal lineages. As the sistema de casta and associated regulations piled up, ancestry and purity of blood was increasingly linked with access to economic resources and prestigious offices (Martínez 2008:158).

Table 3.1. Partial List of Common Categories in the Sistema de Castas (Mörner 1967:58-59; Vinson 2017:45).

Social Category	Categorical Mixture
Castizo	español and mestiza
Mestizo	español and india
Mulato	español and negra
Morisco	español and mulata
Coyote	indio and mestiza
Chino	lobo and negra

The limpieza de sangre and the Holy Office of the Inquisition played a crucial role in the eventual structure of the sistema. Investigatory tribunals were instituted in New Spain in 1571 (McAlister 1984:427). Problems of blood purity in the colonies were framed, as in Iberia, in terms of religion and lineage. Although the clergy expressed increasing cynicism toward the conversion of native people, it was believed they could eventually obtain the status of cristianos viejos (Martínez 2008:169). Notably, this process could be hastened through miscegenation between natives and Old Christians. This was based on the idea that blood could transmit biological, moral, and religious traits. If Spanish blood could purify, then African blood was seen as contaminating. Blacks were associated not only with religious infidelity, but slavery. Over time, Spanish writers (such as Torquemada) increasingly associated blackness with divine punishment for the sins of Ham. While this philosophy had previously been used to justify slavery, it also came to support the argument made by Fray Prudencio de Sandoval and others that blacks and their descendants were *permanently* stained (Martínez 2008:158,169,222; Palmer 1976:39; Sandoval 1955[1606]:319). That is, unlike the indigenous people, no amount of mixing with European blood could diminish the impurity of African descendants.

Concepts of blood purity arrived early in the conquest, but then continued to evolve through *both* colonial and transatlantic interaction (Martínez 2008:175; Stoler 1995:30; Vinson 2017:44). Restrictions placed on civic and ecclesiastical positions required that individuals who sought political power prove that they were Old Christians and free of the stain of heretics and African blood. The Inquisition served a key role in investigating individuals and providing the required certificates of blood purity. In sixteenth century Iberia, inquisitors developed the method of calculating purity in terms of proportion, such as “half Christian,” “one-quarter Christian” and so on, based on their lineage. This method translated to the American colonies, eventually becoming entrenched within the sistema de castas. While a mestizo was essentially half Christian, “castizo” represented the mix of an español and a mestizo. Or in Iberian terms, a person who was three-quarter Old Christian (Vinson 2017:44-45). By the early seventeenth century, the Spanish Inquisition adopted the policy that only a person with no more than one-quarter native blood and without black stain could obtain certification of purity (Martínez 2008:166). The Inquisition thus served as a formal mechanism for reinforcing the social structure of the sistema de casta.

Throughout the seventeenth century, the Inquisition as well as other imperial and local institutions imposed the sistema de castas by excluding castas from privileges based upon purity of blood. Royal restrictions against mestizos' rights to bear arms were reiterated in 1654, 1661, and 1668, and also were evident through the many individual petitions for formal licenses to carry weapons (Schwaller 2012; Vinson 2017:49).[4] In 1643, illegitimate mestizos were prohibited from serving as soldiers in the military (Mörner 1967:43). Beginning in the first half of the century, municipal officials frequently reserved vecindad for españoles exclusively. In 1630, King Charles I barred natives, mulatos, and illegitimate mestizos from attending colonial universities. Given that a college degree was required for many official and ecclesiastical posts, this policy had far-reaching implications (Martínez 2008:152).

Cognitive Mechanisms of Change: Scientific Philosophy

Finally, historians such as Vinson (2017:44-45) argue that shifts in scientific philosophy reinforced the racial hierarchy that was ultimately embedded within the sistema. Early Iberian notions that climate negatively affected people born in America represented a threat to criollo power and access. In the early seventeenth century, colonial elites responded through public discourse and debate, arguing that European blood was naturally resistant to environmental effects that otherwise damaged natives (Cañizares

Esguerra 1999; Martínez 2008:138-139; Vinson 2017:44-45). These elitist arguments not only reinforced Spanish superiority, but simultaneously elevated the importance of a person's bloodlines above environment in the purity or corruption of a person's body and mind. If lineage was more important than environment in shaping a person's culture and biology, then a person's phenotype may be a more important gauge of blood purity.

These debates led to the racialization of the sistema de castas during the seventeenth century by linking the principal parent groups (españoles, indios, and negros) to "essential" biological characteristics and mental capabilities (Cañizares Esguerra 1999; Martínez 2008:138-139; Schwaller 2016:44). According to seventeenth century discourse, natural environmental effects were limited by inherent racial qualities. These arguments were seemingly supported as subsequent generations of criollos and blacks did not evolve into natives (Cañizares Esguerra 1999:61-64; Schwaller 2016:44).

From Sistema de Castas to Incipient Economic Class in the Eighteenth Century

Cope (1994:7) has argued that the period between 1660 and 1720 marked the apogee of the sistema de casta. Following this period, numerous historians have documented growing signs of instability in the sistema and a shift toward economic class as an increasingly important driver of the social order during the eighteenth century (e.g., Boyer 1997:66; Chance and Taylor 1977, 1979; Martínez 2008; McAlister 1963; Seed 1982; Seed and Rust 1983; Vinson 2017). The sistema was an idealized social order where race determined political position, labor relations, and social status. With the sistema's roots in the sixteenth century, Spaniards were the privileged beneficiaries of native tribute and food production, while Africans and their descendants provided skilled and unskilled labor in the plantations, mines, and households (Seed 1982:569). As unions between these parent groups produced mixed offspring and the sistema de castas solidified in the seventeenth century, the idealized relationship between race and class expanded to include people of mixed descent. The placement of castas within colonial society was reinforced by municipal, viceregal, and imperial legislation and institutions (Martinez 2008; Mörner 1967; Schwaller 2012; Vinson 2017).

Based on accumulated colonial legal precedents, Mörner (1967:61) suggests the following idealized relationship between casta and economic class. Peninsulares were the bureaucrats and merchants. Criollos were the large landowners and mestizos were the artisans and shopkeepers. Mulatos were the urban manual laborers and natives were peasants and unskilled laborers. Reinforcing this racial hierarchy during the eighteenth century was a series of "casta paintings" (e.g., Carrera 2003; García Saiz 1989; Katzew 2004). These paintings were largely produced for elite consumption in Spain by criollo artists, although a few were created by mixed castas themselves (Katzew 2004; Martínez 2008:227). The subject matter of these paintings was the generational reproduction of different casta categories presented through a series of panels (Figure 3.2). Each panel typically featured a father, mother, and at least one child with inscriptions identifying their casta categories (Katzew 2004; Martínez 2008:227). Importantly, these paintings included contextual imagery that promoted cultural stereotypes and linked casta categories to socioeconomic roles (Katzew 2004; Seed 1982:574) A preponderance of historical evidence, however, suggests that this was not the colonial reality and that by the 1700s the relationship between racial identification and economic position was diverging.

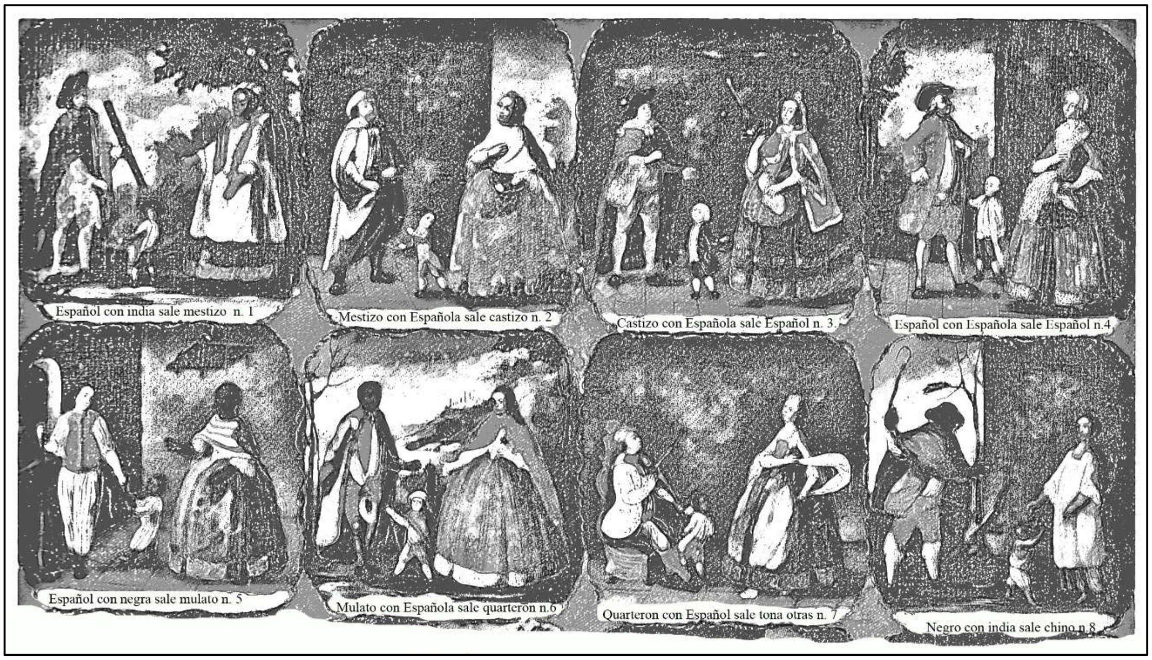

Figure 3.2. Casta Painting from ca.1750, Unknown Artist (Adapted from Katzew 2004:36, Plate 61)

As was seen in early seventeenth century Mexico City, a perfect correlation between labor and race never really existed (Cope 1994). Nonetheless, the consensus among modern historians is that the casta system was relatively stable as a primary determinate of the colonial social order until the mid-eighteenth century (e.g., Anderson 1988; Boyer 1997:64; Chance and Taylor 1977, 1979; McAlister 1963; Seed 1982). It was during the final century of Spanish colonialism that the basis of the colonial hierarchy began to shift from casta to economic class. Scholars have documented late colonial shifts in social structure using quantitative data drawn from organizational and tax records, church and civil censuses, and particularly from parish records (see Schwaller 2016:7).

In this final section, I first outline the evidence for the decline of the casta system and the development of an incipient economic class. I next describe the causal mechanisms responsible for this transformation. New imperial and ecclesiastical policies formally transferred some groups across religious boundaries and created new incentives for cross-boundary interaction, thus eroding perceived distinctions between Spanish, casta, and native groups. Developing capitalism and the Enlightenment shifted socioeconomic values and promoted the accumulation of wealth through commerce and advanced alternate criteria for categorization. At the same time, historians have noted large-scale shifts in labor relations away from coercive means. That is, there were substantial declines in the African slave trade and labor drafts, and regionally variable reductions in debt peonage, while free wage labor grew in importance (Aguirre Beltrán 1944; Gibson 1964:253-255; Salvucci 1987:117-121; Van Young 1981:244-261, 1983:12).[5] Socioeconomic mobility was again an important relational mechanism that drove change from the bottom-up, leading to a growing incongruity between casta and economic position. Elites and imperial agents seemingly could not halt these changes. By the end of the century, new imperial policies even allowed castas to purchase "whiteness," while the sale of hidalgo status became more prevalent. These policies had the effect of formally transferring individuals across existing social boundaries.

Evidence for a Categorical Shift

Much historical work has focused on the growing divergences between race and occupation in the eighteenth century. Brading's (1971) seminal study of the 1792 census for Guanajuato found that peninsulares and criollos dominated elite positions and mulatos were largely isolated to the bottom economic rung of society. Mestizos, however, represented an "ambiguous middle layer" with no consistent link with any occupational position (Brading 1971:258). Adapting and updating Brading's methods, Chance and

Taylor (1977, 1979) also documented divergence between race and economic position for criollos, mestizos, and mulatos in late colonial Antequera (Oaxaca).[6] Criollos in particular occupied all levels of the economic hierarchy, with more than half of criollo men working as low-status artisans. Variable degrees of divergence in the link between race and the division of labor also has been documented in other locations, such as eighteenth-century Mexico City (Seed 1982; see also Valdes 1978), Puebla (Thomson 1989), Orizaba (Castleman 2001), and early nineteenth century Guadalajara (Anderson 1988),

In addition to labor, historians point to changes in marriage patterns and increased rates of exogamy as evidence for the blurring of social boundaries based upon casta (e.g., Anderson 1988:220; Castleman 2001; Chance and Taylor 1978:477; Frederick 2011; Martínez 2008:238-239). Chance and Taylor's (1977, 1979) study of parish records in late eighteenth century Antequera found that while Spanish and native people were the most endogamous, they still married outside their group in more than 30 percent of cases. Meanwhile, castas were intermarrying across casta boundaries in 60 to 75 percent of cases. This pattern of intermarriage is roughly comparable to subsequent historical studies in other locations, including Mexico City (Valdes 1978), Puebla (Thomson 1989), Orizaba (Castleman 2001), and Teziutlán, Veracruz (Frederick 2011).

Another noted change was the proliferation and growing emphasis placed on alternate classificatory frameworks found in tax, organizational, and Inquisition records, as well as ecclesiastical and civil censuses (Andrews 2016; Boyer 1997; Martínez 2008:247; McCaa 1984; Vinson 2017). Within a single document, descriptions of individuals increasingly included references to *calidad* (overall quality and reputation), *condición* (phenotype or lineage), and *clase* (socioeconomic position) (Martínez 2008:247; McCaa 1984; Vinson 2017:56-58; Rappaport 2014). Casta and calidad often were used interchangeably during the eighteenth century (Andrews 2016; Boyer 1997; Martínez 2008:247; McCaa 1984; Vinson 2017). Growing emphasis placed on other dimensions of social difference also extended to descriptions of marital partners. For instance, in 1752, a member of the clergy in Tlaxcala argued that husbands and wives should share not only a common casta, but also a similar social status and economic class (Martínez 2008:248). In some cases, casta was not even recorded in late colonial baptismal records and it appears that such judgments were not made until individuals married – suggesting that racial lineage was not the overriding determinate of casta assignment (e.g., Chance and Taylor 1977; Frederick 2011).

Finally, historians have taken stock of the inconsistent application of casta categories in the eighteenth century (e.g., Boyer 1997; Castleman 2001; Chance and Taylor 1977; Cope 1994; Frederick 2011; Martínez 2008; Mörner 1967; Seed 1982; Vinson 2017; Von Germeten 2006). Historians such as Boyer (1997), Twinam (1999, 2015), and others have noted many anecdotal cases of individuals "passing" or changing their casta category in Inquisition and other documents. More systematic comparisons between census data from multiple years, as well as baptismal and marriage registers also demonstrate that individuals sometimes changed their casta over the course of their lifetime. In Orizaba, between the 1777 and 1791 censuses, hundreds of individuals changed their casta and in most cases these changes moved individuals up the casta hierarchy (Castleman 2001:237-238). Similar adjustments in casta assignments have been documented in Mexico City (Cope 1994; Seed 1982; Valdes 1978) and Antequera

(Chance and Taylor 1977). For late eighteenth century Antequera, Chance and Taylor (1977:466) suggest that so many mulatos were passing as españoles that the mulato category would disappear from the city by the mid-nineteenth century. For Guadalajara, Anderson (1988:240) argues that the mulato category had already disappeared by the early nineteenth century (see also Valdes 1978 for evidence of a similar pattern in Mexico City). Scholars have attributed instability in the casta system and observed shifts toward economic class to environmental, cognitive, and relational mechanisms.

Top-Down Mechanisms of Change: Formal Collective Transfer and Formal Incentive Shifts

Imperial and ecclesiastical policies underwent adjustments that formally transferred some groups across existing social boundaries and created new incentives that eroded perceived distinctions between Spaniards, castas, and natives. During the late seventeenth century, external and internal pressures led to renewed debates regarding limpieze de sangre (Martínez 2008:201-207). External pressures came from European powers that questioned Spain's right to American territory, propagating the Black Legend – accusing the Spanish Empire of exploiting and committing genocide against the native population. Given that Spain had long used evangelism as a justification for its expansion in America, it was politically expedient to assess the religious status of natives and their mixed blood descendants. At the same time, a surge in both the number of castas and the local restrictions placed on their participation in various institutions necessitated a reassessment of native and casta legal standing (Martínez 2008:206).

In the late 1600s, the Supreme Council of the Inquisition assembled to reconsider who could claim sufficient blood purity to enter restricted institutions, particularly within ecclesiastical offices (Martínez 2008:201-205). The council confirmed the status of criollos as cristianos viejos despite calls by some peninsulares to exclude them. In addition, the council determined that the descendants of early native converts were now "pure" and worthy of the title cristianos viejos. This would logically include their mixed blood mestizo descendants, as well. King Charles II concurred with the council's decision in 1697, decreeing that indigenous Christians held both purity and legal equality with Spanish hidalgos (Martínez 2008:205). Martínez (2008:206) argues that this conclusion was necessary to justify Spain's two centuries of American conquest and colonialism. If native people and their descendants could not achieve the status of Old Christian after multiple generations, then in religious terms their colonial project might be considered a failure. This decision, however, had the effect of blurring an important religious boundary between natives, mestizos, and españoles.[7]

Around the same time, church policies hardened against extramarital unions, threatening to excommunicate unwed couples (Martínez 2008:238). This policy shift created an incentive for black and casta intermarriage and, consequently, increased legitimacy rates (Chance and Taylor 1977:462; Seed 1988:97-98; Martínez 2008:238-239; Valdes 1978:33).[8] As was seen in earlier periods, illegitimacy had become a cultural stain associated with people of mixed descent. Growing legitimacy rates among blacks and castas reduced a perceived social difference between Europeans, blacks, and castas in the eighteenth century. The Church further magnified this shift in the 1690s when ecclesiastical officials ended previous practices of protecting European women by allowing them to marry in secret and without the required banns in order to hide premarital pregnancies (Seed 1988:97-98).

While the actions of the Church and Crown eroded social boundaries by minimizing religious and moral distinctions, eighteenth-century Bourbon reforms had the effect of reducing the economic standing of criollos. In order to create a more efficient mercantile economy, the Bourbon monarchs believed that they needed to restrain the power of local elites and expand the royal bureaucracy (Martínez 2008:241). Reforms included reducing the power of Mexico City's merchants' guild, establishing new monopolies over some colonial trade goods (e.g., tobacco and pulque), expanding the imperial bureaucracy, and raising sales taxes on the colonial economy. These alterations in colonial policy were a boon for Spain but were less beneficial in the colonies, exasperating the already skewed distribution of wealth (Garner 1993:255; Martínez 2008:241-242). Peninsulares who were awarded with new royal positions benefited from Bourbon reforms, while some criollos fell in economic standing (Martínez 2008:242).

Environmental and Cognitive Mechanisms: Developing Capitalism and the Enlightenment

While shifts in imperial and ecclesiastical policies played important roles in reshaping the colonial social order, most scholarly discussion has focused on the increasing flexibility and social mobility within the sistema de casta (e.g., Boyer 1997; Castleman 2001; Chance and Taylor 1977; Martínez 2008; Vinson 2017). Before discussing these relational mechanisms directly, it is important to describe the large-scale environmental and cognitive mechanisms that contributed to those changes. Developing capitalism was a key macroscale process that concatenated with other mechanisms, producing instability within the sistema. As the colonial economic system shifted emphasis from coercive labor under mercantilism to free wage labor and open international trade, social status became less dependent on political power and increasingly tied to commercial exchange and the accumulation of wealth (Boyer 1997:66; Chance and Taylor 1977:485; McAlister 1963:366-367). Potential for social mobility increased as the medieval stigma that had been long tied to commerce receded. Trade and craft production outside of corporate guilds grew and restrictions within artisan guilds were loosened (McAlister 1963:368-370).

The value of personal labor, achievement, and "other principles of enlightened rationalism" contributed to the growing number of references to other measures of identity, such condición, clase, and overall quality of individuals expressed through calidad (Martínez 2008:247). As Martínez (2008:247) notes, "the ancient regime's lexicon of purity of blood increasingly merged with 'bourgeois' concepts of diligence, work, integrity, education, and utility to the public good." Casta categories were more frequently applied using reference to community assessments of personal character, economic position, and phenotype, or what Cope (1994:57) has referred to as "reputational" race.

While official policies of the Catholic Church continued to emphasize blood purity in terms of religious and genealogical lineage, in practice the process of determining limpieza de sangre was becoming more and more secularized (Martínez 2008:248). Scientific exploration and debates that began during the previous century continued. Interest in the impact of nature, environment, and biology reinforced popular ideas about the link between blood purity and phenotype, particularly skin color (Martínez 2008:248; Vinson 2017:35-68). Due to population movements or inconsistent record keeping, locating reliable records of individual lineage was often not possible. The

Inquisition and other institutions regularly turned to community witnesses whose testimonies veered from religious and genealogical lineages and emphasized phenotypical descriptions instead (Martínez 2008:248-249; Vinson 2017:50). While clergy might sometimes rely on skin color if the parents were unknown or they distrusted parental claims, ecclesiastical officials still tended to depend more on ancestral lineage and calidad (Martínez 2008:248; Vinson 2017:49-51). In other words, colonial realities were conflicting with and shaping Church and imperial policies.

Bottom-Up Relational Mechanisms of Change: Socioeconomic Mobility

Based on her research in Mexico City, Patricia Seed (1982:583) suggests economic pathways for the advancement of castas. Blacks and natives could attain social mobility by acquiring a skill and joining the ranks of mestizo and mulato artisans. Through this form of economic advancement, some natives and blacks might "pass" as mestizos or mulatos. In turn, mestizos and mulatos could advance from the intermediate group to the ranks of españoles by amassing the necessary capital to acquire property (i.e., tools and shops). By linking data from parish and census data, Seed (1982:596-598) documented several cases between 1752-1753 in which castas changed their racial category at least in part through skilled labor and property ownership. Similar cases have been observed in Orizaba (Castelman 2001:240-245), and Antequera (Chance and Taylor 1977).

Mörner (1964:54) referred to the popular emphasis on physical appearance for assigning casta as "pigmentocracy." Colonists imagined that inherited physical attributes could render stable categories, but genetics instead created extensive variability that made casta assignments socially subjective (Seed 1982:573). The complexity of the sistema was further complicated by the rapid growth of the casta population and the number of casta categories used to define them. By the late eighteenth century, the number of casta labels had grown to as many as 40 categories so that, in theory, an individual could be classified to the third or fourth generation. In reality, however, only between four and seven categories were regularly found in parish registers, tax rolls, and censuses (Frederick 2011:508; Martínez 2008:166,239; Mörner 1967:58-59; Seed 1982:573). As a result, it was rare that casta categories accurately reflected true ancestral lineage. Instead, inconsistencies and individual shifting between categories were guaranteed (Frederick 2011:508; Martinez 2008:225).

Elites and colonial institutions managed and legitimized social categories through their "power to create definitions, archives, and classifications" (Martínez 2008:225), but once defined, categories could be manipulated by individuals and groups from the bottom up. "Slippage" between casta categories proved more situational than systematic, providing opportunities for individuals to maneuver between categories for social or economic advantage (Frederick 2011:508; Boyer 1997). Individual motivations for manipulating social categories are found within the accumulation of laws and regulations that alternately awarded some racial groups and penalized others. "Whitening" an individual's casta brought social prestige and status, but also practical advantages, such as exclusion from taxes, access to some ecclesiastical and political offices, the ability carry arms without restrictions, vecindad status, and participation in certain merchant and artisan guilds (Boyer 1997; Martínez 2008:167; Mörner 1967:41-42). It should be noted that in some cases, individuals also might attempt to pass for a lower ranked category. A mestizo, for instance, might try to distance themselves from their European roots to avoid the jurisdiction of the Inquisition or military service. Alternately, a native might try to pass as a mestizo if military service was desirable or to avoid the head tax (Archer 1975:233; Boyer 1997; Castleman 2001:233; Martínez 2008:167; Mörner 1967:41-42).

Social mobility as a mechanism of social transformation can be further parsed into other mechanisms that caused movement up and down the colonial hierarchy. One such mechanism was physical migration to a new location where an individual's background was unknown (e.g, Boyer 1997; Castleman 2001; Ouweneel 1996: 14–15; McAlister 1983:398-399; Parker 1993). A person could also change their appearance in order to pass as a higher ranked casta. An eighteenth-century traveler, Concolorcorvo, suggested that passing between castas might be achieved just by changing one's clothing and hygiene (Mörner 1967:69; see also Twinam 1999).

Marriage offered another opportunity to rise within the casta hierarchy. Anderson (1988:220) argues that societies have a "conservative resistance" toward changes in marital patterns. Thus, the rate of intermarriage was probably even more extensive than officially reported. Anderson's argument is based, in part, on the clergy's late colonial propensity to "equalize" the recorded casta category of married couples. In several studies comparing parish and census data, scholars have found that individually assigned casta categories sometimes shifted when an individual married (e.g., Chance and Taylor 1977; Castillo Palma 2000; Castleman 2001; Frederick 2011; Seed 1982). Often this meant that the casta of one marriage partner was elevated to more closely equal their higher status spouse.

A common means of social advancement in empires generally, and the Spanish colonies in particular, was through military service (Sinopoli 1994:166-167). In New

Spain, social mobility through military successes had its roots in the Iberian reconquista, when it was inextricably linked to Christian nobility (McAlister 1963, 1984:32-33). Social and economic gain through military achievements carried over to the Spanish colonies during the height of the American conquest. By the end of the sixteenth century, however, there were fewer opportunities to win extensive lands and wealth through military exploits. There still remained, however, more modest advantages to military service, particularly for castas, blacks, and natives. Service in the military raised the reputations of individuals in the eyes of the state as trusted and responsible allies in the imperial project. More concretely, service provided slaves an avenue to manumission. For free castas it gave access to arms, and exemptions from the head taxes. In some cases, castas were able to advance through the ranks and obtain officer commissions (Vinson and Restall 2005).

Restrictions placed on service in the regular army remained in effect. Even criollos were typically excluded from the highest ranks of the regular army until the Bourbon reforms of the late eighteenth century (Marchena Fernández 1990:57; Vinson and Restall 2005:20). For most of colonial history, militias made up the bulk of colonial defense (McAlister 1957:2). In 1540, a royal decree required that all colonial towns form their own militias in order to supplement the regular army that was sparsely represented in New Spain. As most locations lacked a large European and criollo population, many communities allowed natives, free blacks, and their descendants to form militias (McAlister 1957; Vinson and Restall 2005:23). By the end of the seventeenth century, black and mixed militias were common and provided opportunities for individuals to improve their social and economic status (Vinson and Restall 2005:43-44).

While militias provided benefits for individuals serving locally, other forms of military duty afforded more debatable gain even for those from the lowest ranks of society. Presidial companies were separate from both the regular army and the militias (Moorhead 1975:178). They were essential for guarding the northern frontier and important ports in New Spain. In Northern New Spain, the ranks of most presidial companies were drawn from local populations and thus provided some socioeconomic rewards for those who served. It appears that officials in these regions had little difficulty drawing volunteers (Archer 1975:234; Moorhead 1975). Other locations, such as the Port of Veracruz and the Northwest Florida presidios, were supplied with troops recruited, and often conscripted, from outside their respective regions (Archer 1975:234 McAlister 1957; Pike 1978). Non-local recruits fared poorly in these locations where – after being separated from their families – they suffered from outbreaks of yellow fever and high death rates (e.g., Archer 1975:234-236; Coker 1998). Despite the substantial drawbacks for those pressed into military service in distant presidios, individuals still received the standard benefits from service in the military, such as tax exemption.[9] In addition, distance from a soldier's home community may have provided circumstances in which a person might remake themselves – provided they survived the experience.

Top-Down Mechanisms of Change: Formal Individual Transfer

Social mobility within the sistema de castas may have reached its pinnacle when the Crown facilitated (for a price) the formal transfer of individuals to different social categories. In 1795, the Spanish state released a price list that included *cédulas de gracias al sacar* (certificates of whiteness) (see Twinam 2015). The subjects of these royal favors were primarily people of African descent. Although historians have long been aware of this favor in the royal price lists, Twinam's (2015:151-176) analysis of 40 petitions for whitening demonstrates precedent that such petitions extended back to at least 1743. These petitions were to allow people of African descent to take up occupations that were otherwise closed to them.

At the same time, there was a growing trend of selling hidalguía, legally granting españoles and native elites the noble title of "don" or "doña" (Mörner 1983:354-355; see also Valdes 1978:125). The Crown had long been hesitant to grant the legal title of nobility to colonial elites, often leading criollos and peninsulares to adopt the title informally. Mörner (1983:355) argues that by the eighteenth century simply being categorized as an español was akin to having a hidalgo status. Yet, not all españoles were legally granted hidalgo status and census takers did not label all criollos and peninsulares as dons or doñas (e.g., Anderson 1988; Castleman 2001). Castleman (2001:245) argues that the erosion of the casta system may have led to restrictions on the use of this status title. Nevertheless, the sale of hidalguía increased to the extent that by the nineteenth century the title was sold even to those who could not establish their Spanish lineage (Valdes 1978:126). By granting petitions for "whitening" and then later selling gracias al sacar and hidalguía, the Crown at least tacitly embraced the mutability of casta categories by the end colonial period.

Summary

In this chapter, I reviewed historical trends in social categories over three centuries and at a macroscale that geographically included locations throughout New Spain. I identified evidence for major shifts in social categories and the causal mechanisms – cognitive, environmental, and relational – for those changes that have been identified historically (see Figure 3.1). In sum, during early encounters, colonists borrowed from Iberian ideals regarding the proper ordering of pluralistic societies. The géneros de gente encompassed socio-religious, socioeconomic, socio-geographic dimensions of identification. As colonial people engaged in sexual relations across géneros, colonists added new labels to categorize individuals that did not easily fit within either of their parental groups. Through casuist laws and use of analogic precedents, colonial categories were formally imposed and incentivized. By the seventeenth century, declines in native communities and growth in peninsulare, criollo, and mixed populations had changed the socio-demographics of New Spain. The sistema de castas developed and was formally imposed and incentivized during the seventeenth century as a means of control over a socioeconomically mobile society. A concurrent shift in scientific philosophy racialized this system. Yet, by the early eighteenth century, the sistema as the main hierarchical structure of colonial society was already beginning to break down. External and internal pressures led the Crown and church to formally transfer racial groups across socio-religious boundaries. New ecclesiastical incentives contributed to increased intermarriage between casta groups, increasing legitimacy rates and thus further blurring social distinctions. When combined with developing capitalism, Enlightenment ideals, and increasing socioeconomic mobility – both up and down the colonial hierarchy – the result was a growing incongruity between casta and economic position. The Crown appeared to acquiesce to colonial transformations by selling certificates that formally transferred individuals to other casta and socioeconomic categories. A number of historians have argued that these changes represent a large-scale shift toward an incipient economic class.

Macroscale social transformations – from the development of géneros de gente to the sistema de castas, and, finally, the early development of an incipient economic class – took place within the context of shifting labor relations – from reliance on native labor drafts and the African slave trade to a growing dependence on semi-free and free wage labor. From the beginning of the conquest, social categories were borrowed from Iberia and structured, at least in part, based on who performed colonial labor and who reaped the benefits. As labor relations evolved, so too did categorical labels as a means of social control. Mechanisms for explaining the transformation of social categories developed dialectically between local colonial interactions and imperial institutions. The mechanisms that I have underscored in this chapter are not new insights but have been drawn from decades of historical research.

This chapter has focused on trends that are visible at the macroscale, encompassing multiple levels of interaction. Macrolevel imperial policies impacted social relations and categories from the top down, while microlevel interactions involving socioeconomic mobility, sexual unions, and marriage patterns had emergent effects from the bottom up. Despite the incorporation of multilevel interactions in this discussion, the macroscale perspective has the effect of muting regional variability in order to highlight general patterns. Regional differences in natural resources, indigenous cultures, local colonial governments, as well as community and regional location within multiscalar exchange networks all created initial conditions that, when combined with concatenating relational mechanisms, created unique local trajectories in relational and categorical modes of identification. Local changes may or may not have spread to other locations, but when they did, imperial responses through casuist jurisprudence and analogical use of precedents played a key role. In the next chapter, I use insights from this macroscale review to assess relational mechanisms involved in local transformations at the Port of Veracruz and the borderland presidios of Northwest Florida.

[1] "New Laws" is an abbreviation for Laws and Ordinances Newly Made by His Majesty for the Government of the Indies and the Good Treatment and Preservation of the Indians.

[2] Historians, sociologists, and archaeologists frequently use the term "mestizaje" (among other concepts) to refer to biological mixing that produced mestizo populations. I am not using the term here for two reasons. First, I wish to avoid theoretical and political ideas that are often attached to the term both in modern and historical parlance (e.g., Vinson 2017; see also Chapter 2). Second, mestizaje generally sidesteps the role of people of African descent in this process.

[3] Much early historical work focused on the role of debt peonage in maintaining a permanent labor force for agricultural production (e.g., Chevalier 1963:277-288; Frank 1979:66-77). More recent scholarship in new regions and with coverage in the seventeenth century have revealed variability in labor regimes -- ranging from dependence on debt peonage for small-scale production and local distribution to highly commercialized production using slaves, free wage, and mixed sources of labor for interregional distribution of raw materials and products (Arroyo Abad et al. 2012; Chance 1988; Charlton 1986:129; Van Young 1983). For urban locations, wage labor also became important for unskilled and skilled labor, as well as domestic service (Cope 1994; Guthrie 1939). Debt peonage has been documented in bakeries and textile obrajes (workshops) at Mexico City and elsewhere (e.g., Cope 1994:99-100; Gibson 1964:243; Salvucci 1987:105-107).

[4] Viceroys did grant a growing number of licenses to bear arms to mulatos and free blacks for service in militias and for other practical purposes despite royal prohibitions (Schwaller 2012, 2016:75; Vinson 2017:49).

[5] There was an apparent shift from the seventeenth century – at least is some regions -- from nominally free debt peonage to free wage labor. In the region surrounding Guadalajara, Van Young (1981:245-259) has documented significant drops in indebtedness throughout the eighteenth century. This pattern has similarly been shown in the Valley of Mexico during the same period (Gibson 1964:254-255; Van Young 1983:12). The Spanish state never approved of debt peonage and royal officials instituted regulations attempting to curb the practice since the end of the sixteenth century (Gibson 1964:253; Chevalier 1963:283-285; Salvucci 1987:112). In the eighteenth century, legal caps on debt were instituted by the viceroy and the royal audiencia to protect the freedom of wage laborers (Van Young 1981:260; see also Zavala 1944:732-744). The recovery of the native population at the end of the seventeenth century likely also played a key role in shifts toward free wage labor by providing an ample labor pool (Van Young 1981:256-261, 1983). Salvucci (1987:134) similarly has identified declines in coercion for most regions. For instance, there were documented declines in debt peonage in obrajes located the Valley of Mexico and the Puebla-Tlaxcala Basin (Salvucci 1987:117-121).

[6] McCaa et al. (1979) have questioned some aspects of Chance and Taylor's (1977) methods, but largely agreed with their overall interpretations. Seed and Rust (1983) have, in turn, criticized McCaa et al. (1979) for their approach and supported Chance and Taylor's (1977) interpretations.

[7] Notably absent from both the king's and the council's decree were people of African descent.

[8] Valdes's (1978) examination of Mexico City's baptismal records dating between 1724 and 1811 revealed that legitimacy rates for castas were typically higher than 60 percent, while legitimacy rates for castizo and españoles varied between 60 and 80 percent. Even more stark, Chance and Taylor's (1977:462) study of marriage registers from Antequera suggest that between 80 to 90 percent of all participants between 1793 and 1797 claimed legitimate birth. In fact, if these parish records are at all reflective of reality, criollos had a slightly lower rate of legitimacy than castas in late colonial Antequera.

[9] Not all conscripts laboring at the presidios were enlisted soldiers. Many were forzados (convict laborers) who, based on the severity of their crimes, received no military benefits (Clune et al. 2003:27; Pike 1978).

CHAPTER 4

DOCUMENTING THE MECHANISMS OF SOCIAL TRANSFORMATION IN VERACRUZ AND NORTHWEST FLORIDA

Altering the scale of analysis improves our ability to identify variation and reoccurring mechanisms and processes of social transformation (see Chapter 2). In this chapter, my analysis shifts to the regional and community historical perspective within two different locations within the viceroyalty of New Spain. I examine the top-down and bottom-up mechanisms of change within central Veracruz, with a focus on the colonial Port of Nueva Veracruz (1599-1821) and three sequentially occupied presidios in the frontier region of Northwest Florida (AD 1698-1763. The occupation of the Port of Veracruz spanned each of the macroscale transformations outlined in the previous chapter, from the géneros de gente to the development of the casta system and through the late eighteenth-century shift toward an incipient economic class. During the eighteenth-century, Veracruz was connected to the presidios of Northwest Florida, supplying people and provisions to the frontier settlements throughout their 65-year occupation. Veracruz, therefore, contributes to a shifting baseline for understanding change at the colonial borderland settlements. Colonists first arrived in Pensacola from Mexico during the height of the casta system in New Spain. Later settlers, soldiers, and convicts occupied the presidios during a period of growing instability in the socio-racial hierarchy. Historical analyses of Veracruz and Northwest Florida provide insights into the variability and local mechanisms of social change.

This chapter includes three main sections. In the first two sections, I separately examine the mechanisms of social change in Veracruz and then the presidios of Northwest Florida. For each case study, I first set the stage with a discussion of initial regional conditions, labor relations, and a brief historical overview of the colonial settlements. I then draw on primary and secondary historical evidence to examine the bottom-up and top-down mechanisms of social change in the two regions. Finally, in the third section, I compare the two regions.

Social Transformations at the Port of Veracruz

The Port of Veracruz served as an important gateway for European and African people entering New Spain. For most of the colonial period, Veracruz was one of only four legal ports connecting Spain to its mainland American colonies.[1] Furthermore, a network of roads connected Veracruz to major colonial centers. During the sixteenth century, the port was relocated three times, before Nueva Veracruz was finally established on the mainland across from the island of San Juan Ulúa in 1599. Initially a sparsely populated settlement, the port grew throughout the seventeenth and eighteenth centuries, becoming one of the most economically important port cities in New Spain. In this section, I first set the stage by characterizing the initial conditions and labor relations that developed within central Veracruz over the course of three centuries. I then provide a brief historical overview of the port. Finally, I examine primary and secondary historical sources in order to assess the top-down and bottom-up mechanisms of social change.

Setting the Stage

The native populations that Europeans encountered in Veracruz were culturally diverse, the result of centuries of local development and interaction with and immigration from the central highlands. In addition, the region included several provinces that were already incorporated into the Aztecs empire. Rapid change followed initial encounters, driven by severe depopulation of native communities and the influx of African slaves and European settlers through the port of Veracruz. The categorical distinctions that developed were strongly tied to the control of the evolving labor system. Labor trends roughly paralleled patterns seen throughout New Spain, shifting from coercive institutions based on native labor drafts, then African slavery, and finally to a growing reliance on free wage labor. Despite an early collapse in their numbers, indigenous people dominated inland populations, contributing to colonial demands for subsistence agriculture and some community produced goods and services. Meanwhile, as a permanent labor force, black slaves fulfilled demands for skilled workers. It was within this region that the port was founded and then moved twice before slowly growing in population and economic importance.

Initial Regional Conditions. In 1518, Juan de Grijalva sailed from Havana with 200 men aboard four ships to investigate reports of gold and silver found in lands to the west. Grijalva spent five months exploring the Gulf coastline from the Yucatan Peninsula to Pánuco in Northern Veracruz. He returned to Cuba with stories that inspired Governor Diego Velázque to send Hernán Cortés and over 100 sailors and 500 soldiers to investigate those lands (Díaz del Castillo 1963; Blázquez Domínguez 2000). Traveling first with Grijalva and then with Cortés was the soldier and chronicler Bernal Díaz del Castillo (1963) who later wrote accounts of these earliest European encounters. Cortés landed along the Gulf coast of Veracruz across from the Island of San Juan de Ulúa on Good Friday 1519 (Figure 4.1).

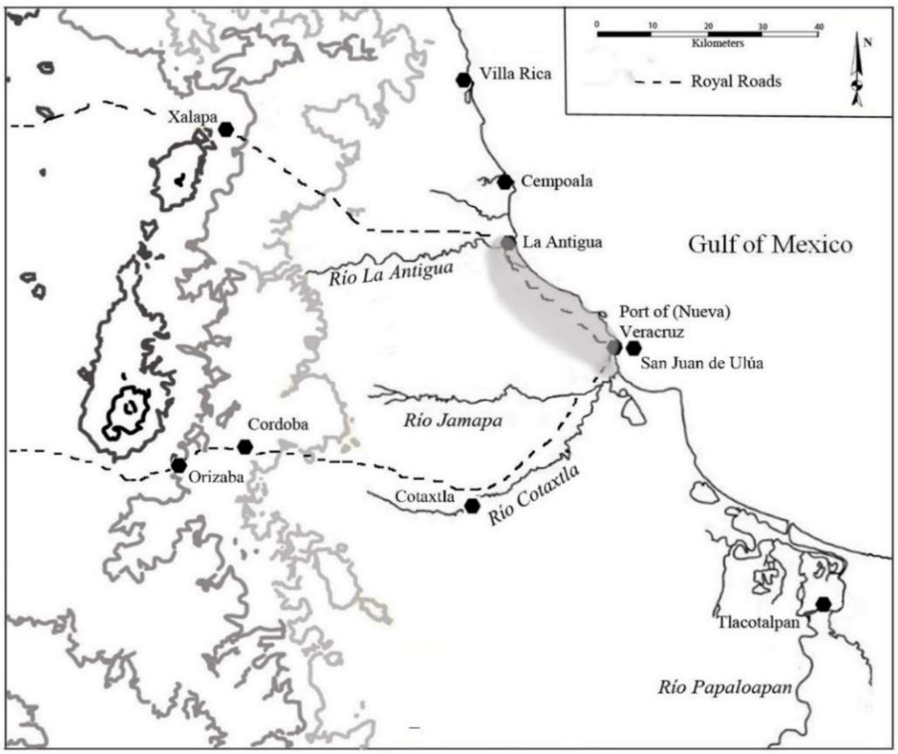

Figure 4.1. Map of Central Veracruz Showing Locations Mentioned in the Text. Shaded area was dominated by non-native people by the end of the sixteenth century (see Sluyter 2002:162)

Although the Cortés expedition encountered envoys of the Aztec emperor Moctezuma, according to Díaz (1963:107-110), there were no significant native settlements in the area directly across from Ulúa. The conquistadors traveled north and encountered Cempoala, a city that Díaz described as a Totonac-speaking Aztec dependency. Both Hernández Aranda (1995) and García Márquez (2014) note, however, that both Totonac and Nahuatl were spoken in communities around and to the north of

Cempoala. The city center itself was likely a heterogenous community, reflecting a mixing of local populations with earlier Postclassic migrants from the central highlands of Mexico (Stark and Eschbach 2018:104-105). Highland to Gulf lowland migrations and interactions were a distinctive feature of the Postclassic period (AD 900-1521). These migrations were evident in the appearance of new materials, such as comales (tortilla griddles) and fondo sellado (stamped base) pottery that were used in central Veracruz by the Middle Postclassic (AD 1200-1350). Later immigration from the central highlands during the Late Postclassic (AD 1350-521) were connected to Aztec expansion (Venter 2012; Umberger 1996).

Early colonial sources, such as the Codex Mendoza (Berdan and Anawalt 1992), the chronicler Fray Diego Durán (1967), and late sixteenth century *Relaciones Geográficas* (Paso y Troncoso 1905) document tributary and strategic Aztec provinces, as well as the immigration of Nahuatl speakers in central Veracruz (see Scholes and Warren 1965; Umberger 1996). The Tochtepec tributary province included towns along the Alvarado (Papaloapan) River, such as Tlacotalpan that continued into the colonial period (Smith and Berdan 1996:287). Xalapa was located in a strategic province, along a major route between the coast and the central highlands – as it was in the colonial period (Smith and Berdan 1996:287). The strategic Cempoallan province was situated along the Gulf coast, north of Ulúa, and included the large center of Cempoala that was encountered by Cortés and Díaz (Smith and Berdan 1996:287).

In addition to these and other Aztec provinces, Duran (1967, 2:244) describes migrations to the Gulf coast following famines in the central highlands in the 1450s.

These population movements and subsequent interactions contributed to the multi-lingual communities encountered by Cortés (Stark and Eschbach 2018). Gerhard (1972:365) asserts that mainly Nahuatl was spoken south of Cempoala, while Totonac was the predominant language within and to the north of Cempoala. This may be roughly the case, but Gerhard's description of individual jurisdictions in central Veracruz, suggests linguistically heterogeneous communities by the early colonial period (Stark and Eschbach 2018:107).

After the arrival of Cortés, there was an outbreak of smallpox in 1520. The population of Cempoala declined from more than 20,000 tributaries (native heads of households) to only 20 tributaries ten years later (Gerhard 1972:365). Similar declines in native populations were recorded in tax assessments and other documents throughout central Veracruz. Depopulation was further exacerbated by outbreaks of measles, typhus, and other unknown diseases (Gerhard 1972:365; Sluyter 2002:153-159). Siemens (1998:107) and Sluyter (2002:153) estimate that more than 90 percent of native populations in central Veracruz had disappeared by 1580. Near some centers, such as Cempoala and Cotaxtla, Sluyter (2002:154) argues that relative declines were as high as 98 percent or more.

Civil authorities in central Veracruz undertook two major phases of congregación to resettle and consolidate scattered native populations into new communities between AD 1550–1563 and 1593–1605 (Cole 2003:77-79; Sluyter 2002; 156-158); although, most of these resettlements likely took place during the earlier period (Cole 2003:79). These new settlements were organized to fit Spanish ideals for town planning and many were established along royal roads, providing needed services to merchants, muleteers, and other travelers (Cole 2003:82-85,117). Following population declines and congregación, European settlers rapidly took ownership of the land through a growing number of grants (Carroll 1991:11; Sluyter 2002).

Declines in the indigenous populations created an increasing demand for both skilled and unskilled African slave labor (Aguirre Beltrán 1944, 1946; Carroll 1991). The king instituted a special licensing system (the *asiento*) as a requirement for shipping African slaves to the colonies (Aguirre Beltrán 1944:412; McAlister 1984:122,235). Chaunu and Chaunu (1956:41-42, 396-403) estimated based on data from 263 licenses that there was an average of approximately 810 slaves imported per year to America between 1551 and 1595.[2] Gonzalo Aguirre Beltrán (1944:414) used census data and chronicler accounts to argue that blacks outnumbered Europeans by the end of the sixteenth century. In 1600, Phillip II streamlined the slave trade by turning from a patchwork of individual agents to monopolistic contracts with Portuguese asientists (Aguirre Beltrán 1944:416-419). As a result of these reforms, the number of slaves sent to the American colonies increased dramatically with nearly half of all slaves sent to New Spain through the Port of Veracruz (Palmer 1976:14). Spain granted the Portuguese licenses to import approximately 3,500 slaves annually to the port (Aguirre Beltrán 1944:416; Booker 1984:19). In 1631, this number dropped to 2,500 slaves annually until Portugal broke from the Habsburg dynasty a decade later (Aguirre Beltrán 1944:419). Aguirre Beltrán (1944, 1946:16) estimates that an average of 2,000 slaves annually entered the viceroyalty through Veracruz between 1580 and 1650. The slave trade then declined in the late seventeenth century once Spain stopped issuing contracts to the Portuguese in 1640. Despite Spain's contract with Britain's South Sea Trading Company in 1713, this downward trend continued into the eighteenth century (Aguirre Beltrán 1944:429).

Despite severe declines in indigenous people, the importation of black slaves, and the immigration of Europeans, native populations continued to dominate in most regions of central Veracruz (Carroll 1991; Cole 2003:53). A notable exception was within the jurisdiction of Nueva Veracruz (see Figure 4.1). The coastal lowlands were unhealthy and remained sparsely populated for at least a century (Blázquez Domínguez 2000:75; Hernandez Aranda 1996e:176; Knaut 1997:621). Beginning in 1578, the viceroy issued prohibitions against taking native laborers and servants to the lowlands due to high mortality rates along the Gulf coast, particularly for those not acclimated to the tropical environment (Cole 2003:128-132). Although the port was economically important, the coast was not an enticing place to live. During the early colonial period, European immigrants preferred to move inland to more temperate climates within the region (Cole 2003:56; Cook 1998:135-137; Knaut 1997:83). By the early seventeenth century, Africans and their descendants dominated the coastal plain around the principal port of New Spain (Cole 2003:53; Sluyter 2002:161-162).

Labor Relations in Central Veracruz. Broad categorical distinctions were closely tied to the organization of labor, which in turn was influenced by shifting local conditions (Carroll 1991:78-80). Broadly speaking, labor changed from coercive regimes in the sixteenth century toward increasing reliance on free wage labor during the mid-seventeenth and eighteenth centuries. Early dependence on native labor drafts were challenged by the severity of population declines in the coastal lowlands. Indigenous depopulation also facilitated the rapid transfer of Spanish control over land and the means of production in the region (Carroll 1991:79-80). Ranching and sugar production represented two of the earliest industries in central Veracruz (Blázquez Domínguez 2000:68; Sluyter 2002:67-72). The first cattle were introduced in 1521 and intensified with colonial expansion. By 1620, much of the coastal plain had been granted to colonists for cattle and sheep estancias (Sluyter 2002:110). However, it was the sugar haciendas that drove demand for a permanent labor force. Cortés introduced sugar to southern Veracruz by 1524 and a sugar hacienda was established at Cempoala a decade later. Haciendas continued to spring up in a number of locations over the next century (Cardoso 1983:23-24; Cole 2003:54,70).

Labor regimes in central Veracruz were always diverse, but there were clear shifts in emphasis that roughly paralleled the trajectory of labor relations throughout colonial New Spain (see summary of Veracruz labor regimes in Carroll 1991:61-78). In the sixteenth century, coercive regimes dominated primarily through the encomienda and repartimiento, drafting natives into private and public rotational service. As the native population declined, emphasis shifted to African slavery, particularly on sugar haciendas. Coerced African labor offered more than a simple replacement population. Hacienda owners demanded young males between the ages of 15 and 40 who were capable of intensive production. Slavery also offered a labor force that was important to an industry that required both permanent and skilled labor that was not as well-served by rotational drafts.[3]

In urban sectors, black slaves worked as domestics and as wage earners, surrendering all or most of their profits to their masters. Other slave owners rented their slaves for contracted periods of time. Skilled slaves earned higher wages and were thus more valuable (Carroll 1991:66-67; see also Cardoso 1983:27). There were few manufacturing industries in Veracruz, but there were many artisan shops in urban centers (Blázquez Domínguez 2000:89). Spanish craftsmen often bought slaves and apprenticed them to increase their value (Carroll 1991:66-67). Slaves also were taught trades for public projects. In the 1590s, for instance, the engineer Bautista Antonelli recommended the hiring of master stonemasons to teach their craft to slave laborers for the construction of fortifications at Ulúa (Calderon Quijano 1984:23; see also Cole 2003:175).

While slaves filled the need for skilled labor, many more were unskilled. Thousands labored as field hands, and black slaves were often used as dock workers and for carrying goods between urban centers in central Veracruz (Carroll 1991:66). At the same time, native labor remained mostly rotational and generally unskilled in European trades (Carroll 1991:74). Native communities participated in subsistence agriculture, paying their taxes in coin and maize (Blázquez Domínguez 2000:73; Cole 2003:123). While African slaves carried goods along the royal roads, native labor was drafted for their repair and maintenance (Cole 2003:62).[4] Indigenous communities also owned *ventas* (inns) along the royal roads that they maintained or rented for the lodging and provisioning of travelers and mule trains (Cole 2003:117).

During the seventeenth century, the slave trade declined and the number of racially mixed castas increased rapidly, providing an alternate labor pool. Free wage labor grew in importance, as coercive systems declined. Later in the century, native populations recovered, adding to the pool of wage laborers (Carroll 1991:71-73). Native laborers had continued to work at haciendas as temporary and supplemental wage earners in the sixteenth century. This pattern continued into the seventeenth and eighteenth centuries, alongside a growing number of castas (Carroll 1991:65; Cole 2003:99,170). A limited number of native artisans also entered European trades as apprentices, a practice that was more common among mestizos (Cole 2003:162).

Slavery and labor drafts did not end completely but they did decline in the seventeenth century. In addition, unlike some regions of New Spain, available evidence suggests that debt peonage was infrequently adopted by Veracruz employers (Cole 2003:160). Slavery continued to recede in the eighteenth century until it was irrelevant and illegal by the early nineteenth century. Free wage labor dominated labor regimes of the eighteenth century in central Veracruz (Carroll 1991:76-78).

A Brief History of the Port. It was within this region that the Port of Veracruz was established and from here that the port would control the flow of people and goods between Spain and its mainland American colonies. After landing in Veracruz in 1519, Cortés established Villa Rica de la Veracruz approximately 65 km to the north of Ulúa (see Figure 4.1). Six years later, for defensive, environmental, and economic reasons, Cortés relocated Veracruz to the south, adjacent to La Antigua River (Blázquez Domínguez and Díaz Cházaro 1999; Gerhard 1972:364). The new location did not have the anchorage for large seafaring vessels, so galleons from Spain moored at Ulúa and then ferried their cargo in barges 25 km north to La Antigua (Blázquez Domínguez and Díaz Cházaro 1999). The mainland across from the island of Ulúa became known as the Ventas de Buitrón with a few inns and their residents meeting the needs of arriving mariners (Blázquez Domínguez and Díaz Cházaro 1999; Paso y Troncoso 1969). Despite the added expense of this arrangement, it remained in place for more than eight decades.

Finally, despite local complaints, the viceroy of New Spain the Count of Monterrey ordered royal and ecclesiastical authorities to move to Buitrón in 1599. Most of the inhabitants of La Antigua quickly followed. The next year, the viceroy ordered local officials to unload all cargo on the mainland across from Ulúa. King Philip III officially recognized the establishment of Nueva Veracruz in this final location in 1615 (Blázquez Domínguez and Díaz Cházaro 1999; Gerhard 1972:361, 365). My archaeological study focuses on this final location of the port during the seventeenth and eighteenth centuries.

As early as 1590, Italian engineer Bautista Antonelli produced town plans for Nueva Veracruz that included the laying out a city grid and the town *traza* (Calderón Quijano 1984:20-25). The residents of Buitrón complained that the planned streets would cut through their houses, but Viceroy Luis de Velasco ordered that the plan be executed anyway (Hernández Aranda 2006c). In a later 1615 drawing by Dutch engineer Adrian Boot, the town plans for Veracruz appeared to adhere to the ordinances of 1573 for the layout of coastal towns (Blázquez Domínguez 2000:22; see also Crouch et al. 1982). There was an orthogonal grid with the main plaza located prominently near the harbor

(Figure 4.2). The earliest structures were built of wood, leading to the moniker for the port, "La Ciudad de Tablas" ("The City of Planks") (Paso y Troncoso 1969).

As illustrated in 1615, the port was initially open and without walls. Despite repeated called for fortification of the Nueva Veracruz, little was accomplished for several decades (Blázquez Domínguez 2000:65; Calderon Quijano 1984). A wall of stakes was erected around the town beginning in the 1630s, but this barrier offered little protection. It was only 6 *cuartas* high (approximately 1.25 meters) and half a *vara* thick (approximately 0.4 meters) and was collapsing by 1663 (Calderon Quijano 1984:76). Following an attack by the pirate Lorencillo in 1683, a new wall was constructed of lime and stone for the defense of the city. The wall was further augmented during the eighteenth century (Blázquez Domínguez and Díaz Cházaro 1999:89). The wall ultimately consisted of seven bulwarks and four gates at the end of the eighteenth century (Figure 4.3; Ajofrín 1986[1763]; Calderon Quijano 1984).

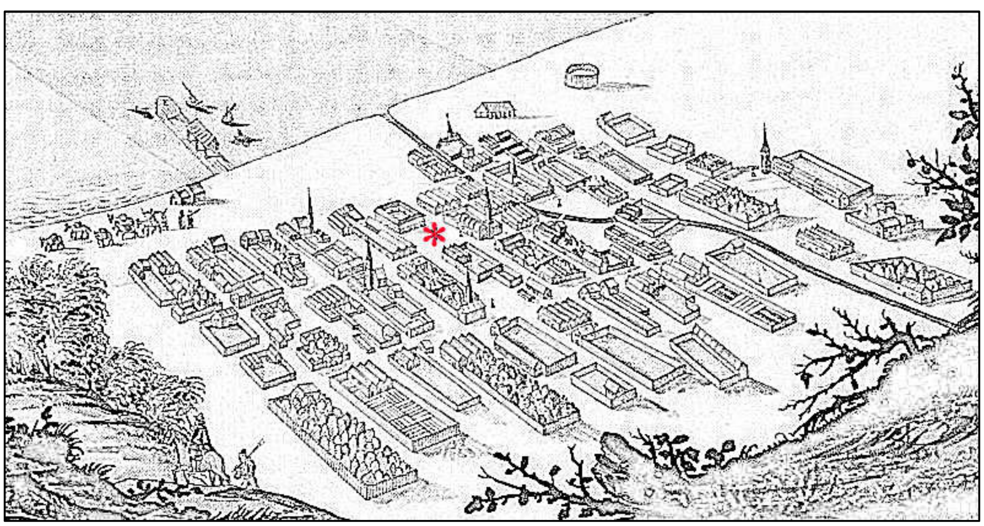

Figure 4.2. Representation of the Port of Veracruz in ca. 1615, Based on a Drawing by Adrian Boot (Adapted from Antuñano Maurer 1999:17). The main plaza is indicated with an asterisk (*).

Mechanisms of Social Change

Social change in Veracruz roughly paralleled macroscale social transformations in New Spain, shifting from a social organization borrowed from Iberia to the development of a racially based casta system in the seventeenth century. By the end of the eighteenth century, documented divergence between casta and socioeconomic position suggests instability in the casta system as an overarching schema for organizing colonial society. In order to examine mechanisms of social change in Veracruz, I draw on a combination of published traveler accounts, official relations, and colonial maps, as well as some secondary historical studies. In addition, the Revillagigedo census of 1791 provides a detailed house-by-house account of individuals living within the walls of the port. Using these data, I examine the top-down and bottom-up mechanisms of social change in Veracruz (Figure 4.4).

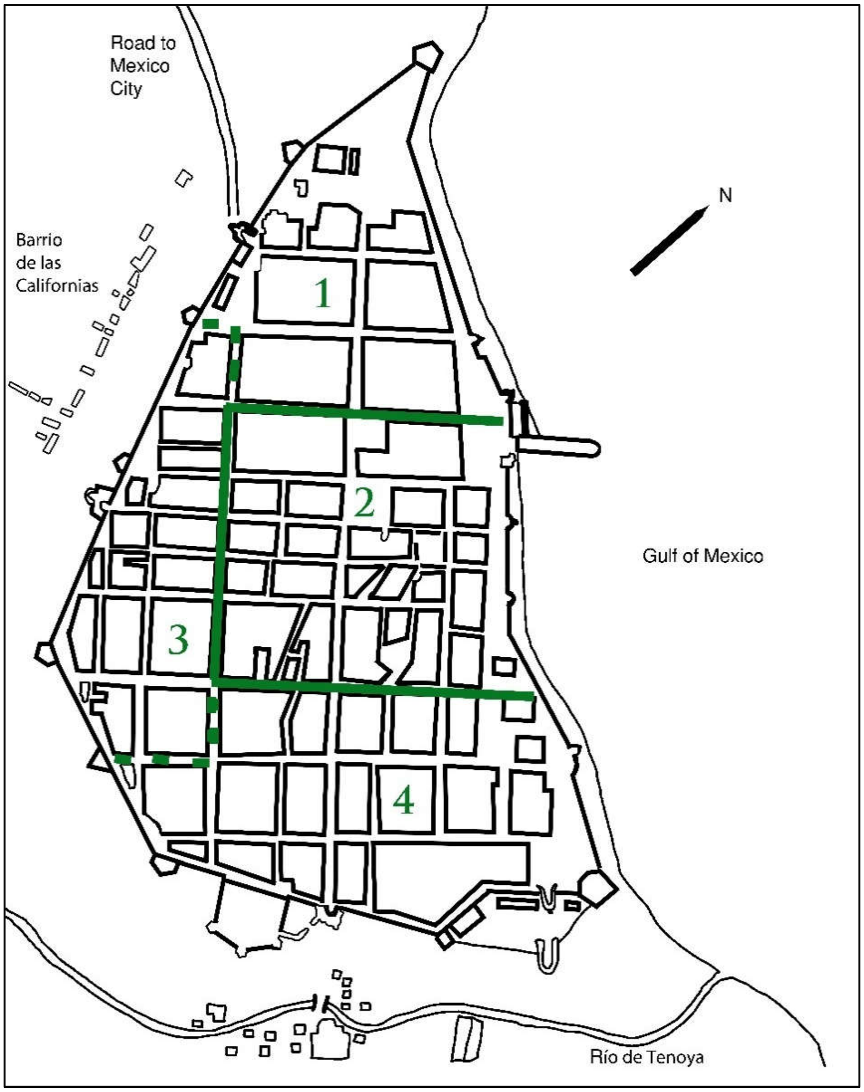

Figure 4.3. Eighteenth Century Town Plan of Nueva Veracruz Based on a Combination of Historical Maps. Numbers and boundaries in green approximate the four parts or cuarteles of the port as described in the 1791 census (see also Hernández Aranda 2004, 2009). Note: Settlements outside the wall are often left out of historical maps. The representation of the Barrio de las Californías is based on an 1878 map that includes that neighborhood.

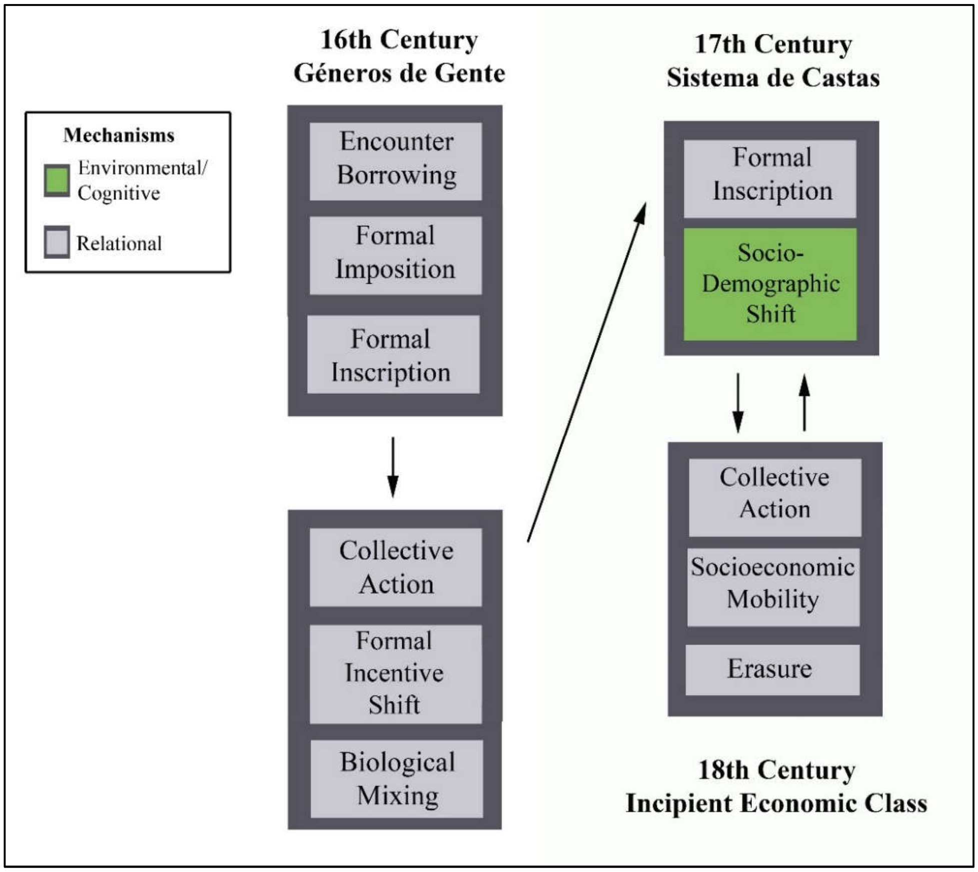

Figure 4.4. Causal Mechanisms Contributing to the Transformation of Social Categories in Colonial Veracruz. *Note:* Mechanisms are presented in roughly chronologically order from top-to-bottom and from left-to-right. Mechanisms that co-occurred or had a close dialectical relationship are grouped.

Following initial encounters and devastating epidemics, categorical distinctions borrowed from Spain were applied mainly to distinguish between European colonists and African slaves along the coastal plain, where native populations had largely disappeared. Socioeconomic and socio-geographic differences were inscribed through spatial and institutional segregation. Collective action in the form of slave revolts in Veracruz directly affected change in imperial policies directed toward people of African descent throughout the Spanish colonies. Biological mixing, changes in the slave trade, and the eventual recovery of inland native populations led to socio-demographic shifts in the colonial middle period. Historical data on the population of the port is scarce for the seventeenth century, but evidence drawn from *cofradía* (confraternity or brotherhood) constitutions hint at the racialization of casta categories and attempts by American-born Afromestizos to gain socioeconomic mobility through collective action. By the end of the eighteenth century, derogatory casta categories were largely replaced by more positive euphemisms. Analysis of the 1791 census indicates a growing divergence between casta labels and socioeconomic position. Marriage patterns are of limited value due to the known biases of census takers (see Chapter 3), but it appears that early attempts to inscribe distinctions through spatial segregation were being erased from the bottom up.

Encounter/Borrowing and Formal Imposition. Initial encounters described by Díaz (1963) and Cortés (2010) occurred eighty years before the founding of Nueva Veracruz and prior to colonial epidemics that would drastically reduce the surrounding native population. Descriptions of the port's population were limited for the sixteenth century, appearing within official reports, letters, and chronicler accounts. According to the second letter written by Cortés (2010) to the king of Spain, he left 150 men at Villa Rica in August 1519 before marching with the majority of his forces toward Tenochtitlan (Mexico City).

Subsequent reports, written decades later, describe a population dominated by European immigrants, African slaves, and their decedents at La Antigua and Ulúa (Table 4.1). Relaciónes, written between 1571 and 1590, provide some of the early evidence of categorical borrowing at the port. The socio-geographic label "vecino" was used either in conjunction with or as an indicator for the géneros "español." This vecino label contrasted the socially dominant group of españoles with a much larger number of subaltern negros and mulatos. Negros and mulatos were consistently categorized based on their socioeconomic status as esclavos (slaves) or libres (free people). The link between the labels vecino and español on the one hand, and negro, esclavo, and libre on the other, continued in official reports and ecclesiastical accounts from 1609, 1681, and 1683.

As discussed in the previous chapter, the terms vecino and negro were borrowed from Iberian society. The español category developed in Spain and the Caribbean by the 1520s and was subsequently borrowed in New Spain (see Schwaller 2016:41 and Chapter 3). Relaciónes from the 1570s indicate that there were no indios present at La Antigua (Paso y Troncoso 1905:191-192; Velasco 1894:212). Categories were thus used to distinguish mainly between españoles and negros. While the Crown and Church had a vested interest in evangelizing native people – and distinguishing between indios and cristianos españoles – there was less inclination to evangelize the black population (Cardoso 1983:45). Thus, town citizenship and slave status were emphasized contra ethno-religious labels.

Table 4.1. Documentary Descriptions of the Evolving Population at the Port of Veracruz

Year	Description of the population	Document Description	Reference
1519	"dejé en la Villa de la Vera Cruz ciento y cincuenta hombres con dos de caballo, haciendo una fortaleza que ya tengo casi acabada"	Second letter from Hernan Cortés to the Emperor of Spain	Cortés 2010[1519]:38
1543	"en la tierra firme frente a Ulúa habitaban algunos venteros españoles, los cuales habían obtenido sus solares a través de Mercedes Reales a partir de 1542"	Mercedes Reales of 1543	Description in Hernandez Aranda 2006:164
1568	"50 soldiers, and Captains, that keep the forts; and about 150 Negroes" at San Juan de Ulua; "They are in number, about 400" at La Antigua	Traveler account by John Chilton	Transcribed *in* Seccombe 1903
1571	"Vezinos y casas le pareze que seran mas de 200...No ay en el pueblo ynidios ningunos…Ay mas de 600 negros y negras esclavos, pocos libros aunque algunos. No ay mestizos ningunos, aunque algunos mulatos… poco mas a menos que haura mas de 500 personas de confesion"	Relación de Veracruz by Arias Hernandez	Transcribed *in* Paso y Troncoso 1905:191-192
1571-1574	"pueblo de doscientos vecinos españoles…no hay indios ningunos, aunque hay de seiscientos negros esclavos"	Geografía y Descripción de las Indias by Juan Lopez de Velasco for 1571-1574	Velasco 1894 [1571-1574]:212
1580	"…en lo que toca a la cantidad de los v[ecin]os, tendrá esta ciudad poco más o menos de ciento y cuarenta"	Relación de la ciudad de la Veracruz y su comarca by Hernández Diosdado	Transcribed in Acuña 1985:316
1590	"ciento y cinquenta negros aunque algunos son biejos de poco prouecho…" "ocho o diez españoles bezinos. Los demás son negros esclauos…"	Relación de San Juan de Ulua by the engineer Bautista Antonelli	Transcribed *in* Calderón Quijano 1953:251, 285

Year	Description of the population	Document Description	Reference
1609	"toda de vecinos españoles, tienen muchos negros y negras esclavos y otros muchos libres."	Memoriales del Obispo de Tlaxcala	Mota y Escobar 1987 [1609]:53
1625	"number of inhabitants may be three thousand, and amongst them some very rich merchant" and "The first Indians we met with was at the old Vera Cruz"	Traveler account of Thomas Gage	Gage 1985[1625]:35,39
1646	500 españoles	Noticias sacras y reales de los dos imperios de las Indias Occidentales by Juan Diez de la Calle (1932)	Described in Aguirre Beltran 1946:216-217, Cuadro VIII
1681	"500 vecinos españoles y 500 negros y mulatos"	Relación de las poblaciones del obispado de la Puebla	Described in Widmer 1992:132
1681	"984 hombres libres, 473 muchachos de uso de razón, 1000 mujeres libres y 523 mujeres esclavas, o sea 2980 individuos, correspondientes a 622 familias en 780 casas."	Partial census by a parish priest	Described in Widmer 1992:132
1683	6,000 vecinos at start of the attack 1,800 "negros, negras, mulatos y mulatas, libres o esclavos" taken captive; 300 died	Official investigative documents produced following the attack on Veracruz by Lorencillo	Described in Benítez and Pacheco 1986:116
1697	"abitata da pochi Spagnuoli, e per lo più da Neri, e Mulati" (inhabited by a few españoles, but mostly by negros and mulatos)	Traveler account of Giovanni Francesco Gemelli Carerri	Gemelli Careri 1992[1700]:238
1711	"Lo ordenado eran cuatrocientos a quinientos infantes y cien artilleros, existiendo una dotación inferior a trescientos hombres, comprendidos los de ambos cuerpos."	Report of Pedro de Ruanaba	Described in Calderón Quijano 1953:84

Year	Description of the population	Document Description	Reference
1743	4503 habitantes en 1612 casas	1743 census data	Described in Widmer 1992:132
1746	"quatro Compañías Milicianas de á cien hombres…dos de Mulatos libres, y dos de Negros"	Official report of the historian and geographer to the Viceroy	Villaseñor y Sánchez 1746:274
1754	4790 habitantes	Calculations made by a parish priest	Described in Widmer 1992:133
1776	"En cuatro clases puede dividirse el vecindario de aquella ciudad. Y son: españoles blancos criollos, españoles europeos, negros y mixtos de los blancos y negros, como son los mulatos, y de otras castas de color."	Description by the navy general and explorer Antonio de Ulloa	Transcribed in Solano 1979:29
1778	"una minoría blanca, peninsular y criolla, y, a diferencia de los siglos anteriores, una buena proporción de indígenas, negros, mestizos y mulatos"		Blázquez Domínguez 2000:91
1791	Approximately 4,000 individuals located within the walls of the city.	Padron de Revillagigedo of 1791	Described in González Maroño, 2004:53
1793	586 inhabitants outside the walls of Veracruz	Padrón general de 1793	Described in Widmer 1992:133

Emphasis placed on socio-geographic and socio-economic categories may also relate to the timing of these reports. By the 1570s, at least two generations of natives and colonists were born in America. Much of the surviving native population had been converted to Catholicism and reorganized through programs of congregación (Cole 2003:76-88). Socio-religious categories remained important (i.e., cristiano nuevo, cristiano viejo, and conversos), but the labels indio and español had spread in usage throughout Spain and America during the sixteenth century. The develop of the republica de indios and the republica de españoles during the sixteenth century furthered this emphasis on socio-geographic categories that encapsulated socioeconomic and socio-religious meaning (see Schwaller 2016:41).[5]

Top-Down Mechanism: Formal Inscription. Formal inscription refers to relational mechanisms that are employed locally and emphasize boundaries between groups. Tilly (2005:143) points to spatial segregation as a common means of inscription. Early colonial settlements were governed according to the dual republic systems. In central Veracruz, most pueblos de indios were founded or reorganized through programs of congregación (Cole 2003; Sluyter 2002), while Spanish town were founded through licenses issued by imperial authorities to Spanish vecinos (Ordenanzas 1935[1573]). According to the 1573 ordinances, native people were not to enter Spanish towns while they were being constructed (Ordenanzas 1935 [1573]:322).[6] The assignment of lots to founding vecinos españoles, created a social organization in which Spanish elites were located closest to the plaza. Lower status Spaniards and natives that arrived later were located near the peripheries. The spatial segregation of blacks is not specifically addressed in these ordinances.

Velasco’s description of La Antigua (ca. 1571-1574) indicates that negros esclavos were living there “arriba para la traginería y trato de las mercaderías” (up[river] for the carrying and handling of merchandise), possibly on the periphery of town. Once the port was transferred across from Ulúa, maps of the port indicate definitive attempts to segregate the population. Drawings by Adrian Boot in 1615 and Nicolás Cardona in 1623 (Figure 4.5; see also Figure 4.2), both show the southern periphery of the port separated from the rest of the town by the Tenoya River. Hernández Aranda (2006c:168) argues based on both documentary and archaeological evidence that this southern neighborhood was occupied largely by subaltern people of African descent. When a wall was eventually erected in the 1630s, it enclosed only the plaza, public structures, and private house lots to the north of the river, leaving the population to the south of the Tenoya outside the wall. Although the town wall was rebuilt and augmented multiple times, its placement continued to exclude the southern periphery, maintaining a social barrier throughout the colonial period (see Figure 4.3; see also Juárez Hernández 2001; Gil Maroño 1996).

Some segregation is also noted between hospitals. The epidemics that severely reduced the native population also infected Europeans and Africans – particularly those newly arrived immigrants from temperate climates (Cook 1998:135-137; Knaut 1994:83). As a result, hospitals founded by the church orders became important institutions in the Gulf lowlands. By 1671, there were three hospitals at the port that treated different members of the population (Paso y Troncoso 1905:192). The hospital of Nuestra Señora served blacks in Veracruz, both slave and free. Another served the poor ship crews,and another, and a third was sponsored by the cofradia de sangre, likely serving natives and españoles (see Germeten 2006:27).[7]

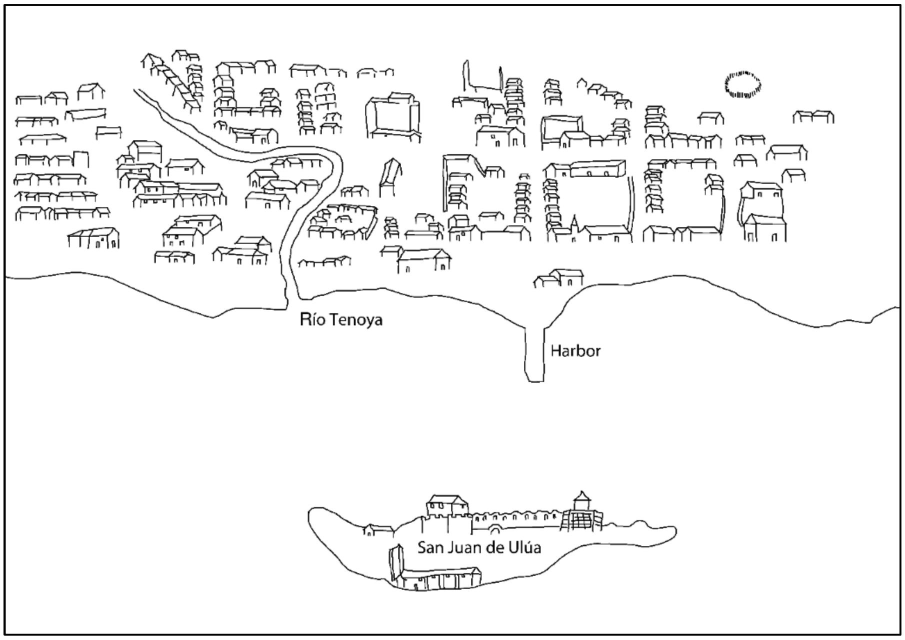

Figure 4.5. Representation of Nueva Veracruz Based upon a 1623 Painting by Nicolás Cardona (adapted from Antuñano Maurer 1999:20)

Bottom-Up Mechanism: Rebellion as Collective Action. Slaves working in the sugar fields and mills were subjected to strenuous work, long hours, and cruel punishments (Cardoso 1983:51). One result of these abuses was coordinated revolts. As early as 1537, Viceroy Mendoza described rumors of a planned rebellion in Veracruz and central Mexico (Davidson 1966:243). It is unclear if this early plot was real or imagined, but revolts were eventually realized in the 1570s throughout central Veracruz, including uprisings in Medellin, Jalapa, Tlacotalpan, Alvarado, and Orizaba (Aguirre Beltran 1946:210; Cardoso 1983:53).

Slaves also escaped captivity, forming palenques (runaway slave communities) between Veracruz and Orizaba (Davidson 1966:246). The mountainous terrain between the coast and Sierra Madre provided cover from slave owners and Spanish troops. Beginning in the 1570s, members of these settlements began robbing travelers along the royal roads and attacked haciendas in order to free slaves and add to their numbers (Cardoso 1983:53; Davidson 1966:246; Mota y Escobar 1987[1609]). Despite military efforts to eliminate these threats, they continued into the seventeenth century. Most revolts in Veracruz were relatively small, the largest occurred in 1609 when black rebels attacked and burned down a hacienda just outside the city of Veracruz, killing a Spaniard and capturing six native women (Alegre 1842:178).

Top-Down Mechanism: Formal Incentive Shift. Reactions by imperial authorities to real and imagined slave revolts in central Veracruz directly contributed to changing policies that were applied throughout the Spanish American Empire. A 1548 ban on selling arms to blacks was in reaction to rumored revolts of the previous decade in central Veracruz. Blacks caught with a knife or other weapon were to be castrated. This penalty was later reduced to 100-200 lashes followed by publicly nailing the slave's hand to a post (Cardoso 1983:52; Davidson 1966:244; see also Chapter 3). Such public displays further emphasized categorical distinctions, highlighting the negative character attributed to people of African descent. Punitive punishment also encouraged the revolts later in the sixteenth century.

In response to continuing uprisings, Philip II issued a series of decrees between 1571 and 1574. The decrees included penalties for aiding escaped slaves and positive incentives for the capture of runaways. These rewards extended to blacks who helped authorities hunt them down (Cardoso 1983:53). In response to the 1609 attacks in central Veracruz, two military companies assembled, which included native archers and negros and mulatos who cleared brush ahead of the troops and sought to capture rebels led by an escaped slave named Yanga (Cardoso 1983:56; Trens 1948:316). Their pursuit was only partially successful, leading to negotiations that freed the slaves and legally founded a free black town in Veracruz called San Lorenzo de los Negros. In exchange, the former slaves swore not to give aid to future runaways and to halt their attacks on travelers and haciendas (Cadoso 1983:56; Trens 1948:317-318).

Despite these efforts, the number of runaway slaves grew in central Veracruz. In 1612, new ordinances were issued that again prohibited the supply of arms to blacks. Penalties were simultaneously increased in severity. Punishment for selling arms to blacks, both slave or free, now carried the death penalty (Cardoso 1983:58).

Bottom-Up Mechanism: Biological and Cultural Mixing. Carroll (1991:120) has demonstrated using plantation inventories, notarial, parish, and census records that European and Native people in central Veracruz were endogamous in about 90 percent of cases in 1580, 1645, and 1715. Yet, biologically mixed populations grew in the sixteenth century through a relatively small number of endogamous marriages and many more illicit unions. For their part, blacks were only somewhat less endogamous in about 70 percent of cases.[8] Carroll's data come from locations inland from the coast, where demographic data reflect a much larger native population despite the ravages of early epidemics.[9] Serial data for the population of the port of Veracruz is not available until the end of the seventeenth century, but qualitative evidence is suggestive.

There were few European women at the port and reportedly no native women within the vicinity (Hernández Aranda 2006c; Pérez de Rivas 1896:195; Velasco 1894 [1574]:212). Letters written by vecinos españoles indicate that some of them did solicit their wives and sisters to join them in New Spain (Otte 1996). Based on land grants and Inquisition records, Hernández Aranda (2006c:167) has verified that at least some of these European women did immigrate to Veracruz between 1540 and 1616. While African males were imported in much greater numbers than black women, the later still made up approximately a third of the slave trade (Cardoso 1983:26). Women of African heritage were thus quite numerous within the overall female population along the coast. Annecdotally, there were several instances of royal officials, including the viceroy, condemning Spanish abuses against black women that, nevertheless, resulted in biological mixing at the port (Hernandez Aranda 2006c:166).

Arias Hernandez's relación of Veracruz (Paso y Troncoso 1905) notes an unspecified number of mulatos were living at La Antigua as early as 1571. He also directly states that there were no mestizos. Later descriptions of the port also mention mulatos but no mestizos until the eighteenth century (see Table 4.1). Given the absence of a marked native population along the coast, it unsurprising that there would be a similar lack of mestizos. It appears that biological mixing was largely between blacks and Europeans at the port and surrounding hinterlands.

Environmental/Cognitive Mechanism: Socio-Demographic Shift. Socio-demographics were in constant flux, but changing trends contributed to shifts in social relations and categories. Early macroscale trends described in the previous chapter varied between regions. As already noted, lowland native depopulation was more extreme than in more temperate areas (Sluyter 2002:153-159). Near the coast, particularly in the jurisdiction of Nueva Veracruz, the native population virtually vanished. By the 1620s, more than half of the coastal plain and lower piedmont surrounding the port was granted to European settlers for estancias (cattle and sheep ranches) (see Figure 4.1; Sluyter 2002:108-113). At the same time, the slave trade brought thousands of bozales (slaves born in Africa) through Nueva Veracruz (Carroll 1991:85).

During the colonial middle century, socio-demographics underwent new shifts. The native population began to recover, while Spanish and mixed populations also increased (Blázquez Domínguez 2000:81-82; Carroll 1991:73). As the slave trade declined in the seventeenth century, American born Afro-descendant populations came to outnumber bozales (Carroll 1991:69). In addition, the slave trade could no longer control the demographics of the population based on the needs of slave owners. Not only were two-thirds of bozales male, but most were shipped to Veracruz in their prime, between the ages of 15 and 40. As the black population began to reproduce naturally and the number of bozales decreased, the sex and age distribution of blacks and their mixed descendants began to reflect the rest of society (Carroll 1991:68-70). Simultaneously, the number of free blacks and their casta offspring increased, particularly after 1650 (Carroll 1991:70,73).

Bottom-Up Mechanism: Collective Action through Cofradías. Confraternities were institutions introduced from medieval Europe. As corporate institutions they served a number of societal functions, playing a shifting role in the social transformation of colonial society. Their most explicit purpose was to organize the veneration of a saint's day or religious sacrament. For castas and African descendant populations they facilitated collective action, while simultaneously reaffirming categorical labels that created divisions in society. Data generated from these institutions, therefore, provide information on changing social relations and categorical identities.

Cofradías could be organized by any secular or ecclesiastical body or lay person, so long as their constitution was approved by the church. In the sixteenth and early seventeenth centuries, African slaves and their descendants formed cofradías under the direction of religious orders and haciendas as a means of mutual support and survival, as well as a way to pay for their own burials (Germeten 2006:1). There are also indications that cofradías were used for meeting and plotting rebellions (Germeten 2006:7). As socio-demographics and the colonial labor system shifted from a population of African slaves to American-born free wage laborer, Afromestizos altered their cofradías to emulate Spanish brotherhoods as a means of social mobility in Veracruz (Germeten 2006:4).

In 1636, the Cofradía of the Coronation and Saint Benedict was formed at the Franciscan Convent in Veracruz. The constitution of Saint Benedicts emphasized categorical identification based upon place of birth. This was emphasized by favoring negros and mulatos born in America for senior office positions within the brotherhood (Germeten 2006:192-193). Two decades later emphasis shifted from place of birth to physical appearance. The constitution of the Confraternity of Our Lady of the Conception and the Humility and Patience of Christ was written in 1659. Organized by pardo and mulato militiamen, the extensive constitution specified that leadership and voting privileges were restricted to those who were mulatos and "not of any other color" (Germeten 2006:193). The timing of this shift – from emphasizing place of birth to phenotypical characteristics – is consistent with macroscale observations of colonial transformations and the racialization of social categories during the seventeenth century (see Chapter 3).

Bottom-Up Mechanisms: Socioeconomic Mobility, Division of Labor, and Erasure. Detailed historical data on the port's population are not extant until the eighteenth century. In 1791, a house-by-house census was prepared by Don Juan Manuel Muñoz for the Viceroy of New Spain the Count of Revillagigedo. Similar lists were prepared for cities throughout New Spain between 1791 and 1793, providing valuable data that historians have used to examine the evolving social structure throughout New Spain (e.g., Brading 1973; Castleman 2001; Chance and Taylor 1977). For Veracruz, the census only includes the population within the town wall and military families were not consistently recorded. Despite these limitations, the census is a valuable trove for the quantitative analysis of the occupants of nearly 900 households. In general, the name, age, racial category, occupation, place of birth, and marital status were recorded for the head of each household. Except for occupation, similar data was typically recorded for their spouse, if applicable. For children, only their name, age, and occasionally their racial category was indicated. Dependents, such as servants, slaves, apprentices, and renters were also consistently documented.

The census was organized into four *cuarteles* (see Figure 4.3). Cuartel three is located to the west of the town center and included the neighborhood of the Barrio de Minas, which is the focus of the archaeological analyses discussed in Chapters 5-9. In the western cuartel, there was a large number of castas of mixed African, Spanish, and native descent (Table 4.2). Because there were reportedly few natives in and around the port, it is not surprising that only about 10 percent of the castas here were identified as mestizos. Most other castas were listed as pardos or morenos. Unlike earlier descriptions of the port, the labels mulato and negro rarely appear in the 1791 census. Instead, these derogatory terms were replaced with more positive labels. Pardo is a euphemism often used as a term for castas of mixed African, native, and sometimes European descent. Similarly, moreno was a more benign term for negro (see Aguirre Beltran 1946:173; Vinson 2017:44-45, 69).[10]

In this discussion, I supplement my analysis of the western quarter with an examination of census data for the second (central) cuartel of the port. The central quarter included the main plaza, administrative structures, and the highest relative frequency of españoles (both peninsulares and criollos) recorded in the census. In this area of the port, approximately 65.7 percent of the population fell into the español category. At the same time, the percentage of mestizos/pardos and their non-European parent groups were relatively equal (see Table 4.2). Data from the second and third cuarteles provide an adequate sample for assessing the range of social mobility, both up and down the colonial hierarchy.

Table 4.2. Casta Categories Identified for the Residents of Cuarteles 2 and 3 at the Port of Veracruz

	Cuartel 2 (Center)		Cuartel 3 (West)	
Category	**Count**	**Percent**	**Count**	**Percent**
Españoles	366	65.7	163	31.8
Mestizos	61	11.0	54	10.5
Indios	40	7.2	27	5.3
Pardos	58	10.4	152	29.6
Morenos	28	5.0	117	22.8
Negros	4	0.7	0	0.0
Chinos	0	0.0	4	0.6
Unidentified	49	N/A	178	N/A
Total	606	100.0	695	100.0

Source: Padrón de Revillagigedo 1791

In order to assess socioeconomic mobility at the port, I examine the distribution of socio-racial categories across a hierarchy of occupational groups. The census identifies dozens of specific occupations within the port and so it is first necessary to create occupational groups. To do this, I draw on previous work, particularly historical studies by Chance and Taylor (1977), Seed (1982), and Anderson (1988). At the top of the economic hierarchy were the elite, including royal, municipal, and military officials, as well as rural landowners (*labradores*). Beneath the dominate elite group were merchants, master artisans, and shopkeepers (MMS) who controlled the means of production and/or distribution (Seed 1982:578). Because the census only rarely differentiates between masters, journeymen, and apprentice artisans, I adopt Anderson's (1988:234) method of identifying shop owning masters based on their titles as "don." The third tier was made up of managers who supervised the means of production and distribution (Seed 1982:578). Beneath managers were journeymen and apprentice artisans whose tools were potentially their only means of production and otherwise only had their skilled labor to sell (Seed 1982:578; Anderson 1988:236). At the bottom of the economic hierarchy were free unskilled laborers, servants and, finally, slaves.

Both casta and occupation were identified for a total of 352 male adults who inhabited the central and western quarter.[11] This included 251 individuals from the central quarter and 101 for the western quarter. The relationship between casta and occupation in Veracruz follows a pattern that is similar to studies undertaken for late eighteenth-century Mexico City (Seed 1982) and Oaxaca (Chance and Taylor 1977). Upper and lower tiers of the colonial hierarchy are generally consistent with imperial ideals. That is, Elite and MMS occupations were dominated by criollos and peninsulares (Figure 4.6). The few pardos that fall within these categories were royal guards or officers in the militias (n=3) and rural landowners (n=2). Militia and military service as a pathway to social advancement was discussed in Chapter 3.

At the alternate end of the spectrum were moreno and negro slaves who were relatively few in number (n=11), consistent with declines in the slave trade. Between these extremes are what Brading (1973:396; see also Taylor and Chance 1977) referred to as the "ambiguous middle layer." Pardos and a few morenos were artisans and even managers, achieving some upward socio-economic mobility through skilled labor and supervisory positions. While more than half of the criolles fell into the elite or MMS category, about a third worked as apprentices or journeymen. A small number of peninsulares and criollos also worked as servants and unskilled laborers alongside indios, morenos, and pardos.

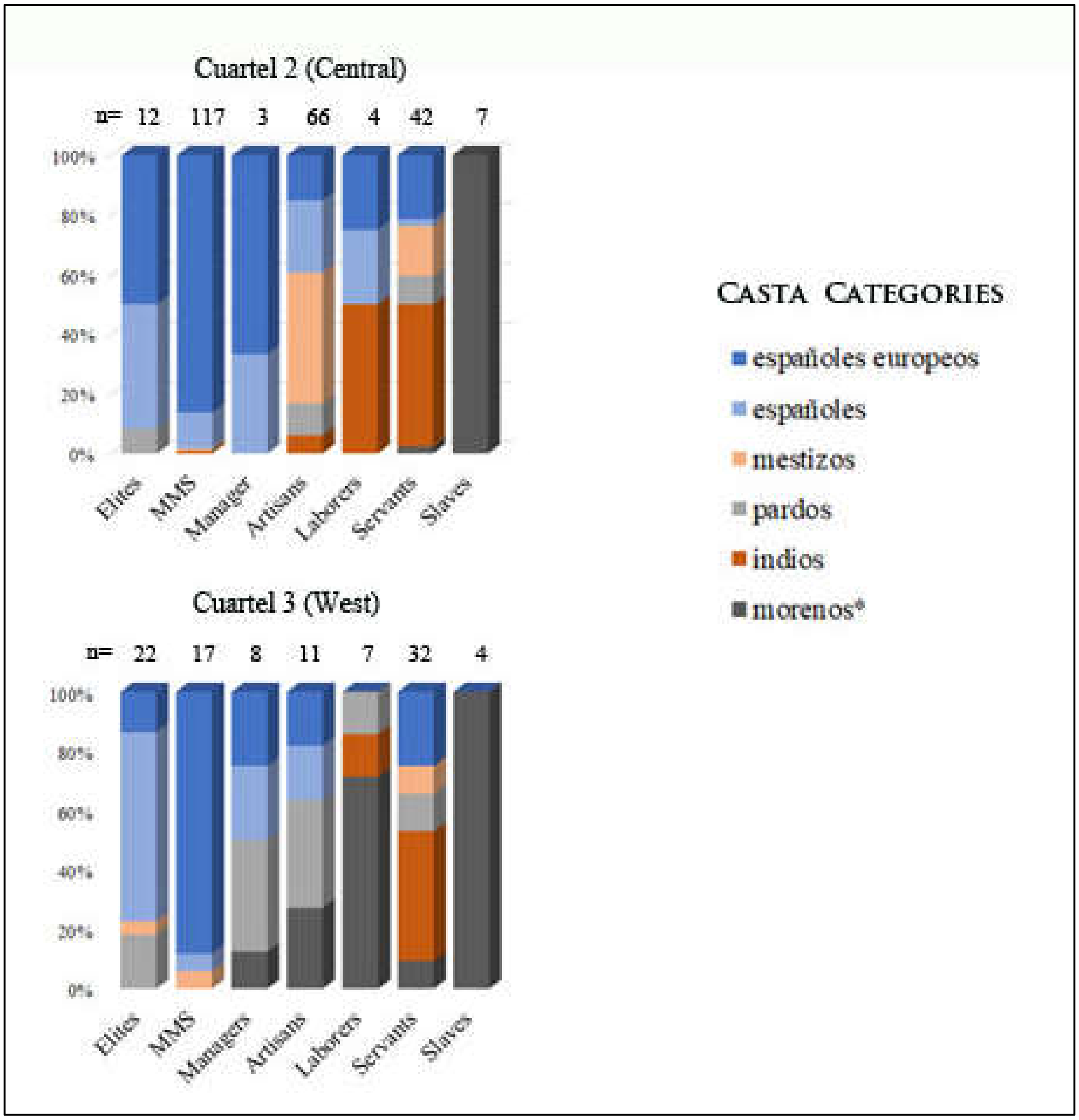

Figure 4.6. Distribution of Casta and Occupational Categories in Cuarteles 2 and 3 at the Port of Veracruz in 1791. Note: four negro individuals were included under the moreno category

The occupational distribution varied between city quarters. These patterns reflect general demographic differences between these two parts of the city. In the central traza, there were far more artisans in general (see Figure 4.6). There, mestizos dominated positions of journeymen and apprentices. In the western quarter there were fewer artisans and those were mostly pardos or morenos. These low status castas also held a slightly higher proportion of the elite and manager positions in the western quarter compared to inhabitants of the central traza. Laborers were mainly morenos in the western cuartel, but this occupation group was split between indios, criollos, and peninsulares in the central cuartel. This analysis shows that by the late eighteenth century, strict overlap between casta and socioeconomic position was primarily at the extremes. Peninsulares and criollos were found in all occupational groups. Pardos were found in every group, except among MMS. Guilds often had restrictions limiting the membership of Afromestizos, particularly at the upper rank of master (Cope 1994:96; Gibson 1964:402; Carrera Stampa 1954:226). A preliminary review of cuartel 1 (North), however, found at least one case of a pardo, Juan Chrisostomo Martinez, who was a master shoemaker, indicating that mobility to the MMS tier was rare but did occur at the port of Veracruz.

Labor relations further led to at least a partial erasure of formal inscription. A general census of 1793 describes 586 inhabitants identified as mostly negros, mulatos, and indios living outside the wall (Hernández Aranda 2006c:171; Widmer 1992:133). Yet, because African slaves and their mixed descendants worked in criollo and peninsular households, attempts at segregation were of limited success. Even within the central cuartel, more than a third of the residents were classified as castas, negros, or indios. Afromestizos worked as domestic slaves, servants, and apprentices in the highest status sector within the port. Also, within the town walls, inhabitants of African descent made up the majority of the population in the western cuartel (see Carroll 2005:254-257 for discussion on labor relations and the "erasure" of segregation in urban settings).

Bottom-Up Mechanism: Intermarriage and Socioeconomic Mobility. The 1791 census also provides data for the assessment of marriage patterns. Choice of spouse sheds light on the permeability of social boundaries (see Chance and Taylor 1977:477). Until the eighteenth century, available evidence suggests that most biological mixing was through illicit relations in central Veracruz. For New Spain, this pattern began to shift in the early eighteenth century (see Chapter 3). Historians studying degrees of endogamy for New Spain utilize two statistical measures: Cohen's kappa and conditional kappas.

Cohen's kappa compares the frequency of actual endogamy to the expected frequency of endogamy that would occur through chance given the actual gender distribution of a population (Rust and Seed 1985; Strauss 1977). A value of "1" indicates that every possibly endogamous relationship has taken place. If endogamous patterns were the result of random chance, the kappa would be "0." For the western and central quarters of the port, the 1791 census documents 125 marital relationships in which both partners were also identified by casta. In Table 4.3, endogamous relationships appear along the diagonal. For the combined population of both city quarters, the kappa is 0.405, suggesting a moderate degree of endogamy in the total sample population.

Table 4.3. Marriage Patterns in Cuarteles 2 and 3 at the Port of Veracruz in 1791

Casta designation	española europea	española	mestiza	parda	morena	*Total*
Cuartel 2 (Central)						
Español europeo	2	23	2	2	0	29
Español	0	6	1	2	0	9
Mestizo	0	2	0	0	0	2
Pardo	0	1	0	2	0	3
Moreno	0	0	1	0	0	1
Subtotal	2	32	4	6	0	44
Cuartel 3 (West)						
Español europeo	1	14	1	0	0	16
Español	0	12	3	0	0	15
Mestizo	0	0	1	0	0	1
Pardo	0	1	2	23	4	30
Moreno	0	0	0	1	18	19
Subtotal	1	27	7	24	22	81
Cuartels Combined						
Español europeo	3	37	3	2	0	45
Español	0	18	4	2	0	24
Mestizo	0	2	1	0	0	3
Pardo	0	2	2	25	4	33
Moreno	0	0	1	1	18	20
Total	3	59	12	30	22	125

Conditional kappas enables a closer examination of endogamy by racial category and gender. In each case, the results may range between -1 and 1. A value of "1" indicates perfect endogamy. A value of "0" indicates a random marriage pattern, suggesting that socio-racial categories were not a relevant factor in marriage choice. Finally, a value of "-1" indicates a strict preference for exogamy. Evaluation of the conditional kappas indicates that peninsulares had a low degree of endogamy. Examination of Table 4.3 and Table 4.4 indicates that this was because of the low frequency of peninsular women. There were only 3 married peninsular women compared to 45 men. Unmarried peninsular women were also rare at the port. Peninsular men, thus, married primarily criollas. Mestiza women, in contrast, married across the socio-racial spectrum. It is apparent that peninsulare/criolla and mestiza marriages account for most of the observed exogamy suggested by Cohen's kappa.

Table 4.4. Cohen's Kappa and Conditional Kappas for Cuarteles 2 and 3, Port of Veracruz in 1791

	Cohen's Kappa	Conditional Kappas Male	Female	Combined
Cuartel 2 (Central)	*0.058*			
español europeo		0.054	1.000	0.102
español		0.552	0.124	0.203
mestizo		-0.033	-0.016	-0.022
pardo		0.650	0.317	0.426
moreno		0.000	N/A	0.000
Cuartel 3 (West)	*0.378*			
español europeo		0.055	1.000	0.104
español		0.745	0.369	0.493
mestizo		1.000	0.136	0.239
pardo		0.936	0.786	0.854
moreno		0.711	0.945	0.812
Combined				
español europeo	*0.405*	0.044	1.000	0.084
español		0.527	0.140	0.221
mestizo		0.263	0.061	0.099
moreno		0.879	0.784	0.828
pardo		0.681	0.774	0.724

By comparison, morenos and pardos appear generally endogamous. Morenos rarely married outside their casta and when they did it was generally a marriage between morenos and pardos. Only in one case did the census document a marriage between a moreno and mestiza. Pardos were slightly more socially mobile in their choice of marriage partners. Most pardo marriages were endogamous, but in some case pardos married mestizas and even españoles. In two cases, pardas even married peninsulares. In both of these cases, their husbands were Spanish “dons” and master artisans. These patterns are generally consistent when considering each city quarter separately. One exception is among the small number of married pardas living in the central quarter. Here, four of six pardas were married to españoles.

The 1791 census suggests a limited permeability in casta boundaries. Yet, incidents of exogamy are probably underestimated as census data was collected after the couple were married. Historians have long noted that census takers had the tendency of equalizing the casta of marriage partners in the late colonial period (Anderson 1988; Castleman 2001; Chance and Taylor 1977). Often scholars turn to parish records for comparative datasets. Unfortunately, the earliest extant matrimonial data date to 1801.[12]

Summary

There are currently few descriptions of the port of Veracruz (Villa Rica, La Antigua, or Ulúa) until the 1570s, half a century after initial encounters between native and European people. By this point, more than a generation had passed and epidemics had drastically reduced the indigenous population, particularly along the coastal plain surrounding the port. Socioeconomic and socio-geographic distinctions were borrowed from Spain and imposed from the top down, mainly for the European and African descendant populations that dominated the coastal plain that surrounded the port. Categorical distinctions were further emphasized locally through spatial segregation. As the slave population increased, rebellions in Veracruz directly contributed to shifts in imperial policies, restricting access to arms and increasing penalties related to runaway slaves. Given that non-native people dominated the area in and around the port, biological mixing was mainly between Europeans, Africans, and their descendants.

During the seventeenth century, the number of American-born blacks and castas increased. Evidence from the constitutions of cofradías indicate that collective action was shifting emphasis from place of birth to physical appearance, presenting local evidence for the racialization of casta categories. By the eighteenth century, there is finally detailed historical data for the port's population. I draw on historical methods used in other regions to assess the degree of overlap between the ascription of casta categories and occupation using the Revillagigedo census of 1791. The results of my analysis parallel findings for Mexico City and Oaxaca, demonstrating some divergence between casta and occupation and reflecting both upward and downward socioeconomic mobility. Although analysis of marriage patterns reveals little evidence of exogamy, the diversity of castas within cuarteles suggests at limited erasure of segregation at the port.

Mechanisms of Social Transformation at the Presidios of Northwest Florida

In this section, I shift my focus to across the Gulf of Mexico to the frontier of the Spanish Colonial Empire. The presidios of Northwest Florida were located in the borderlands adjacent to expanding French and British territories. Thus, between 1698 and 1763, the presidios functioned primarily as a military garrison for the defense of the northern frontier and the protection of Spain's shipping lanes. Although there were three sequentially occupied presidios, they represented a single community, evolving over the course of 65 years. Santa María de Galve (1698-1719), Isla de Santa Rosa (1722-1756) and finally San Miguel de Panzacola (1756-1763) were established relatively late in the colonial period, within a region that was generally depopulated. Some native groups eventually migrated to Northwest Florida – most notably the Apalachee and Yamasee who founded missions supported by the presidios. Yet, native populations were never large, and colonial administrators turned to convict labor drawn from urban locations in New Spain, including the Port of Veracruz.

In this section, I first set the stage by describing the initial conditions and labor relations that developed in La Florida over the course of nearly two centuries. I then describe labor relations in eighteenth century La Florida and provide a brief historical overview of the Pensacola presidios. Finally, I examine socio-demographic shifts and the relational mechanisms (both top-down and bottom-up) that contributed to social change in the frontier settlements of Northwest Florida.

Setting the Stage

The presidios of northwest Florida were founded relatively late in the colonial period. Since the mid-sixteenth century, imperial resources were directed toward establishing and then maintaining a presidio in east La Florida, supported mainly by government subsidies and a chain of missions up the coast of modern-day Georgia and extending westward as far as Apalachee territory around the big bend region of La Florida (Figure 4.7). These missions provided the primary labor force that sustained Spain's north Atlantic frontier for nearly a century and a half. Only once the French began to encroach on the northwest Gulf coast in the late seventeenth century did Spain again attempt to establish a presence there. By that time, the indigenous population around Pensacola Bay was gone and the native people who would later migrate to the area were already experienced in dealing with European powers. The first Pensacola presidio, Santa María de Galve, was founded just a few years before the destruction of the Florida missions. Labor relations shifted thereafter with Spain's native allies becoming as much supported by the Crown as vice versa. Even after the eventual founding of two missions in Northwest Florida, the marginal native population could never provide a sufficient labor pool. Officials turned to penal servitude to supplement native labor and support three sequentially occupied presidios over the course of 65 years.

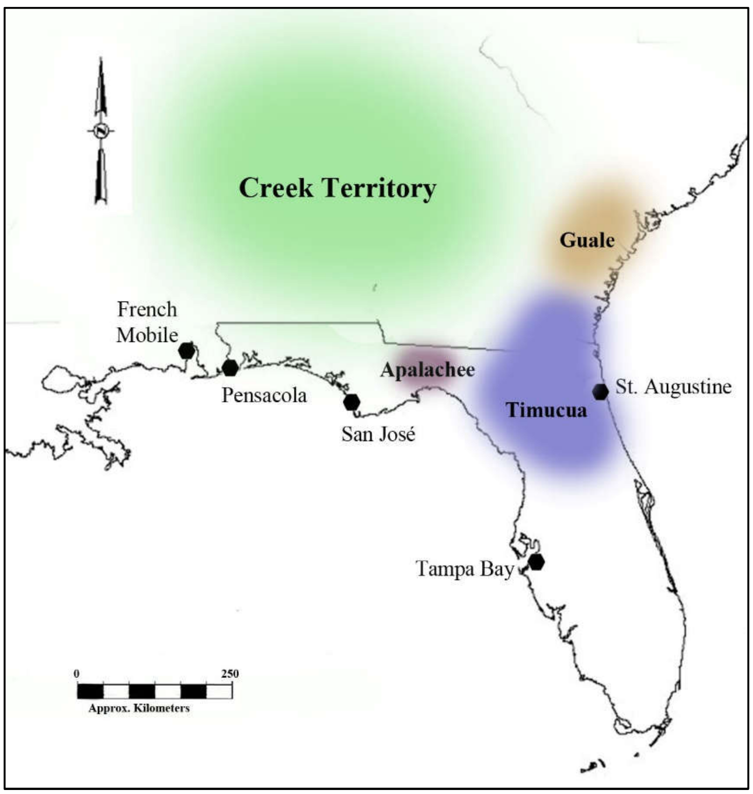

Figure 4.7. Map of La Florida and Surrounding Macro-Region. Locations of Major Native Groups just Prior to the Collapse of the Colonial Mission Chain are Indicated.

Initial Regional Conditions. Spanish explorers were sailing along the northern Gulf coast within thirty years of Columbus's landing in the West Indies. Setting out from Jamaica, Alonso Alvarez de Pineda discovered the Mississippi river delta and likely passed by Pensacola Bay in 1519 (Weber 1992; Weddle 1985). Survivors of the failed Pánfilo de Narváez expedition were probably the first Europeans to encounter indigenous people in Northwest Florida. Narváez first landed near Tampa Bay in 1528 where he and 400 men disembarked and traveled west by land (see Figure 4.7). Indian attacks and illness led to the demise of most of the explorers, including Narváez. An expedition treasurer, Alvar Núñez Cabeza de Vaca (2016:46-51), described encounters with native peoples near an estuary that historians believe was either Pensacola Bay (Smith 1968:242) or neighboring Mobile Bay (P. Hoffman 1994:63).

Eleven years later, Hernando de Soto began exploring the interior while his ship captain Francisco Maldonado sailed along the northern Gulf coast. In 1539, Maldonado weighed anchor in a bay 60 leagues from Apalachee in a province referred to as either "Ochus" (Hudson 1997:144-145,411-412; Smith 1968:49) or "Achusi" (Varner and Varner 1951:247), which historians believe to be Pensacola Bay (Hudson 1994:80). Maldonado was met by indigenous people who reportedly offered to supply his ship (Varner and Varner 1951:247). After exploring the bay, Maldonado left with two of these natives, returning to Pensacola several times between 1540 and 1542 in failed attempts to rendezvous with Soto (Hudson 1994; Varner and Varner 1951).

The Tristán de Luna y Arellano expedition followed twenty years later and was the most organized attempt by Spain to colonize La Florida up to that point. Financed by

King Philip II of Spain, Luna sailed for Pensacola with 11 ships (plus another in tow) and approximately 1,500 people, including soldiers, servants, African slaves, some wives, children, and 200 "Aztec" warriors and craftsmen from Mexico City (Galloway 1995:143-160; Hudson et al. 1989; Priestley 2010 [1928]; Smith et al. 1995; Worth 2017). Barely more than a month after landing in Pensacola a hurricane destroyed seven ships with most of their supplies. Based on Soto's previous reports, Luna expected to find native villages that could provision the expedition, but instead they saw only a few huts (Priestly 1928:213, 275). Explorations into the interior found that many of the native villages previously described by Soto were significantly reduced due to disease and colonial disruption. These factors likely contributed to the depopulation of Northwest Florida as well (Dobyns 1983; Smith 1987, 1994; Larsen et al. 1992). Luna ultimately abandoned plans to colonize the Gulf coast in 1561 and Spain shifted focus eastward, successfully colonizing northeast La Florida with the establishment of St. Augustine in 1565 and Santa Elena in 1566 (Weber 1992:60-75).

Over the next 150 years, first Jesuit and then Franciscan priests organized missions to the north and west of St. Augustine. At its apex in the seventeenth century, the mission chain that developed included over 40 missions, 70 friars, and 26,000 Christianized natives (Griffen 1993:xv; Hann 1990; Milanich 1994:277). The mission system served three primary functions: 1) converting native people to Catholicism, 2) transforming them from potential enemies into allies, and 3) providing a source of laborers to St. Augustine (Milanich 1994:277). This mission chain went no further west than Apalachee and never reached Pensacola (Griffin 1993:xv; Milanich 1994:277).

Labor Relations in La Florida. The colonial labor structure in the borderlands evolved through experimentation in eastern La Florida, centered at St. Augustine, with native laborers drawn from the Spanish mission chain. By the seventeenth-century, colonial survival revolved around three economic institutions: the repartimiento, the *gasto de indios*, and the *situado*. The repartimiento labor drafts operated much the same in La Florida as they did in central Veracruz and throughout New Spain. First instituted in La Florida by Governor Gonzalo Méndez de Canzo sometime between 1597 and 1600, the continuation of the garrison at St. Augustine depended on the labor draft. Through the rotational system, natives built public structures, unloaded Spanish supply ships, transported goods, cut firewood, and grew maize and staple crops (Bushnell 1994:121-122; Worth 1998:129). In return, native laborers received wages through their chiefs in the form of manufactured goods equal in value to one real per day of labor (Bushnell 1994:122; Worth 1998:126).

In addition to the repartimiento, the *gasto de indios* (native expense) was instituted in 1593. This expenditure provided gifts in the form of manufactured goods and horses to native *caciques* (headmen) in order to encourage peaceful relations and alliances with native communities (Bushnell 1981:66; McEwan 2000:74; Worth 1998:136). Through the strategy of "peace by purchase," native leaders were effectively transformed into political and cultural brokers who facilitated the labor drafts (Bushnell 1994:105). After 1616, the gasto de indios was regularly included in the situado for Florida (Bushnell 1981:66; Sluiter 1985:5).

The key value of the eastern borderlands was strategic, providing an important buffer zone protecting Spain's shipping lanes. Because the function of the presidios was primarily militaristic, they always depended on government assistance (Deagan 1983:34). The situado was an annual subsidy instituted in the Florida frontier province by King Philip II as early as 1571. Spain transferred funds, first to the treasury in Veracruz, then to Mexico City in 1592, and finally to Puebla after 1702. During their period of responsibility, the treasury in each of these cities became financially responsible for supplying the Florida presidios (Bushnell 1994:43; Sluiter 1985:3). The subsidy supplied the necessities of presidio life in the frontier, including daily rations, military salaries, wages for skilled and unskilled labor, and munitions. Despite the intentions of the crown, the situado was notoriously unreliable and regular deficits left St. Augustine dependent on the mission system to make up the difference (Bushnell 1994; Worth 1998:130). After the mission system began to collapse in 1704, native communities attached to the presidios also came to rely on the situado for rations, supplies, and sometimes for wages (Bushnell 1994:210; Dadiego 2014:65; Childers and Cotter 1998).

The Pensacola presidios were founded nearly 300 km west of the Apalachee missions and just prior to their destruction. The first governor of Northwest Florida arrived in Pensacola with orders to barter for native labor and provisions. Colonists did obtain some food supplies from the Movila Indians residing at Mobile Bay in 1699, and by the following year some natives were working for rations or wages at the presidio (Childers and Cotter 1998:88). Natives assisted in building the first presidio, tilling the ground for vegetable gardens, hunting game, and fishing for the presidio occupants

(Childers and Cotter 1998:87-91; Clune et al. 2003:58; Yarza y Escalona 1746). Unlike east Florida, however, there was never a large native population in Northwest Florida. Even after the founding of a couple of missions for native migrants to the area, the native population remained relatively small, leading administrators to supplement the local labor force with *forzados* or *gastadores* (convict laborers) from New Spain (Childers and Cotter 1998; Clune et al. 2003; Childers et al. 2007; Dysart 1998).

Adapted from medieval Iberia, penal servitude had been utilized in presidios and *obrajes* (textile mills) throughout Mexico since the sixteenth century (Pike 1978, 1983; Salvucci 1987:107-109). As free wage labor came to dominate in most regions of the viceroyalty, obraje owners increasingly refused to purchase convict labor until the practice ended in 1767. Thereafter, all convicts sentenced to hard labor were sent only to the presidios (Salvucci 1987:109). The use of convict labor in Pensacola, thus, occurred during a period of large-scale decline in penal servitude – and in coercive labor regimes in general. There were few native laborers who were skilled in European trades, so the presidios depended on artisans from Mexico, sometimes conscripted, to fulfill this role (Childers and Cotter 1998; Childers et al. 2007:23; Clune et al. 2006:38; Coker and Childers 1998:36; Lorenz de Rada 1698b).

A Brief History of the Presidios. After the founding of St. Augustine, Spain virtually forgot about Northwest Florida until the French began exploring the region in the late seventeenth century. In 1686, Sieur de La Salle rediscovered the mouth of the Mississippi River and the French prepared to establish a settlement on the northern Gulf coast (Weber 1992; Weddle 1985). The French colonial presence on the Gulf revitalized

Spain's efforts to establish a settlement in west Florida. Spain began plans for a presidio at Pensacola Bay in order to impede French expansion. In 1693, Admiral Andrés Pez and Carlos de Sigüenza, a Mexican mathematician, arrived in Pensacola to inspect the landscape and map the bay. Sigüenza recommended to the viceroy of New Spain that a fort should be built on the Barranca de Santo de Tome and two batteries at the Sigüenza Point on Santa Rosa Island (Coker 1996; Faye 1941).

Over the next seven decades, a Spanish presidio was established in Northwest Florida and then relocated three times (Figure 4.8). For the current study, I focus on the occupation of the presidios in Pensacola during the First Spanish Period,[13] first at Santa María de Galve (1698-1719), and then at Isla de Santa Rosa (1722-1756), and finally at San Miguel de Panzacola (1756-1763). Andrés de Arriola established Santa María in November of 1698 and directed construction of the settlement, including the Fort of San Carlos de Austria, on the mainland near the bluffs that overlooked the entrance to Pensacola Bay. Outside the fort, there was a village with a church and numerous residences that were occupied during the first few years of the presidio (Clune et al. 2003:20; Coker 1996; Faye 1941).

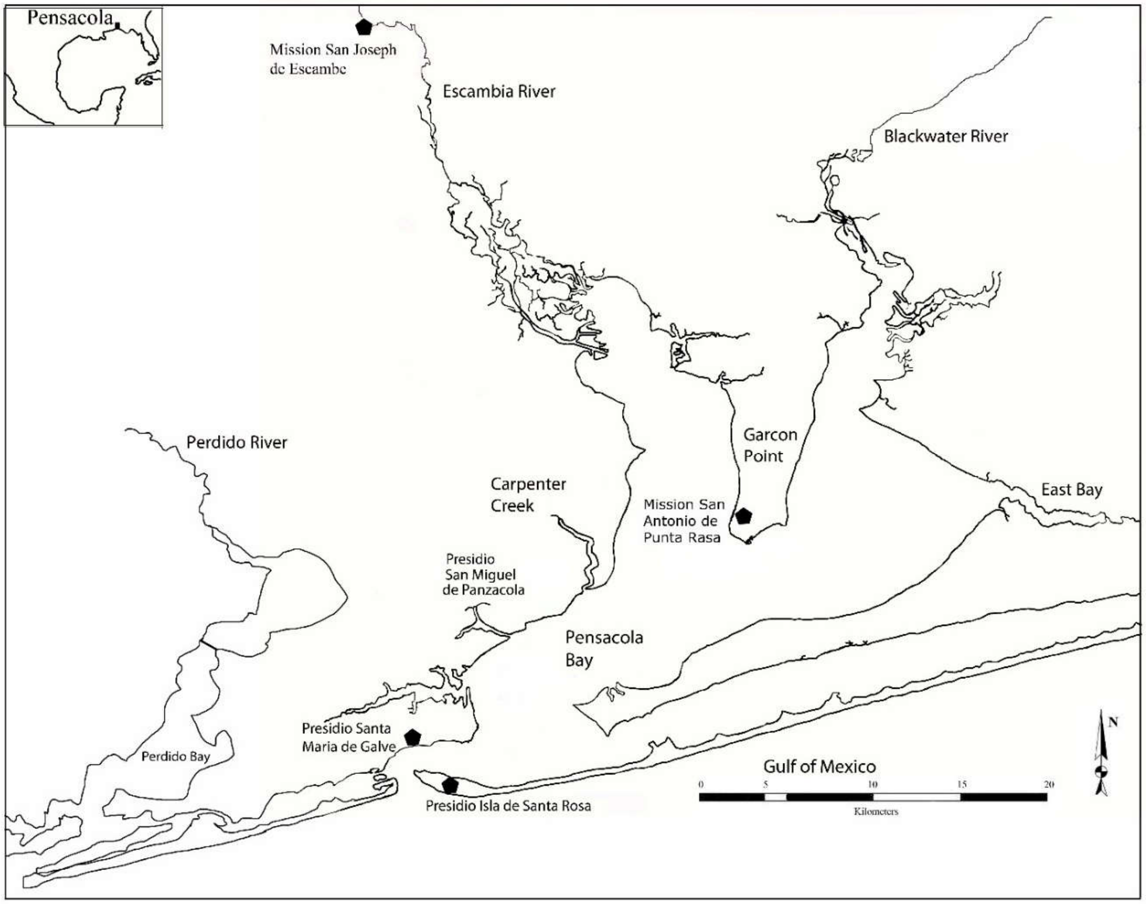

Figure 4.8. Map of Northwest Florida Presidios and Missions with Known Locations

When a French squadron arrived in 1699, construction of the fort was still incomplete. The unfinished walls were not visible from the bay, but the Spanish soldiers were able to convince the French officers to continue westward (Faye 1941). Pierre Le Moyne de Iberville moved on to establish a settlement first at Biloxi in 1699 and then at Mobile in 1702, less than 100 km away from the Spanish presidios (see Figure 4.7; Higginbotham 1977; Manucy 1959).

Between 1701 and 1713, the Spanish and French were allied against Britain during the War of Spanish Succession when Philip of Anjou, a Bourbon and grandson of Louis XIV, ascended to the throne of Spain (Nettels 1931). British colonists in Carolina formed alliances with neighboring Creeks and those native allies raided St. Augustine and the Spanish mission chain, particularly the Apalachee, leading to the eventual collapse of the missions by 1704. The Apalachee survivors abandoned their homes and fled east to St. Augustine, to the northern Creek interior, and to the west to Pensacola (Hann 1988:264-269; Worth 1998:145-149; Wright 1971:64-67).

Most of the Apalachee and some Chacato who arrived in Pensacola in 1704 moved onto Mobile (Coker and Childers 1998; Hann 1988:264), but some settled along Perdido River with rations from the Spanish settlement beginning in 1705 (Childers and Cotter 1998). Following attacks by natives allied with the British, colonists abandoned the village and retreated to inside the fort until the Treaty of Utrecht ended the war in 1713 (Coker and Childers 1998; Wright 1971:67-68). Four years later, the Apalachee that had been living among the Creeks migrated to Pensacola and joined some of the Apalachee from Santa María and Mobile, establishing the town of Nuestra Señora de la Soledad y San Luís near the mouth of the Escambia River in 1718 (Worth 2008).

That same year, conflicts again broke out, but this time both the French and British were allied against Spain during the War of Quadruple Alliance (1718-1721). In September 1719, Jean Baptiste Le Moyne ultimately captured Santa María for the French and burned the fort and village to the ground (Clune et al. 2003:80-81; Griffen 1959:242; Ford 1939). A small number of French soldiers held Pensacola, while the Spanish garrison retreated eastward 200 km to Presidio San José (Coker 1999).

Two years later, the Treaty of Paris ended the War of Quadruple Alliance and returned Pensacola Bay to Spain. Because of prior attacks on the mainland, Phillip V ordered the strategic relocation of the presidio to Santa Rosa Island in 1722 (Ford 1939:128). Santa Rosa was a barrier island that suffered through at least eight major storms, requiring multiple episodes of rebuilding (Clune et al. 2006; Harris and Eschbach 2006). Following a series of devastating storms in 1752, Spanish officials formally requested permission to relocate to the mainland where a warehouse had been built around 1741 to protect supplies from storms that wreaked destruction on the island (Childers 2003; Faye 1941).

During the occupation at Santa Rosa, two missions were founded in Northwest Florida by native groups (see Figure 4.8). Based on historical evidence, it appears the Apalachee mission Nuestra Señora de la Soledad y San Luís survived the French occupation of Pensacola (Worth 2008, 2011). Two decades later, the mission was relocated several leagues upriver to the new site of San Joseph de Escambe (ca. 1741-1761). At about the same time, a number of Yamasee refugees arrived from St. Augustine, fleeing a siege by British forces. By 1749, these newcomers founded a second mission called San Antonio de Punta Rasa on Garcon Point (Harris 2007; Dadiego 2014:58; Worth 2008).

By July of 1755, most of the population of Santa Rosa was living at the new mainland site of Presidio San Miguel de Panzacola, even though permission for this move was only formally issued by the Viceroy in New Spain on July 14, 1756 (Benchley et al. 2007; Worth 2013). The third presidio was established between two creeks on a low terrace along Pensacola Bay (Benchley et al. 2007:6). Construction of the fort was protracted but eventually completed by 1760. Later Spanish and British maps depict most residences within the fort walls to protect their occupants from attacks by the Tallapoosa and Alibama (Upper Creeks) peoples (Benchley et al. 2007:30; Worth 2013). These attacks resulted in the burning of both the Apalachee and Yamasee mission towns with their occupants retreating closer to the fort in 1761 (Childers et al. 2007:38; Worth 2008; Worth et al. 2015). The relatively short-lived occupation of Presidio San Miguel ended when the Spanish agreed to surrender all of Florida to the British at the end the Seven Years War (1756-1763; Gold 1969).

Mechanisms of Social Change at Santa María de Galve

Historians have been investigating the presidios of Northwest Florida for decades, producing a copious inventory of secondary literature. In addition, through several decades of University of West Florida (UWF) investigations at the presidios and missions, researchers have collected hundreds of scanned and transcribed documents from the Archivo General de Indias in Seville (AGI) and the Archive General de la Nación in Mexico City (AGN). These scans and transcriptions are currently on file at UWF's Special Collections and UWF's Archaeology Institute. I draw on this trove of primary documents, including letters, memorials, reports, relaciones, and requisition lists, as well as secondary literature, to examine social transformations at the presidios. This analysis has identified both top-down and bottom-up mechanisms of social change, beginning with the first presidio of Santa María de Galve (Figure 4.9).

Because the presidios were established relatively late in the colonial period, initial social organization was borrowed from colonial Mexico, not from medieval Iberia. Although the late seventeenth century represented the height of the casta system in New

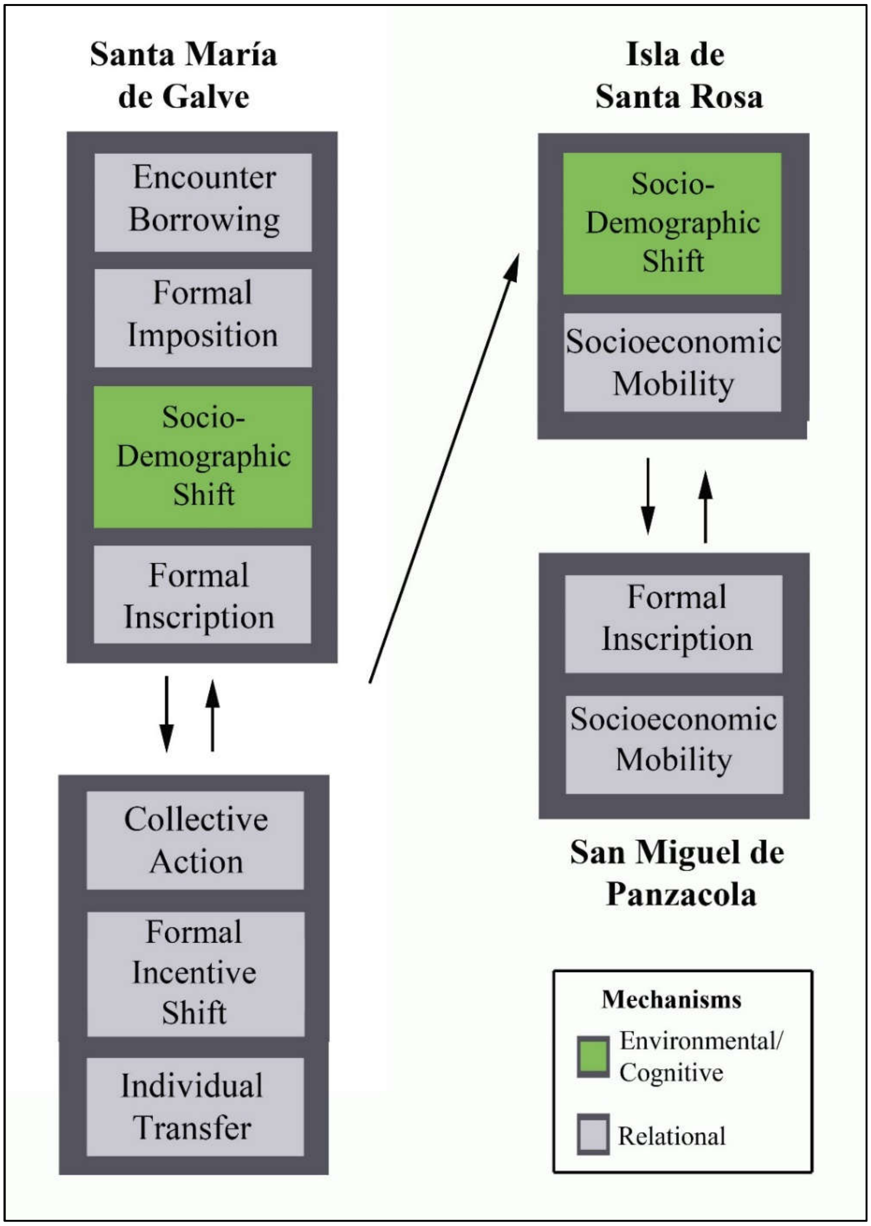

Figure 4.9. Causal Mechanisms Contributing to the Transformation of Social Categories in Colonial Northwest Florida. *Note:* Mechanisms are presented in roughly chronologically order from top-to-bottom and from left-to-right. Mechanisms that co-occurred or had a close dialectical relationship are grouped.

Spain, military enlistment status and rank predominated in organizing labor and socioeconomic status at Santa María. Military status was further inscribed through the spatial organization of the colonial settlement. Casta identities were not completely erased and were infrequently imposed in some official reports. Indio was the only socio-racial label that was consistently applied. Following Apalachee migrations to the area in 1704 and 1717, native communities were established at a distance from the presidio, inscribing a distinction between casta colonists and indios. Meanwhile, within the presidio settlement, reliance on coerced labor resulted in mutinies and desertion, leading to both negative and positive incentive shifts. Individual transfer through the enlistment of forzados and granting of wages to skilled workers offered not only a means of placating convicts and conscripted soldiers, but also provided an avenue for some limited socioeconomic mobility.

Encounter/Borrowing and Formal Imposition. As already mentioned, early encounters between indigenous people of the northern Gulf coast and European explorers were intermittent. Expeditions by Pineda, Narváez, and Soto took place during a two-decade period that followed the Spanish conquest of New Spain. These encounters were largely between peninsular Spaniards and proto-historic native communities. More than a generation after Cortés landed in Veracruz, the Luna expedition was organized in colonial Mexico. A product of his time, the socio-demographics of Luna's colonizing force was substantially different from previous undertakings. By March 1599, approximately 500 soldiers were recruited from Oaxaca, Zacatecas, Puebla de los Angeles, and Mexico City (Priestley 2010 [1928]:238). These colonists were described as "españoles," but many were likely criollos or mixed offspring that had avoided the mestizo label (see Chapter 3). Luna's expedition also included an additional 1,000 individuals described as mestycos (mestizos), mulatos, and indios (Priestley 2010

[1928]:54; Worth et al. 2017). Encounters that followed between natives and diverse géneros de gente from Mexico were significant but brief, as the Luna settlement in Pensacola failed after only two years (see ongoing investigations of the Luna site by archaeologists and historians at the University of West Florida; e.g., Worth et al. 2017, Worth 2018). Further encounters between natives and colonists were suspended in Northwest Florida for nearly a century and a half.

When Arriola arrived at Pensacola Bay, he brought with him semi-volunteer reenlistments recruited from Puebla, Mexico City, and Nueva Veracruz (Bozomo 1698; Junta General 1698; Santa Cruz 1698), as well as convict laborers taken from the jails of Mexico City (Coker and Childer 1998:17; Junta de Hacienda 1698). Arriola himself was a former sergeant major of the presidio of Veracruz and now the governor of Northwest Florida. The colonists included artillerymen, priests, craftsmen, and other skilled workers, bringing the total number of initial colonists to more than 350 individuals, not including military officers (Junta General 1698; Urbina 1698a). Of the approximately 200 infantrymen, about a third were recruited from Veracruz (Lorenz de Rada 1698a).[14] In addition, correspondence between the governor of Veracruz and the viceroy indicate that a number of surgeons, carpenters, and blacksmiths, with their associated skilled laborers, were forcefully conscripted from the port for service in Pensacola (Lorenz de Rada 1698b; Tobar 1698). This colonial garrison was supplemented by another 50 soldiers recruited in Havana (Dunn 1917:180-181; see also Reina 1698).

Thus, from the beginning, Pensacola was a pluralistic society, consisting mostly of convicts and soldiers from a number of regions in colonial Mexico and only a small number of soldiers and officers from Spain.[15] Colonists borrowed categorical distinctions that were, by this point, broadly recognized across the viceroyalty. The late sixteenth century was the height of the casta system in colonial Mexico (see Chapter 3), but Santa María was also a presidio garrison with distinctions based upon military enlistment and rank. Official reports and correspondence regarding the maintenance of the presidio predominantly imposed the latter distinctions, as well as references to civilian administrators, craftsmen, and ecclesiastical positions.

Casta designations are rarely mentioned in extant documents for the presidios. It is not until a decade after colonists arrived in Pensacola that there is a description of the socio-racial composition of the presidio. According to a 1708 report, only 34 percent were españoles. Most were mestizos (41 percent) and the rest were people of mixed African descent, labeled mulatos (21 percent) and zambos (4 percent of mixed native and African descent) (Clune et al. 2003:25).[16] A decade later, the new Governor Matamoros, who just arrived from Mexico, complained that most of the convict laborers were mestizos or mulatos and could not be trusted (Coker and Childer 1998:71). Aside from these uncommon occurrences, the only consistent socio-racial distinction that was regularly made in reports, correspondence, and requisition lists were in references to indios (Coker and Childer 1998:32).

Environmental and Cognitive Mechanisms: Socio-Demographic Shifts. A defining characteristic of the Pensacola presidios was their changing population, mainly as a result of migration. Figure 4.10 shows variation in the population of the first presidio garrison with approximations based on requisition lists for rations and wages. The initial population of more than 400 soldiers, officers, convict laborers, and artisans was plagued with illness and desertion. Within six months, the population fell such that only 162 were receiving rations (Coker and Childer 1998:18-22; Dunn 1917:183).[17] While in Veracruz in December 1699, Arriola acquired 100 recruits from the "jails and slums in Mexico," yet by March 1700 the population fell again to only 80 inhabitants, the lowest in the history of the presidios. New recruits arrived over the next few months, again lifting the garrison numbers to 280 (Coker and Childer 1998:22-24). Although documented fluctuations between 1698 and 1700 were the most sever, the cycle of population loss and influx of new recruits and conscripts continued throughout the occupation of Santa María.[18]

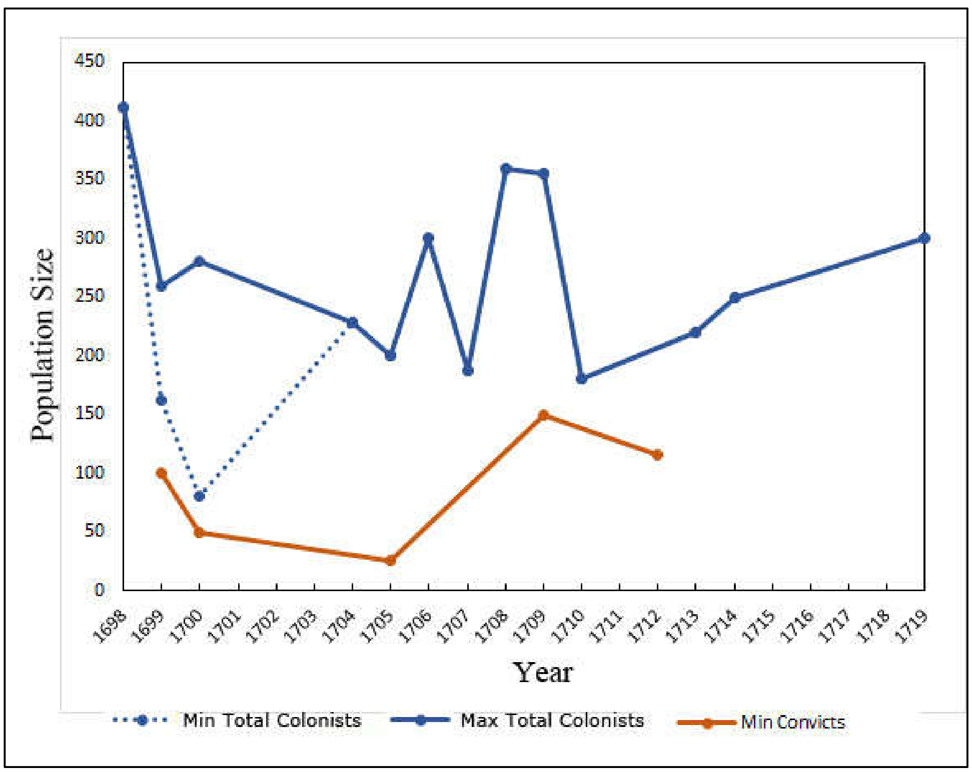

Figure 4.10. Fluctuating Population at the Presidio Santa María de Galve.
Sources: Coker and Childers 1998; Clune et al. 2003; Eschbach 2006; Urbina 1705, 1706, 1708, 1713.

The native population remained small in Northwest Florida, particularly during the occupation of Santa María. A group of Chacatos were paid to hunt buffalo and deer for the presidio until most of them moved to Mobile in 1703 (Harris 2003:269; Rowland and Sanders 1929). Ocatoze were reportedly living on the periphery of Santa María four years later (Junta 1707). Other small groups likely were temporary residents of the region or at the presidio, but the most notable shift occurred following the destruction of the east Florida mission system. As already mentioned, Apalachee migrants moved westward and some ultimately founded a small pueblo along the Perdido River in 1705 (Cui 1705; Landeche 1706b; Urbina 1706a, 1706b). A second Apalachee migration from Creek Territory followed near the end of the occupation of Santa María in 1717, leading to the establishment of Nuestra Señora de la Soledad y San Luís the following year – the first known mission in Northwest Florida (Harris 2003:275-276; Worth 2008).

Top-Down Mechanism: Formal Inscription. As in Veracruz, colonial officials attempted to inscribe categorical difference through segregation. Because garrisoned presidios were primarily established for defense, the fort was the central organizing structure at Santa María (see Clune et al. 2003:43). Early descriptions of the socio-spatial organization of the presidio are limited. Jayme Franck's map identifies the governor's house inside the fort (Figure 4.11; see also Arriola 1702; Landeche 1706a). Franck's plans also called for the construction of separate barracks for officers and infantrymen within the western wall (Franck 1699). Three years later, soldiers' barracks were reportedly present inside the fort (Arriola 1702). After a fire destroyed their quarters in 1704 (Arriola 1699), presidio soldiers relocated to small huts located just outside the stockade. Landeche (1706a) suggests this was because the officers feared the conscripted soldiers. Native dwellings for some friendly Ocatoze natives were further away from the fort along the village periphery (Junta 1707), thus a degree of socio-spatial organization was maintained based on distance from the fort. In addition, colonists were forbidden from interacting with the small community of Apalachee that had settled along the Perdido river (Cui 1705; Landeche 1706b; Urbina 1706a, 1706b).

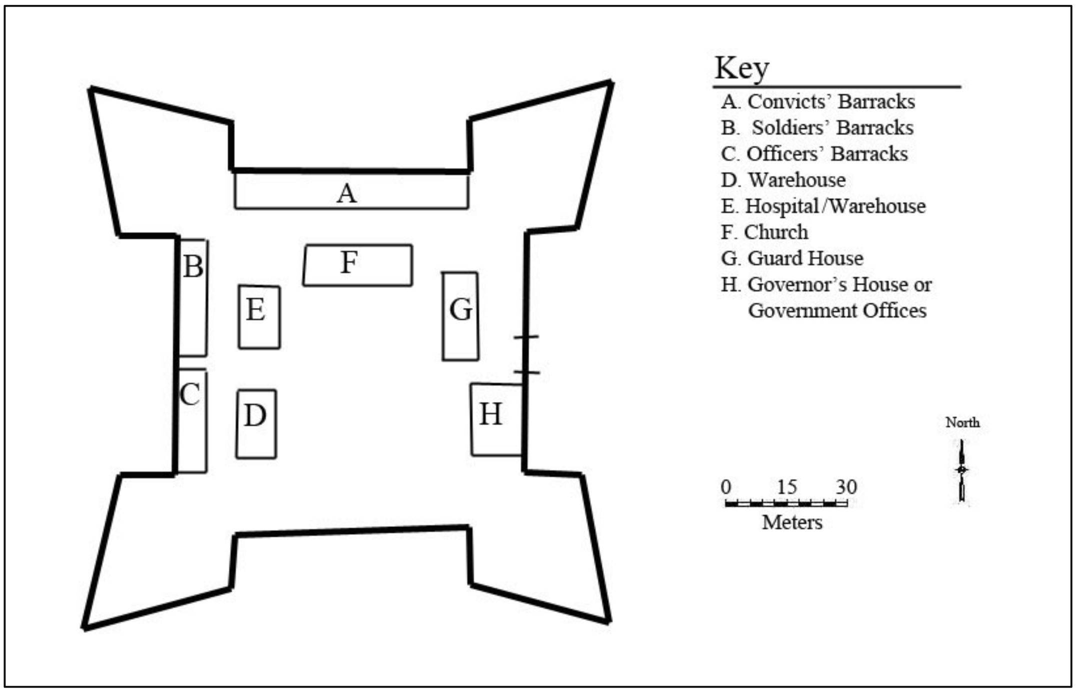

Figure 4.11. The Fort at Santa María de Galve Based upon Franck's 1699 Map, Le Maire's 1713 map, and a 1719 French map (Adapted from Bense and Wilson 2003:98, figure 4.12)

After 1707, the socio-spatial organization of Santa María became more formalized. That year, the settlement's residents took refuge inside the fort as attacks by natives allied with the British escalated in frequency and scale (Clune et al. 2003:42-43; Higgenbotham 1977:309). Bense (2004:60-62) has proposed that the organization within the fort was ultimately organized along two concentric rings. The center ring was made up of public structures surrounding a plaza, reflecting Spanish norms for colonial town planning (see Crouch et al. 1982). The second ring was located along the curtain wall and included residential structures. By 1708, three soldiers' barracks were constructed along the north and west walls of the fort. These barracks are shown in a 1713 Le Maire map. Six years later, a French map identifies the southwest barracks as quarters for the officers (see Figure 4.11). Based on archaeological evidence, Bense and Wilson (2003:132-133) have argued that the northwest barracks housed the soldiers, while convicts resided in the northern barracks (see also Chapter 6). This new spatial organization formally inscribed categorical difference based upon socio-geographic distinctions, enlistment status, and rank, while casta identification appears muted. Soldiers and convicts of diverse socio-racial and regional identities were compelled to live within the same structures and worked side-by-side in their labor and defense of the fort.

Bottom-Up Mechanisms: Rebellion as Collective Action. The status of convict laborers placed them at the bottom of the presidio's hierarchical structure regardless of their ascribed casta identity. Forzados carried not only a reputational stain as criminals, but also suffered an economic consequence. While convicts received a ration, they earned no wages for their work. At the same time, forzados were forced to perform the most grueling tasks required for the construction and maintenance of the presidio (Arriola 1698b; Urbina 1705c; see also Pike 1983:41-42). Their shared plight led to revolts at Santa María that took two forms: escape and mutiny.

Upon arriving in Pensacola, Arriola began releasing the forzados from their shackles so that they could complete their work. He believed that the remote location of the presidios would discourage flight. The new governor was mistaken. Less than a month after they arrived, 24 forzados and 2 infantrymen escaped from the presidio. These men were recaptured, but this was not the last time that convicts would attempt to escape (Arriola 1698b).[19] A more coordinated plan was implemented in 1712 when 16 sixteen fozados, with the aid of three soldiers, cut a hole in the wall of their barracks and then scaled the curtain wall (Salinas Varona 1712).

As convict laborers comprised such a significant proportion of the presidio's population, the potential for mutiny was of constant concern to presidio officers and administrators (Clune et al. 2003:26; Urbina 1713). The most damaging episode of revolt is indicated by conflicting reports that forzados set fire to the camp soon after the garrison arrived in Pensacola (Coker and Childer 1998:18; cf., Arriola 1699). Whether the fire was intentional or accidental, officers and administrators sought means to limit potential revolts by forzados and conscripted soldiers.

Top-Down Mechanisms: Formal Incentive Shift and Individual Transfer. Reminiscent of Veracruz, imperial authorities feared rebellion by a subaltern group whose labor was coerced. The governors of Pensacola adopted both negative and positive incentives to deal with a perceived threat to imperial interests. After the first escape attempt by forzados in 1698, Arriola wanted to execute four convicts as an example to the others. Friars serving at the presidio intervened and the governor agreed not to kill them. Instead, he punished the infantrymen who had helped them escape by sentencing them to serve two years without pay (Arriola 1698b). The soldiers were effectively reduced to the same status as the convicts they sought to help. It appears that it became a regular practice of presidio governors to target the perceived leaders of rebellious behavior as an example to others. Some troublemakers were publicly punished and then sentenced to service in St. Augustine (Salinas Varona 1713a, 1713b; Urbina 1713).

Meanwhile, presidio administrators realized that more than coercion was necessary to control their labor force and thus developed positive incentives. Within two months of Arriola's arrival in Pensacola, fearing a sea attack by French ships, the new governor pardoned all the forzados in an attempt to gain their loyalty (Arriola 1699). This early action by Arriola developed into the increasingly common practice of rewarding good behavior by enlisting convicts as soldiers who would then earn wages in addition to their salary (Clune et al. 2003:27). The individual transfer from forzado to soldier opened up opportunities for at least modest socioeconomic mobility for those initially condemned to unpaid hard labor at the presidio. Captain Antonio de Landeche complained that in some cases conscript soldiers were even promoted in rank to officer positions (Landeche 1706a).

In addition, because the presidios were in constant need of skilled artisans and to alleviate the resentment of coerced laborers and soldiers, presidio officials began to pay wages to anyone who possessed a skill. The number of skilled laborers present at the presidios at any given time is difficult to assess because administrators varied in how they identified them (Childers and Cotter 1998:83-87). Despite potential gaps and inconsistences in record keeping, a report to the viceroy does indicate that at least eight carpenters and two blacksmiths were initially sent from Veracruz to help build the fort and village at Santa María (Lorenz de Rada 1698b). Franck also trained several convicts in carpentry in 1699. Between 1703 and 1705, as many as 80 skilled artisans were reportedly working in Pensacola (Childers and Cotter 1998:86).

Mechanisms of Social Change at Isla de Santa Rosa and San Miguel de Panzacola

Following the capture of Santa María by French troops, the Spanish garrison withdrew to Presidio San José for three years. In 1722, the presidio occupants returned to Pensacola and founded a new presidio on Santa Rosa Island (see Figure 4.8). Surrounded by water on three sides, imperial authorities hoped that the new presidio could avoid the native attacks of the past. The barrier island, however, suffered from devastating storms, leading to another relocation by 1756. Although established in different locations around Pensacola Bay, Santa María, Santa Rosa, and San Miguel represent the continuation of the same community. For my examination of the latter two presidios, I again turned to the collection of primary documents found at UWF's Special Collections and UWF's Archaeology Institute. In addition, while doing research at the AGN in 2013, I identified and later transcribed a document titled Reales Listas, año 1741, Real Contaduría del Presidio de S^{ta} Rossa Punta de Siguenza (a transcription is provided in Appendix A). The Reales Listas of 1741 provides previously unknown details about the members of families, individual *pobladores* (settlers), and forzados who were receiving rations at the presidio. The list includes names and, in some cases, ages, places of birth, casta categories, marital statuses, and terms of service. The document also was updated with notes on the status of individuals until at least 1746. Although the document excludes soldiers, officers, and others who were receiving a salary, the text sheds new light on specific segments of the presidio population.

Based on my analysis of primary documents, supplemented by secondary sources, I have identified three mechanisms of social change at the Santa Rosa and San Miguel (Figure 4.9). Historians and archaeologists have previously noted a change in the socio-demographics of the presidios after 1740. After this year, there was an obvious increase in settler families, women, and children. This shift reflects a greater success in recruiting volunteers who migrated to the presidios from Mexico. At the same time, the number of convicts continued to fluctuate. Analysis of the Reales Listas of 1741 confirms that at least some of this fluctuation was due to the enlistment of forzados or gastadores as soldiers. Opportunities for socioeconomic mobility at the presidio also could be achieved through skilled labor and "passing." Yet, at both presidios, inscription through socio-spatial organization continued to emphasize enlistment status, rank, as well as the possession of valuable skills and marital status. As at Santa María, socio-racial inscription was mainly between a pluralistic community of colonists and native migrants from elsewhere in the borderlands.

Environmental and Cognitive Mechanisms: Socio-Demographic Shifts. During the occupation of Isla de Santa Rosa, changes in immigration led to important alterations in the socio-demographics of Northwest Florida. Convict labor so characterized the first presidio that some scholars have described Santa María as a penal colony with a garrison dominated by men (Bense 2004:3; Clune et al 2003:25). From the beginning, only a small number of women were attached to soldiers and officers, typically as wives who received rations and sometimes a salary (Clune et al. 2003; Landeche 1706a; Moscoso 1707). This continued at Santa Rosa, where between 19 and 20 women were regularly receiving rations and salaries (Clune et al. 2006:41-42; Eschbach 2007:86-89).

After 1740, there was a significant increase in the number of voluntary settler families enjoying rations and salaries (Figure 4.12; Clune et al. 2006:41). The situado began to provide for six settler families in 1741 (Misc. 1741; Reales Listas 1741). Two years later the number of families receiving rations increased to 13 (Urueña 1743). By 1752 there were 21 families receiving rations and the next year there were 32 families (Urueña 1752; Urueña 1753a). In 1754, the viceroy indicated that another 35 young women had immigrated to Pensacola. Some were already wives of men recruited to the presidio, while others would marry soldiers once they arrived (Revillagigedo 1754). By 1763, there were reportedly 172 members of families (Clune et al. 2006:41).

The recently uncovered list of some of the presidio inhabitants from 1741, gives insight into the presidio population at the beginning of the socio-demographic shift. The list shows that the six families that were receiving rations included 77 individuals (Reales Listas 1741). The heads of each household were mainly from Mexico. In one case, Juan Ygnacio de Soliz y Carcamo and Doña Magdalena Garcia had served at the previous presidio of San José where Magdalena had given birth to two children before the garrison returned to Pensacola. Those children were now adults and residing at Santa Rosa with the rest of their family, demonstrating some limited long-term continuity in the occupation of the presidio.

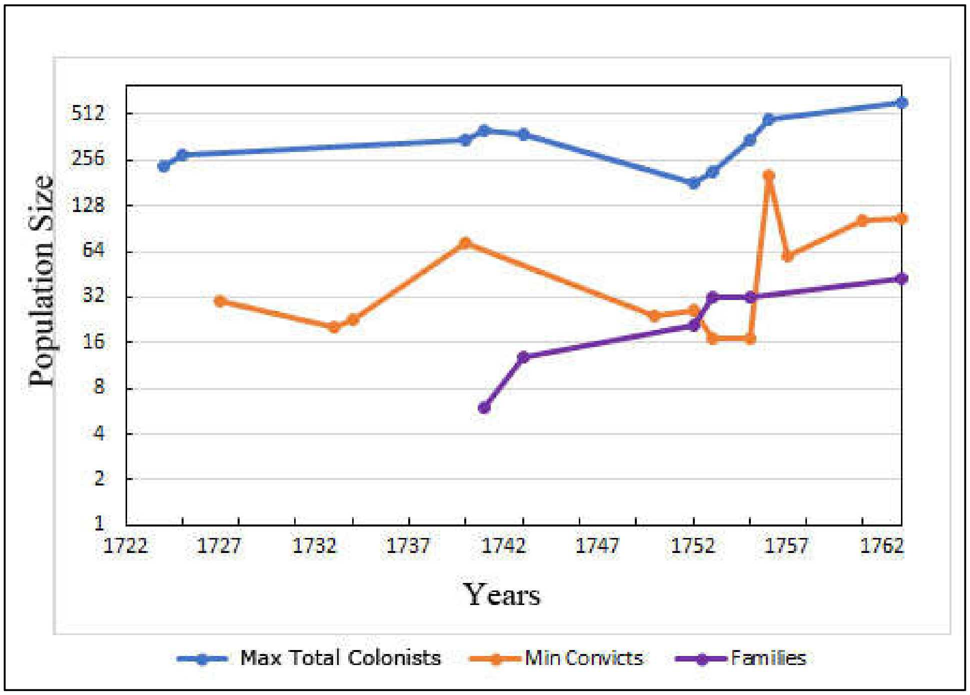

Figure 4.12. Population Trends at Presidio Isla de Santa Rosa and San Miguel de Panzacola. *Sources:* Casafuerte 1724; Childers et al. 2007; Clune et al. 2006; Eschbach 2006, 2007; Urueña 1725, 1740, 1741, 1743, 1752, 1753a, 1755, 1756.

Outside of the presidio were additional demographic changes in Northwest Florida. The Apalachee mission that was present in Pensacola since 1718 was moved upriver to the site of Mission Escambe around 1741. Worth and others (2012) estimate that Escambe was inhabited by only 30 to 50 Apalachee or about four to six families (see also Dadiego 2014:55). At about the same time, Yamasee refugees began to immigrate into the area, ultimately founding Mission Punta Rasa by 1749 (Worth 2008). Based on census data from 1763, there were only about 50 to 70 Yamasee people or 10 to 12 families living at the mission on Garcon Point (Benchley et al. 2007; Dadiego 2007; Misc. 1763). While these missions were small, together they represented the most stable native presence in proximity to the Spanish presidios since the establishment of Santa María.

Bottom-Up Mechanisms: Socioeconomic Mobility. The number of forzados continued to fluctuate over time at Pensacola (see Figure 4.12). Historians have long suspected that this was due, at least in part, to the enlistment of convicts as soldiers (Childers and Cotter 1998:84; Clune 2006:40-41). In 1734, for instance, officials immediately enlisted 14 of 23 forzados that Veracruz administrators had recently sent to Santa Rosa (Escobar 1734). The Reales Listas of 1741 sheds new light on this practice and on socioeconomic mobility at Pensacola. The list includes 77 forzados who were living at Santa Rosa during that year and it appears that the accountant continued to add updates to the document through at least 1746. During that time, at least 13 (nearly 17 percent) were enlisted as soldiers over the next 5 years (Table 4.5). The list also revealed some downward mobility. Between 1741 and 1744, six soldiers and one officer were demoted to the status of forzados for periods of service between 4 and 10 years. Their crimes are not identified.

Upward mobility was also possible through the continued practice of paying wages for skilled labor, even to convict laborers and in addition to the salaries owed to soldiers. At Santa Rosa and San Miguel, wages and rations were only consistently itemized for the salaries of administrators and the members of the military companies.[20] Wages for skilled labor were inconsistently identified. For instance, wages for only one or two carpenters were identified at Santa Rosa in 1724 and 1743. Yet, the accountant Juan de Urueña reported that carpenters *and* blacksmiths were sent to Santa Rosa in 1723

(Urueña 1753), indicating that the artisan wages were not always identified in requisition list for the situado. In addition, residing at the governor's house at San Miguel, there were reportedly other artisans, including a silversmith, a master tailor, and a shoemaker (Childers et al. 2007:32). Similarly, other craftsmen may have engaged in private barter for their services and products.

Table 4.5. Cause of the Decline in Forzados between 1741 and 1746

Cause	Count	Percent
Enlisted	13	16.9
Deserted	12	15.6
Died	7	9.1
Term Ended	16	20.8
Status Unchanged	29	37.7
Total	77	100.0

Source: Reales Listas 1741

The reporting of salaries and wages for soldiers and officers provide some insight into the value of skilled labor at the presidios. Annual salaries at Santa Rosa and San Miguel ranged between 90 pesos for the average soldier and 1,800 pesos for the governor (Table 4.6). In 1705, a number of blacksmiths were paid at the rate of about 10 reales (1.25 pesos) per day. Some blacksmiths were paid between 280 and 350 pesos for specific products. Wages for carpentry varied between a half peso and 2 pesos per day (Guzman and Hessain 1706). In 1708, carpenters were paid 6 reales per pine board (Childers and Cotter 1998:87). At Santa Rosa, carpenters were paid a salary of 90 pesos annually in 1724 and 1743 (Casafuerte 1724, Urueña 1743).

At these rates, a convict laborer could potentially earn at least as much as the average soldier. A skilled soldier receiving wages on top of his military salary could double his wages and earn more than a lower ranked sergeant and even as much as an ensign, surgeon, or chaplain. Wages were often not enough to draw artisans voluntarily to the presidios (Childers and Cotter 1998:86-87), but they did provide an avenue for limited socioeconomic mobility for those who were conscripted into service. As early as 1710, the viceroy granted at least one carpenter the title of a master artisan who was then allowed to return to Mexico to practice his craft (Childers and Cotter 1998:87).

Table 4.6. Salaried Positions at Presidio Santa Rosa and San Miguel

	Pesos Annually	
Position	Min	Max
Governor	990	1800
Captains	900	990
Paymaster	550	550
Lieutenants	438	438
Chaplains	198	198
Master Surgeons	198	250
Master Gunner	180	198
Ensign	182	322
Chief of Forzados	180	180
Sergeant	120	180
Sailing Master	120	132
Corporals	108	116
Warehouse Keeper	90	198
Drummer	90	112
Artillerymen	90	99
Soldiers	90	90
Women	90	90
Carpenters	90	90
Seamen	66	66

Sources: Casafuerte 1724; Urueña 1725, 1740, 1741, 1743, 1752, 1753a, 1755, 1756

To this point, I have discussed socioeconomic mobility in terms of enlistment status, rank, and economic income, but I have yet to address mobility in terms of the socio-racial hierarchy. During this period in New Spain, casta categories continued to be important, even though a hierarchy based on socio-racial identity was becoming difficult to maintain. As with Santa María, colonial administrators seldom imposed casta categories in official documents for the later presidios, but these socio-racial categories were not entirely erased. For instance, a small number of convicts were shipped to Santa Rosa in 1733. Most of these were described as españoles (16 of 20). The rest were labelled as one each of mestizo, mulato, castizo, and one unknown (Childers 2003b:21).

The Reales Listas of 1741 provides new information on the imposition of castas at Santa Rosa. Although the list provides the names of forzados serving at the Santa Rosa, casta categories are only indicated for one entry, a single español. Two additional convicts held the title of "Don" indicating they also probably identified as españoles, criollos or peninsulares, yet sentenced to the lowest status position at the presidio. While casta categories were infrequently ascribed to forzados, the accountant did attempt to apply these labels to the members of six families and some of the individual settlers present at the presidios.

In addition to the 77 members of families, there were 21 individual settlers identified on the 1741 list. Of the 40 that were assigned a casta label, half were identified as españoles (Table 4.7). Notably, the accountant also attempted to describe the phenotype of these individuals, possibly to add clarification of their reported casta and to identify them when distributing rations in order to avoid fraud. Several "españoles" were also described as "color moreno" or "color *cocho*" – descriptions often used for Africans or Afromestizos.[21] Other descriptions suggest more ambiguity, such as "españoles" that the recordkeeper described as "B[lanco] color *trigueño"* (white wheat color).[22] In another 30 cases the accountant only described the individual's phenotype, but did not record a casta category. Contradictions between the application of socio-racial labels and official physical descriptions are indicative of the struggle that administrators faced when trying to maintain a socio-racial hierarchy in the eighteenth century.

Table 4.7. Members of Settler Families that were Identified by Casta Category in the Royal List of 1741

Casta Category	Count	Percent
Español	20	50.0
Castizo	3	7.5
Mestizo	3	7.5
Morisca	2	5.0
Parda	6	15.0
Mulata	6	15.0
Total	40	100.0

Source: Reales Listas 1741

It appears that even when casta labels were applied, colonists were inclined to claim the socio-racial label of español in Pensacola. As mentioned in the previous chapter, movement to a new location could facilitate "passing" as officials in Northwest Florida could not easily verify lineage either with distant parish records or community testimonies from an individual's home community. They had only the word of the arriving colonists and used phenotypes to further identify them.

Top-Down Mechanism: Formal Inscription. While the Reales Listas of 1741 indicates that socio-racial categorical identities remained important to imperial authorities, the spatial organization of Santa Rosa and San Miguel continued to inscribe distinctions based mainly upon enlistment status and rank. Marital status also seemed to have played a role at San Miguel perhaps owing to the shift in socio-demographics noted after 1740. In planning the move from San José to Santa Rosa, Alejandro Wauchope initially proposed a large fort with a main plaza, church, and other important structures within its walls. The Council of the Indies overrode these plans and a much smaller fort was ultimately constructed with most structures located outside its walls (Ford 1939; Wauchope 1723). In 1727, the fort was referred to as only a “fort of stakes” with no space to house the troops (Misc 1727; Rivera and Almonacid 1727). In lieu of a stockade enclosing the settlement, Pensacola Bay served as a natural barrier protecting the colonists who mainly lived in a village outside the fort. As many as 24 small houses were constructed to house the soldiers and convicts, while more substantial structures were constructed for the military officers, governor, and other administrators (Clune et al. 2006; Misc. 1723, 1727; Rivera and Almonacid 1727a; Wauchope 1723).

There are no known maps and relatively few descriptions of the settlement organization on Santa Rosa Island, but Dominic Serres sketched a panoramic view of the fort and village in 1743 (Figure 4.13). The accuracy of specific details seen in the Serres sketch is uncertain, but the general organization probably reflects the settlement when it was drawn.[23] The panorama depicts a small wooden fort to the east and a village extending to the west. The church and governor’s house are depicted as large structures located in the center of the village. Additional rows of larger structures were located to the east of the church, while small unsubstantial structures were located along the western periphery of the village. The depicted organization suggests a socio-spatial organization on the island consistent with Spanish ideals for town planning.

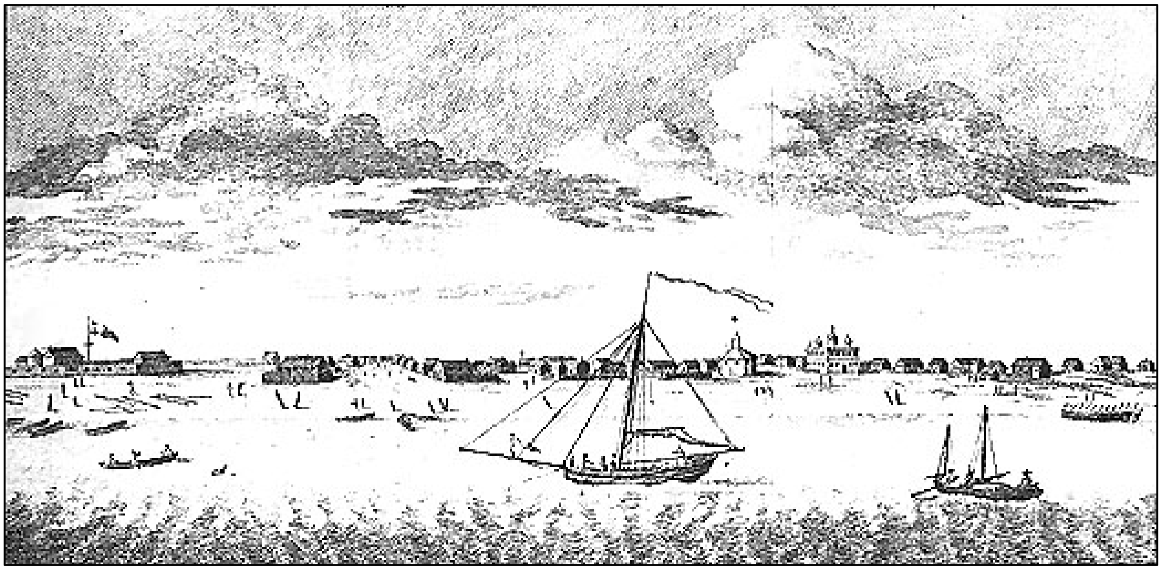

Figure 4.13. Representation of Presidio Isla de Santa Rosa (Facing South), Adapted from a 1743 Drawing by Dom Serres, "A Perspective View of Pensacola" (Universal Magazine 1764)

Once the colonists returned to the mainland, a new fort that was hastily constructed in 1757 became the organizational focus of the garrison. At first, most soldiers lived in individual houses, but by 1760 the military engineer Phelipe Feringan had constructed separate barracks for the soldiers and convicts (Figure 4.14; Childers et al. 2007:34; Worth 2013). Under threat of Creek attacks in 1760, village occupants moved inside the fort walls. Then in 1761 the governor Miguel Román y Castillo burned the houses located just outside the fort walls. Married enlisted men came to live in small huts located inside the north wall of the fort. Larger and more expensive houses were occupied by military officers and administrators located along the east, west, and south curtain walls, some of these structures were valued as high as 800 and 1500 pesos (Childers et al. 2007:30-34). One of the largest structures at the presidio was for the governor, a two-storied residence that had a stone foundation with multiple rooms

(Childers et al. 2007:32). Notably, the presence of several artisans residing at the governor's house suggests that skilled labor may have facilitated the erasure of some inscribed distinctions.

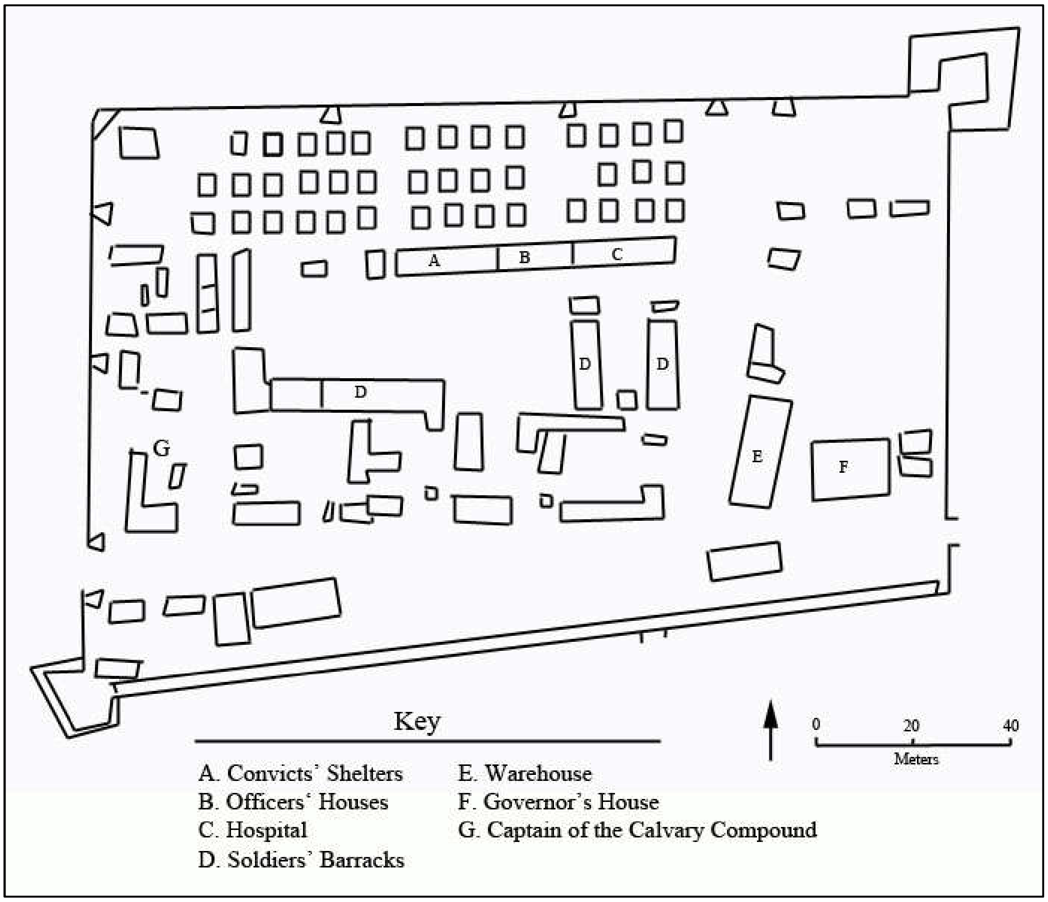

Figure 4.14. Composite Drawing of Two 1763 Maps by Ortiz and Feringan (Adapted from Benchley 2007:19, Rush 1966:139)

Inscription based on socio-racial distinctions at Santa Rosa and San Miguel continued to be primarily between colonial castas and indios. Documents related to the situado consistently listed rations for 120 native people "who enter and leave the Presidio" (e.g., Urueña 1743, 1752). It is unclear how many native people actually lived on the island. We do know that a mission for the Apalachee had been present on the mainland since 1718, eventually relocated upriver to the site of Mission Escambe (Dadiego 2014:50-58; Worth et al. 2012). Worth and others (2012) suggest that this move was made in an effort to maintain a buffer between the native community and the colonists who constructed a new warehouse and kiln on the mainland in 1741. While a handful of soldiers were stationed at Escambe after 1750, a calculation of the population in terms of "person-years" indicates that 91 percent of the habitation of the mission was affiliated with the Apalachee population (Worth et al. 2012). After 1740, Yamasee also began to immigrate to the area, eventually founding a second mission called Punta Rasa on Garcon point – again separated from the presidio by distance and bodies of water (Harris 2007; Dadiego 2014:58; Worth 2008). This spatial segregation reinforced local distinctions based upon socio-geographic and socio-racial differences.

Bottom-up Mechanism: Biological Mixing. Biological reproduction between diverse people played an important role in the social transformation of communities and regions throughout the Spanish American Empire. Yet, biological mixing in notably absent from the list of mechanisms identified for Northwest Florida (see Figure 4.9). Evidence of biological mixing can be viewed in two ways. The arrival of immigrants to Northwest Florida generally led to a distinction between people indigenous to La Florida and newcomers from Mexico. At another level, however, there was also biological and cultural blending within each of these pluralistic groups. As in Veracruz, the extent of biological mixing between colonists and native people in Pensacola was directly related to the socio-demographics of the region. The number of native people living in Pensacola was never very high and most natives were segregated from the presidio population.

Meanwhile, the number of casta women and families increased at the presidios, providing other options for marriage and extramarital sexual unions.

There were certainly sexual unions between casta colonists and native women in Northwest Florida, but evidence for these interactions is relatively anecdotal. Once the Apalachee began to migrate westward, Landeche (1706a) reported to the Viceroy that some soldiers were marrying “natives of the land.” Childers and Cotter (1998:90) argue that the wife of one of the soldiers, Juan Joseph de Torres, was indigenous because Landeche referred to her as a “principal person from la Florida.” There also were scant references to Ocatoze women and children living on the periphery of the village and native women residing at the fort at Santa María.[24] Even though there were two missions in Northwest Florida by the 1740s, there were few accounts of intermarriage. Antonio de Torres lived at the Escambe mission and was married to a native woman. In another instance, the wife of one of the sergeants was the mestiza daughter of a Guale woman from St. Augustine (Hita Salazar 1744; Navarro Medina 1744; Roza 1746). At San Miguel there was reportedly a widower of a native woman from the mission at Escambe (Ytuarte 1761). It is likely that there were more illicit unions that were not reported in documents, but available evidence suggests that most biological mixing was between diverse colonists and potentially between native immigrant populations.

In terms of marriage between colonists, there are only limited data. The Reales Listas of 1741 identified sixteen married couples. Only in one case were both partners identified by casta category – both españoles (Reales Listas 1741). Of course, as already noted, assignment of casta categories to migrants in Pensacola were particularly problematic. Added to this is the inclination among official recordkeepers to equalize casta categories in the eighteenth century (see Chapter 3). As a result, it seems that socio-racial categories played a limited role within the community. This does not mean that imperial officials stopped investing meaning in socio-racial categories, however. In 1754, Viceroy Revillagigedo argued that the presidios needed to recruit better women who were not of broken color or "[d]ark and infertile Mulatas" as had been sent previously (Revillagigedo 1754). Even if socio-racial categories were becoming difficult to apply locally, imperial agent continued to try and impose them in an attempt to control a rapidly changing society.

Summary

Because the Pensacola presidios were founded late in the colonial period, social hierarchies were borrowed, not from medieval Iberia, but from late seventeenth century Mexico. This period marked the height of the casta system. Yet, the military function of the presidios imposed a separate social structure based on enlistment status and rank. Casta categories were not completely erased and were occasionally imposed in official reports and correspondence, but casta labels appeared to have little relevance in the organization of labor and socioeconomic status among colonists. The one socio-racial distinction that was consistently relevant was the indio category.

Subsequent socio-demographic shifts were driven mainly by in and out migration, leading to significant fluctuations in the presidio population. Meanwhile, the native population remained relatively small, marked by Apalachee immigrations to Northwest Florida in 1704 and 1717. Some individual natives lived at the presidio, but the largest known groups were Apalachee who formed separate communities, first along the Perdido River and then at the mouth of the Escambia River. Colonists living within the presidio were also segregated, inscribing social boundaries based upon military enlistment and rank. At the bottom of the presidio hierarchy were forzados, some of whom reacted to their poor conditions through collective action, either mutiny or group desertions. Administrators attempted to maintain control over large numbers of forzados through both negative and positive incentives. Public punishments were devised for troublemakers, but at the same time they rewarded good behavior through enlistment and paying wages to those who possessed a skill.

The strategies implemented by imperial authorities to control a relatively large population of coerced laborers led to avenues for socioeconomic mobility that continued after the transfer of the colonial settlement to Santa Rosa Island and then back to the mainland at San Miguel during the final decade of Spain's occupation of Northwest Florida. Enlistments and pay for skilled labor provided opportunity for movement up the military hierarchy, as well as some monetary gain. The Reales Listas of 1741 reveals that some soldiers and officers also descended that hierarchy as well. While enlistment status and rank remained the main organizing structure at the presidios, colonial administrators were still invested in imposing a socio-racial hierarchy. This was particularly true for the volunteer families and individuals who contracted to settle in Northwest Florida, particularly after 1740. The Reales Listas of 1741 reveals attempts by imperial authorities to impose casta categories on the pobladores. At least half of those identified by socio-racial labels claimed the status of "españoles." Officials who recorded this information also detailed individual phenotypes in ways that contradicted their formal categories. It is possible that individuals were using the opportunity presented through migration to manipulate their socio-racial identities. It is uncertain how much meaning these categories had in the day-to-day lives of the colonists of Northwest Florida. Locally inscribed socio-racial differences appeared to be more strongly emphasized between Apalachee and Yamasee indios and presidio colonists. Within the presidios, inscribed differences continued to highlight enlistment status, rank, and probably also marketable skills and marital status.

Discussion: A Tale of Two Regions

The Port of Veracruz and the presidios of Northwest Florida were both founded by colonists at the direction of the Spanish Crown and within the boundaries of the viceroyalty of New Spain. From the beginning, the port was located along the main axis of colonial development and interaction. In contrast, the presidios of the eastern borderlands were frontier garrisons established to defend the periphery of colonial expansion. The first Port of Veracruz was founded the same year that Cortés landed and ultimately relocated to Nueva Veracruz where the town developed through two centuries of colonial control. In Northwest Florida, the presidios were occupied for only 65 years relatively late in the colonial period

Veracruz provides a long-term view of colonial transformations and a shifting baseline for understanding social change in Northwest Florida. From a hierarchy based on géneros de gentes to the development of the casta system around mid-seventeenth century and finally towards the emergence of an incipient economic class by the end of the eighteenth century. Evidence for these macro-scale social transformations is present for central Veracruz and the port. During the sixteenth century, the Port of Veracruz may refer to Villa Rica, La Antigua, Ventas de Buítron, Ulúa, and finally to Nueva Veracruz. All of these sites were established before the casta system had fully developed in New Spain. Categorical identities were borrowed from medieval Iberia and were imposed by imperial authorities. Along the coast surrounding the port, the population was dominated by European colonists, African slaves, and their American-born descendants. Socio-geographic and socioeconomic labels (i.e., vecino, esclavo, and libre) co-occurred with géneros de gentes (español, negro, and mulato) to impose distinctions between European colonists and a large number of coerced laborers. These distinctions were further inscribed locally through spatial segregation.

African slaves did not simply accept their role in colonial society. Collective action through rebellion and escape in central Veracruz led to changes in imperial policies, aimed at controlling large numbers of coerced laborers through an evolving system of penalties and rewards. Socio-demographic shifts in seventeenth century central Veracruz were driven by increasing numbers of American-born blacks and criollos, biological mixing, declines in the slave trades, and the recovery of the native population during the seventeenth century. Evidence drawn from cofradía records indicates that blacks and their mixed descendants contributed to the racialization of the casta system in Veracruz. Initially serving as a means of mutual support, cofradías became an instrument for achieving social mobility through collective action. American-born Afromestizos used cofradía constitutions to differentiate themselves from bozales and then later to emphasize distinctions based on phenotypes.

It was during this period of racialization that hundreds of soldiers and convict laborers from Mexico City, Puebla, and Veracruz established the first presidio in Northwest Florida. Because the presidios served a military function, socio-racial labels were supplanted by enlistment status and rank as the primary organizing structure. The spatial organization of the settlement further inscribed distinctions based on military status. Convicts, soldiers, and officers were housed in separate barracks, regardless of their other regional or socio-racial identities. Forzados of diverse ancestry served as an important labor force, further emphasizing a distinction that eroded the local importance of other categories.

Nevertheless, imperial authorities remained invested in imposing casta categories. The struggle to find agreement between alleged socio-racial identity and physical characteristics, exhibited in the Reales Listas of 1741, reflects a growing instability in the casta system seen in Veracruz and throughout New Spain (see Chapter 3). The one socio-racial distinction that authorities were able to consistently impose and spatially inscribe was between casta colonists and indios of La Florida. Evidence for sexual unions and intermarriage between colonists and native groups is anecdotal and there is little evidence for children at the presidios until after 1740. Increasing numbers of children appear to be from unions between colonists from New Spain. Documented socio-demographic shifts resulted mainly from migrations both in and out of the presidios.

Penal servitude at the presidios was employed during a period of decline in coercive labor regimes in New Spain. Convict laborers would have been accustomed to an economic system that was based on free wage labor. Even native groups who provided labor to the presidios received wages. Forzados reacted to their circumstance similarly to black slaves in sixteenth and early seventeenth century Veracruz, sometimes engaging in acts of rebellion and coordinated efforts to escape. Reciprocal imperial policies enacted penalties but also provided avenues for socioeconomic mobility. Individual transfer rewarded convicts through enlistment, allowing them to collect wages in addition to their rations. As in Veracruz, demands for skilled labor also offered a means for limited economic advancement. Finally, distance from their homeland communities allowed colonists to manipulate their socio-racial identities and potentially claim an identity as an español, sometimes contradicting physical descriptions applied by colonial authorities.

Socioeconomic mobility was not only *up* the colonial hierarchy. Official documents, including the Reales Listas of 1741, record cases in which military officers were demoted and sentenced to presidio service as forzados. Convicts included those who not only identified as españoles, but in two cases also held the honorary title of "Don." Similarly, by the late eighteenth century in Veracruz, peninsulares and criollos dominated elite positions but also worked as servants and unskilled laborers. Mobility, both up and down the colonial hierarchy, eroded the effectiveness of the casta system in both regions. In Florida, the casta system was further undermined by the presidio's military structure and reliance on a labor force that had no socio-racial basis aside from the distinction between colonists and indios that sometimes worked for wages. Demands for labor in both regions transected imperial ideals of socio-racial segregation, resulting in some spatial erasure based on casta categories.

Social change in Veracruz and Florida was driven by both top-down and bottom-up relational mechanisms. Imperial policies were aimed at maintaining control over the colonial social structure. Within the developing hierarchy, labor was an essential resource and basis of wealth. Early dependence on native labor drafts and then African slavery placed these groups at the bottom of the colonial hierarchy, a structure that imperial authorities attempted to sustain. Bottom-up relational mechanisms and socio-demographic shifts caused changes that required adjustments by imperial authorities at multiple levels. The historical perspective provides insights into the dialectic between top-down and bottom-up relational mechanisms that contributed to the transformation of categorical modes of identification at the regional and community scale. Given that formal categories were used to organize and control colonial society, they also framed the content of historical documents. For this reason, historians have found it difficult to examine social interaction and relational modes of identification disentangled from colonial categories. In the next chapter, I shift my focus to the archaeological perspective and consider relational mechanisms that are not always visible through the study of documents alone.

[1] Between 1564 and 1778, Spanish laws largely restricted transatlantic trade to Seville (and later Cadiz) in Spain and to Veracruz in New Spain, Nombre de Dios on the Isthmus of Panama, and Cartagena in New Granada (Booker 1984; Haring 1975 [1947]; MacLeod 1984; Walker 1979).

[2] This number only represents a partial record of legally imported slaves and does not take into account illicit trade or natural increases once slaves arrived in America.

[3] The Crown contributed to this shift in labor by attempting to protect the dwindling native population with a series of decrees. Beginning in 1596, Phillip III forbade the use of natives in the sugar mills and by 1601, sugar haciendas were forbidden from using natives in any aspect of sugar production (Cardoso 1983:26-27).

[4] As wage labor increased in importance, native laborers also were hired to transport goods on the mule trains of the seventeenth century (Cole 2003:124).

[5] Relaciones for the 1570s and 1580 (Paso Trancoso 1905; Velasco 1894), as well as the 1609 account by Mota y Escobar (1987[1609]) describe the pueblos de indios in Veracruz using socioeconomic categories "tributarios" and socio-geographic label "vecinos." Mota y Escobar also conveys the number of conversos. This is unsurprising given his position as the bishop of the diocese of Tlaxcala.

[6] The 1573 ordinances synthesized and codified existing precedents for the founding of Spanish colonial towns (Crouch et al. 1982; Palm 1951).

[7] The 1571 relacion de Veracruz (Paso y Troncoso 1905:192) states that the third hospital was sponsored by the cofradía de sangre, introduced by early Franciscans missionaries and popular with native converts (Germeten 2006:27). Urban hospitals in Veracruz, such as the hospital Inmaculada Concepción in Jalapa, often served both natives and españoles (Blasquez Dominguez 2000:57).

[8] The disparity between the percentage of native versus black intermarriages is due to the difference in the absolute size of these populations. Despite epidemics, native populations were still much larger than blacks in central Veracruz (Carroll 1991:89)

[9] Specifically, Carroll's data was obtained from Jalapa, Córdoba, Orizaba, and Jalancingo (see Carroll 1991: Appendix 3 for data tables).

[10] Mulato appears only rarely for cuarteles 1 and 4. It is also used as an all-encompassing term for pardos, morenos, negros, and mulatos on the summary pages for each cuartel in the census.

[11] Adult males are identified as individuals 16 years and older.

[12] Parish baptismal records are available for much earlier. The Cathedral of Nuestra Señora de la Asunción has a later transcription of an earlier baptismal book with entries dating between 1689 and 1706. Scans of several original baptismal books are also available online

(www.familysearch.org) for the years 1743-1760, 1760-1786, 1786-1792, and 1792-1820. These parish registries offer a valuable resource for future research.

13 Historians often differentiate between two Spanish colonial periods in Florida. The First Spanish period (1698-1763) ended when Florida was transferred to the British for an 18-year period (1763-1781). The Second Spanish period refers to the return of La Florida to Spain in 1781 until the United States annexed the state in 1821.

14 The governor of the Port of Veracruz reported in September 22, 1698 that Arriola had filled 113 positions before arriving at the port, another 21 were from Spain, and remaining 66 infantrymen were from the "vecinos and residents of this city" of Veracruz (Lorenz de Rada 1698a).

15 A later 1759 review of the officers and cadets at presidio San Miguel indicates that less than half were from Spain, while most were from New Spain (Román Castilla y Lugo 1759).

16 The original document, written by Retez Salazar (1708), is located at AGI Mexico 633. There is supposedly a copy in the Coker Collections at Special Collections at the University of West Florida, but I have been unable to locate it. Clune et al. (2003) described part of the population as "Spanish (probably of Mexican birth)," which was likely expressed as "españoles" without an additional qualifier.

17 Declines due to illness did not always result in death. Often patients were sent to the hospitals in Veracruz. For example, in 1710 the population dropped as 70 individuals were sent to Veracruz for medical care (Coker and Childer 1998:52).

18 Documented recruiting efforts were undertaken primarily in Veracruz, Mexico City, and Puebla(see various accounts in Coker and Childer 1998).

19 At least another 13 escaped in 1699 (Iberville 1991:93-96, 143) and more in later years (Clune et al. 2003:26; Coke and Childer 1998:56).

20 Requisition lists generally only itemized amounts owed to specific positions. For lower ranked positions, such as infantrymen, only their numbers were noted. Names of individuals were sometimes provided for officers, administrators, and occasionally women who were receiving rations.

21 Cocho was sometimes used to describe people of African descent, implying their skin appeared "cooked" (Phillips 2014:75-76)

22 In the eighteenth century, trigueño was sometimes used to describe the skin color of slaves (Phillips 2014:75-76)

23 The sketch appearing in Figure 4.13 is from an engraving published 20 years after it was drawn, which was then used as propaganda by the British to encourage settlement in Pensacola (Clune et

al. 2006). The original sketch has not been located and it is possible that some aspects were altered to present a more attractive view. Nevertheless, official reports describing the presidio and archaeological excavations carried out between 2002 and 2004 suggest that the general organization of the town was probably realistic (Harris and Eschbach 2006). Regardless, Serres's sketch portrays only one version of the settlement's organization, which was rebuilt several times following devastating storms.

[24] In 1707, several Ocatoze women and children were reportedly living at Santa María, but it is unknown if they had relations with the men of the garrison before being captured in an attack by enemy native groups (Junta 1707). In another document, a native woman who was living within the fort was reportedly assaulted while tending to her garden outside the palisade in 1709 (Rowland and Sanders 1932:31-35).

CHAPTER 5

ARCHAEOLOGICAL PERSPECTIVES ON SOCIAL TRANSFORMATIONS

Beginning with this chapter, I shift to an archaeological perspective on colonial social transformations. Material-based approaches provide a lens for examining mechanisms of social change that are difficult to address with historical data alone. In this study, analyses of pottery from Veracruz provide a comparative case for assessing relational mechanisms of change at three sequentially occupied presidios in Northwest Florida. Pottery analyses provide detailed evidence about changing multiscalar interactions, labor relations, and the active signaling of categorical membership.

In this chapter, I describe my approach for operationalizing the theoretical framework (detailed in Chapter 2) using archaeological data. I begin by outlining material approaches for the study of relational connections and the activation of social categories. In brief, I examine the structure and strength of relational connections through the study of inconspicuous technological styles and the distribution of mundane but ubiquitous utilitarian pottery. Conversely, I assess the active expression of categorical distinctions through the study of pottery with high-visibility stylistic attributes and vessels used in conspicuous contexts, particularly decorated serving vessels. Because the archaeological perspective is approached through the study of pottery, I next discuss current organizational schemes and limitations in colonial period pottery typologies in the Southeastern United States and Veracruz. Finally, I briefly consider differences in behaviors related to food preparation and utilitarian pottery, commensality and serving vessels, and technological styles of pottery production between Spain, Mesoamerica, and the Southeastern United States. This contextual information lays the foundation for differentiating between pottery traditions and the examination of relational connections and categorical identification at the Port of Veracruz and Northwest Florida.

Material Approaches to Relational Connections and Categorical Identification

. In Chapter 2, I described two modes of identification that underlie the social structure of Spanish colonialism. The first mode is based upon relational connections that informally introduced diverse traditions through networks of interaction and the organization of labor (Costin 1998; Foster 1960; Silliman 2001; Voss 2005; see also Stokke and Tjomsland 1996:27-31; Tilly 2002:48-49). Interpersonal relationships are best examined through material proxies that reflect learned behavior that was unconscious and took place in low visibility contexts (e.g., Carr 1995; Clark 2001; Peeples 2018; Sassaman and Rudolphi 2001). From the archaeological perspective, I track the strength and structure of relational connections through inconspicuous pottery attributes that were the product of enculturated learning and utilitarian vessels that were used in ordinary daily routines.

The second mode of identification is based on the active signaling of membership in broadly recognizable categorical groups. As already discussed, categories of identification often were used as a means of social control in hierarchical societies, such as the Spanish colonial empire (see Cope 1994; Tilly 1998). Because social categories often existed at very large scales, they required recognizable symbols and common behaviors to communicate membership (Calhoun 1997:44; Tilly 2005:143-144). Categorical signaling is explicitly demonstrated through the eighteenth-century casta paintings that linked stereotypical behavior and material culture with racial categories (Katzew 2004; Loren 1999). Conspicuous material culture, such as decorated serving vessels and tablewares, is appropriate for communicating affiliation with a categorical identity (Boyer 1997; Cope 1994). I approach relational connections and categorical identification using the visibility of physical attributes and contexts of pottery use to examine the relational mechanisms of social change in Veracruz to and Northwest Florida.

Linking Material Culture to Relational Connections

The relational mode of identification shares characteristics with the primordial view of ethnicity, emphasizing enculturation and shared attachments that serve to maintain social identities from one generation to the next (Bentley1987; Geertz 1973; Jones 1997). Material traditions that produce nearly imperceptible physical attributes or develop within low visibility contexts are often the result of enculturation and are rarely manipulated (Clark 2001; Carr 1995; Dietler and Herbich 1998; Gosselain 1998, 2000; Sassaman and Rudolphi 2001; Stark et al. 1998). In addition, plain and lead-glazed utilitarian pottery often circulated at regional scales, reflecting regular interactions between individuals and communities (e.g., Deagan 1990; Fournier García and Blackman 2008; Rodríguez-Alegría and Stoner 2016; Voss 2008b; see also Peeples 2018). Ethnographic research suggests that technological styles that result in inconspicuous evidence on the final product are likely to reflect those more durable aspects of social identification (Clark 2001; Carr 1995; Gosselain 2000:193). I borrow from extensive ethnographic and archaeological literature concerning the relationship between technology and social boundaries (e.g., Clark 2001 Gosselain 1998, 2000; Peeples 2018; Stark et al. 1998) to develop methods to discriminate between pottery produced by castas and Indians in Florida. I then use this information, in combination with a study of pottery provenance, to assess and compare change in labor relations and social interaction at the colonial Port of Veracruz and Northwest Florida.

Definitions of style vary, but archaeologists generally agree that it is a way of doing things that involve a choice (Hegmon 1992:517-518). James Sackett (1982, 1990) has argued that style could be found, not only in highly visible decorations, but in any choice that has a functional equivalent (cf. Wobst 1977). Technological style refers to patterned behavior and the total of all choices made during manufacturing processes (Lechtman 1977; see also Lemonnier 1993). Because inconspicuous attributes that reflect technological styles are rarely susceptible to active manipulation, they are more reliable than decorative attributes for detecting intrusive people and traditions in a region or settlement (e.g., Clark 2001; Stark et al. 1998). Following this logic, I use the analysis of technological styles of pottery from neighborhoods in Veracruz and Mission Escambe in Florida as baselines for identifying casta-made pottery recovered from the Pensacola presidios. I then use chemical composition analysis of pottery and clays to discriminate between imported and local casta-made wares.

If we are to use pottery to understand social relations, then it is necessary to identify who produced them (Costin 1998:5). However, the identification of casta pottery traditions and provenance is only a necessary first step. It is the relational mechanisms that caused social change in Veracruz and Pensacola that is the larger goal of this study.

Costin (1998:3) outlines ways that the act of crafting and the consumption of craft objects can inform on the (re)production and transformation of social identity and relations. Importantly, craft production gives "material expression about the roles, identities, and relationships in the social world" and can reflect "divisions of labor based on components of social identity" (Costin 1998:3).

Colonial archaeologists, led by Silliman (2001, 2006) and Voss (2008b), have begun to focus on the ways that local labor relations can informally introduce Indian and casta traditions. Labor aligns well with the relational framework used in this study (see Silliman 2006; Wurst and McGuire 1999). Analysis of technological styles can provide an entry point for the study of labor and an alternative to dichotomous labels, such as colonizer/colonized or indigenous/European that have too often structured colonial research (see Voss 2008).

As has been demonstrated from the historical perspective, shifts in labor relations and fluidity within the socioeconomic hierarchy could cause change in social organization and eventually lead to the transformation of formal social categories. Craft occupations varied in socioeconomic status (e.g., Chance and Taylor 1977; Seed 1982; see Chapters 3 and 4), with potters occupying a relatively low status compared to other artisans. Even within the Spanish potting profession, there were perceived socioeconomic distinctions tied to an individual's position within the broader social hierarchy. For instance, guild ordinances of the mid-seventeenth century restricted the use of the wheel and prevented Africans and castas from becoming masters or owning their own workshops (Carrera Stamp 1954; Cervantes 1939; Connors McQuade 2005:86; Kaplan

1994:9-10; McMillen 1983:152). Yet, ordinances were not always followed and relationships between producers and consumers could be maintained or transformed in unique local settings (Cope 1994; see also Costin 1998:3). Further, much utilitarian pottery was produced at household scales and informally exchanged outside the control of colonial institutions.[1]

Due to the limited scale of production and circulation, as well as inconspicuous context of use, the distribution of utilitarian pottery is optimal for tracking relational connections. Although there have been few provenance studies focused on colonial period plain and lead-glazed utilitarian pottery (e.g., Carlson et al. 2016; Cordell 2001; Fournier García and Blackman 2008; Rodríguez-Alegría et al. 2013; Rodríguez-Alegría and Stoner 2016), research suggests that many of these wares were produced locally for household consumption and community or regional markets.[2] The distribution of utilitarian pottery is, therefore, potentially suited for assessing the strength of connections between colonial settlements and surrounding communities. These connections introduced and maintained informal traditions, shaping colonial culture at the local level. In colonial Florida it is often assumed that hand-built plainware pottery was produced within the region, while all lead-glazed wares are interpreted as imports, representing external connections (e.g., Bense and Wilson 2003; Deagan 1983; Harris and Eschbach 2006). I examine the provenance of plain and lead-glazed utilitarian wares to test the strength of regional and external connections at the Port of Veracruz and the Pensacola presidios.

Linking Material Culture to Categorical Identification

Social categories align with instrumentalist views of social identification (Barth 1969; Emberling 1997; Jones 1997; Stone 2003). As discussed in Chapter 2, the instrumentalist view advocated by Barth (1969) emphasizes active and situational expressions of ethnicity and other social identities. Archaeological approaches to the instrumentalist view of social identity frequently involve the examination of variation in decorative styles (e.g., Hegmon 1992, 1998; Jones 1997; Stark et al. 1998; Stone 2003). Wobst (1977) defined style as that aspect of formal variation that functions to communicate information. Building on Wobst's functional view of style, Wiessner (1983:257) forwarded the concept of emblemic style, which she defined as "formal variation in material culture that has a distinct referent and transmits a clear message...about conscious affiliation or identity." Ethnoarchaeological research suggests that highly visible objects and styles are frequently used in conspicuous settings to signal group membership (e.g., Bowser 2000; Carr 1995; Hegmon 1992, 1998; Hodder 1982; Wiessner 1983, 1984).

Similarly, because categories of identification can exist at large scales, they require common behavior and material symbols that are also widespread and recognizable outside of interpersonal relationships (e.g., Bourdieu 1984; Calhoun 1995:193-224, Cohen 1978; Wiessner 1983). Through the production or use of material referents, individuals can strategically signal their membership in broadly recognized social groups (Bourdieu 1984; Costin 1998; Jones 1997). Materials appropriate for communicating categorical affiliation require conspicuous attributes that are used in highly visible contexts (Clark 2001; Carr 1995; see also Peeples 2018). In this study, I evaluate the activation of categorical identities by examining decorated pottery, particularly serving vessels and tablewares. Asian porcelains and majolica tablewares, for instance, were exchanged throughout New Spain and thus widely recognized, making them well-suited for the study of formal social categories.

Decorative style has been the most studied aspect of pottery and often has been viewed as emblematic of ethnicity, status, or other social categories (e.g., Hegmon 1998; Jones 1997; Stark et al. 1998; see also Carr 1995). However, decorative designs and other conspicuous attributes of pottery were not static indices of immutable social categories. Colonial studies have shown that people used material culture in order to maintain or transform their categorical identities (e.g., Jamieson 2001, 2004; Loren 1999, 2000; Voss 2008a). Social context plays an important role when interpreting the distribution of highly visual artifacts and designs (Loren 1999:57; Stark et al. 1998:212). In this study, textual data provide important contextual information on changing political, economic, and social circumstances that framed changing consumption patterns.

In New Spain, imperial ideals and broad stereotypes regarding the behavior and material expression of stratified groups reinforced the colonial hierarchy and were widely articulated through individual accounts, Inquisition records, colonial laws, decrees, paintings, and other illustrations (Katzew 1996, 2004; Loren 1999:133-134; Martínez 2008). Perhaps the most detailed expression of colonial categorical distinctions is seen in eighteenth-century casta paintings. Spanish elites commissioned colonial artists to present idealized imagery of the everyday lives of casta men and women – structured according to the racial hierarchy of the casta system (Garcia Saiz 1996; Katzew 2004; Loren 1999:133-140). Frequently in the background of these paintings are images of materials, including ceramics, that vary according to racially ascribed categories (Figure 5.1). For example, majolica and porcelain tablewares were highly recognizable and often were depicted in elite peninsulare and criollo households (Loren 1999:150). Castas, native people, and Africans were commonly portrayed with plain pottery, cooking vessels, and, sometimes chipped majolica and porcelain tableware (Loren 1999:151).

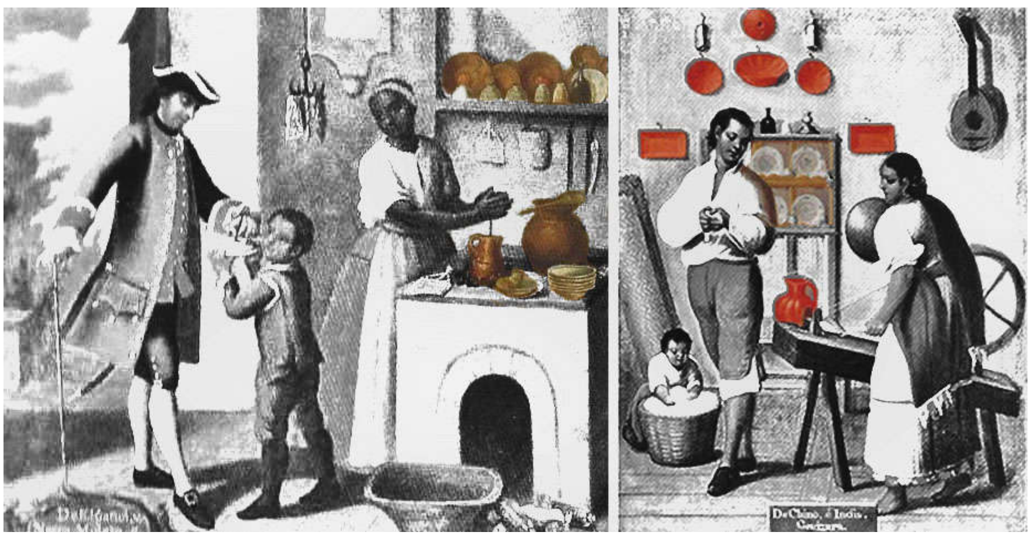

Figure 5.1. Eighteenth-Century Casta Paintings. Digitally Adapted to Highlight Pottery Vessels by Approximating Original Painted Colors: Left: José de Páez, *De español y negra, mulato, 6.* ca. 1770-1780 (adapted from Katsew 2004:25, plate 37); Right: Francisco Clapera, *De chino e india, genízaro.* ca. 1785 (adapted from Katsew 2004:31, plate 50).

Because formal ideals regarding the relationship between social categories and conspicuous material culture were widespread, they also were subject to manipulation according to social context. This was particularly true when people moved to a new location where they had an opportunity to (re)create their identity and adjust their position within society (e.g., Boyer 1997; Castleman 2001; Ouweneel 1996: 14–15). Material culture that was highly visible, including decorative serving vessels and tablewares, allowed colonial people to actively express broadly recognizable social categories, potentially as one part of an overall strategy for achieving socioeconomic advantage. Tableware and serving vessels or highly visible attributes of pottery present a means for materially analyzing the social mobility and expression of social categories by castas from the bottom up.

In this study, I examine the relational mechanisms that led to change in colonial Veracruz and Northwest Florida. Key to understanding social transformations is the interplay between relational and categorical modes of identification. As discussed in Chapter 2, while social categories often structure interpersonal interaction, shifts in durable relational connections can cause change in social structure and, ultimately, categories of identification. I operationalize my theoretical framework from the archaeological perspective using data derived from the study of pottery recovered from two colonial neighborhoods at the Port of Veracruz and three sequentially occupied Pensacola presidios. Analyses of nearly imperceptible attributes that reflect technological styles provide a means for differentiating between pottery produced by casta and Florida Indian potters (Chapter 7). Combined with a provenance study presented in Chapter 8, I examine labor relations and the informal introduction of enculturated traditions at the Northwest Florida presidios (Chapter 9). The distribution of inconspicuous utilitarian wares provides data on regional and external connection in both Veracruz and Florida.

Concurrent shifts in the distribution of decorative pottery, particularly serving vessels and tablewares, suggest change in the expression of categories of identification. Relational mechanisms that directly deal with this mode of identification involve activation (see Chapter 1). As Tilly (2005:143-144) notes, activation can both cause and constitute change in social categories. Thus, my analysis indicates how individuals and groups were actively signalling groups membership, but also serves as evidence of broader shifts in social categories. The dynamics and tempo of social transformations have been assessed historically through the analysis of documents. The archaeological perspective provides an independent line of evidence that I approach in the next four chapters through the analysis of the production, consumption, and exchange of pottery. This requires the reconceptualization of traditional approaches to pottery, which I review in the next section.

Traditional Approaches to Pottery Typology in North American Historical Archaeology

The current treatment of pottery classification in colonial North America presents difficulties for addressing social transformations that are the goal of this study. A fundamental problem that underlies pottery classification schemes stems, in part, from what Lightfoot (1995) has described as the artificial division between "prehistoric" and "historical" archaeologies. In the early twentieth century, prehistorians extended their theories and methods, including typologies, to post-contact native communities. At the same time, historical archaeology developed as a separate sub-field in the eastern United States, with a focus on European materials at colonial towns, such as Williamsburg, Jamestown, and St. Augustine (Lightfoot 1995:202; see also Deagan 1987; Ferguson 1992; Fitzhugh 1985). Although, in recent decades, there have been significant strides in bridging prehistoric and historical subfields (Lightfoot 1995:202), the legacy effect is a continued classificatory division between "European" and "non-European" pottery. Further, this dualistic division in material culture has led to an oversimplification and reification of the colonized and colonizer dichotomy (Voss 2005). Existing pottery typologies require unpacking in order to better address the complex traditions and strategies of pluralistic populations that made up colonial society.

Despite some of the conceptual problems that I will describe below, the segregation of ceramic studies has some practical justifications that are worth noting. Although often discussed as a division between European and non-European, the more fundamental division is between regional traditions in America and mass-produced and widely traded wares. British tablewares and Asian porcelains are found in varying amounts all over colonial America (e.g., Fournier García 1990; Kuwayama 1997; Noël Hume 1970, 1977). Majolica tablewares were initially shipped from Spain to the American colonies, but by the mid-sixteenth century Mexican majolicas were produced and distributed to Spanish settlements across North America (Lister and Lister 1987). The extensive circulation of trade wares requires classificatory agreement between regions, whereas regional pottery typologies are often of little concern to archaeologists working outside those regions.

Although this practical division makes intuitive sense, it has led to unfortunate effects in how we study human behavior and social transformations in colonial settings.

Material divisions have coincided with the dichotomous division of people into colonized/colonizers or European/non-European. This is a gross oversimplification, since many colonists were not Spanish or even European (e.g., Bense 2003; Matthew 2007; Voss 2005; Worth 2017). As discussed in the previous chapter, most of the colonists in Pensacola were castas of mixed heritage from New Spain. This complexity is mirrored in material culture. For example, majolica tablewares are often described as Spanish, yet few majolica ceramics found in America after the sixteenth century were from Spain (Deagan 1987). By the mid-sixteenth century, majolica workshops were organized in Mexico City and Puebla. Spanish, Indians, and, castas participated in the production of these majolicas and, while styles initially copied European trends, new styles quickly diverged to suit an American market (Goggin 1968; Lister and Lister 1987). This begs a question raised by Voss (2012), are these majolicas "European"? Or is it more fitting to view these wares as creolized material culture?

In the following sections, I briefly review pottery typologies that are used in Veracruz and Pensacola, Florida. Because of potential problems with untested assumptions that underly some pottery categories, I divide my discussion between wares that are well-studied and those that have been insufficiently-studied. In brief, under current typological systems pottery that was wheel-thrown, high-fired in well-oxidizing conditions, or glazed is considered an imported trade ware. Imported trade wares are initially sorted by paste compaction and hardness, characteristics which are related to firing temperatures: coarse-earthenware (1000° to 1200°C), refined earthenware (1200° to 1300°C), stoneware (1300° to 1350°C), and porcelain (circa 1400°C). Pottery is further sorted by surface treatments, such as lead- or tin-glazed, painted, or slipped, and then by decorative styles (Deagan 1987:30; Rice 1987:82).

In contrast, researchers assume that pottery found in Florida that is hand formed and low fired (below 1000°C) is locally or regionally made and is sorted using a type-variety system based on paste characteristics (primarily temper type) and decoration. In Veracruz, there is little published research on colonial period pottery and most of that research is restricted to imported tablewares or contact period pottery recovered from Postclassic settlements. Until this study, low fired and hand formed pottery that is plain or slipped/painted have only been sorted by surface treatment and minimal paste descriptions.

Well-Studied Pottery

Most of the well-studied pottery found at the Pensacola presidios is either mass produced tableware or decorated Indian pottery. In both cases, craftsmen added high visibility physical attributes, such as opaque tin-glazes, paints, incisions, punctations, or stamped designs. High visibility attributes provide the necessary information for building ceramic chronologies, but a focus on these attributes limits our ability to study colonial transformations. These attributes are most appropriate for examining categorical modes of identification but provide little information on relational connections.

European and Mexican Majolica Earthenware. The most frequent decorated tablewares imported to Veracruz and Pensacola were majolica tablewares from central Mexico. Mexican majolica is an earthenware that has received ample study over the last century, including: (1) stylistic and chronological analyses (Cohen-Williams 1992;

Cervantes 1939; Deagan 1987; Fournier García and Charlton 1998; Goggin 1968; Lister and Lister 1974; 1982, 1987), (2) provenance research (Blackman et al. 2006; Fournier García et al. 2009; Fournier García and Blackman 2008; Olin et al. 1978; Olin and Myers 1992), and (3) historical investigations of pottery guilds, ordinances, and prices (e.g., Barber 1908; Voss 2012). The importance of majolica to archaeological analyses is related to its wide distribution and its categorical affiliation with high-status and Spanish identity (Bense 1999; Deagan 1983; Deagan and Cruxent 2002; Fairbamks 1973; Gasco 1993; McEwan 1986, 1995; Seifert1977). The underlying assumption is that majolica was relatively expensive and that it is the highest status tableware consumed in the Spanish colonies (Deagan 2001; Garcia Saiz 1996; Katzew 1996; Loren 1999:133-140; Voss 2012).

Voss (2012) has recently critiqued this use of majolica tablewares as an "index" of status and wealth. She points out that research in different regions and temporal periods demonstrates variable availability, cost, and strategic use of majolica tableware based on the specific historical context (e.g., Loren 1999; Rodriguez-Alegría 2010; Van Burn 1999; Voss 2005, 2012; Zeitlin and Thomas 1997). This perspective better aligns with the instrumentalist and categorical views of social identification. Highly recognizable as a material category associated with Espanidad ("Spanishness") (Deagan 2001; Garcia Saiz 1996; Katzew 1996; Loren 1999:133-140), majolica consumption allowed individuals to identify with Spanish colonial elites and signal a higher status.

Other European Coarse Earthenware and Stoneware Tablewares. Majolica was not the only option for white glazed tablewares. French, English, and Dutch manufacturers also produced tin-glazed coarse earthenwares (faience and delftware) that were found at Spanish American sites dating from at least the seventeenth century. By the eighteenth century, Nottingham and white salt-glazed stonewares from England also arrived in the Spanish colonies (FLMNH 2008). Spanish mercantile policies prohibited the direct commercial exchange between their colonies and foreign nations (Cohen 2003; Haring 1966; Macleod 1984). Despite this restriction, foreign manufactured goods reached the colonies legally through an annual fleet system (*flota*), periodically through slave trade ships, capture of foreign ships through privateering, and special dispensation during emergencies (Deagan 2007). Because Spain could never adequately supply their American colonies, people throughout the Spanish colonies turned to illicit trade to supplement their needs (e.g., Roberts 2009; Walker 1979; Vicen Vives 1969:406), potentially accounting for some European tablewares.

European Refined Earthenware Tablewares. Refined earthenwares of English origin do not appear in the American colonies until after 1762 with the first introduction of creamwares. Pearlwares were manufactured after 1780 and whitewares after 1830 (FLMNH 2008). Because of the late dates of these wares, they were not found in Pensacola until after Spain surrendered Florida to the English in 1763 (Coker 1999:21). On the other hand, these wares are found at the Port of Veracruz in the late eighteenth century. Following Bourbon economic reforms, culminating in the opening of Spanish ports to free trade between 1778 and 1789 (Vicens Vives 1969:577-579), English tablewares were continuously available legally within the American colonies. For this study, refined earthenwares are useful for assessing general trends in the consumer strategies of castas at the end of the colonial period in Veracruz.

Asian Porcelain. Porcelain began to enter the American colonies in significant amounts after Spain took control of the Philippines and the Manila trade in 1573. Asian goods were shipped annually from Manila to Acapulco and then carried over land to Veracruz for export to Spain (Carswell 1985; Kuwayama 1997; Shulsky 1999). As with majolica tablewares, Asian porcelain is often associated with Spanish elite households (e.g., Deagan 1993; Jamieson 2004, 2005). Casta paintings frequently portray both majolica and porcelain tablewares in the homes of elite Spaniards (Garcia Saiz 1996; Katzew 1996; Loren 1999:133-140). Shipping records from the late eighteenth century presidios of Santa Barbara and San Francisco suggest that porcelains were more expensive than majolica (Voss 2012). However, like majolica tablewares, patterns varied between sites, regions, and temporal periods. Gasco's (1992) investigation of household inventories from Socunusco (1654-1833) revealed that porcelain and majolica were valued at the same cost as local earthenwares. Loren (1999:155) found that a few chipped porcelain and majolica tablewares were depicted even with low status castas. It is, thus, not surprising that a small number of these wares are often recovered archaeologically even from the poorest residential contexts.

Florida Decorated Indian Pottery. Classification procedures for Florida Indian pottery follow a type-variety system that is typical for pre-Hispanic pottery in the Southeastern United States. Following conventions set forth by Phillips (1970:24-26), types are defined on the basis of paste characterization (primarily temper or other aplastic inclusions), surface treatment, and decorative techniques. Types are further sub-divided into varieties based upon minor variations in paste or design characteristics. Within this system, types are the primary unit of analysis, but types are typically grouped into larger series that share the same temper and geographic distribution (Willey 1949:6). In colonial Pensacola, decorated Indian pottery generally falls into seven ceramic series: Pensacola, Fort Walton, Leon-Jefferson, Lamar, San Marcos, Langdon, and Escambia.

The Pensacola and Fort Walton series refer to late pre-Hispanic types (ca. A.D. 1200 to 1600) that share characteristics with pottery found at the later Pensacola presidios (see Harris 1999, 2003, 2012). The Pensacola ceramic series includes shell tempered wares recovered along the Gulf coast from Choctawhatchee Bay to as far west as Louisiana. The Fort Walton series of sand and grog tempered pottery spatially overlaps with the Pensacola series in Northwest Florida and then extends along the Gulf coast to the east of the Aucilla River (Harris 2012:278).

Leon-Jefferson is an exclusively mission period series (A.D. 1650 to 1750) that is grog tempered and is principally found in and around Tallahassee and north into Georgia. This ceramic series is also found in Pensacola and Mobile, which may represent the western migration of people from the Apalachee province following the fall of the Spanish mission system in 1704 (Cordell 2001; Harris 2003:260). As described in the previous chapter, the Apalachee founded at least two missions in Pensacola (Worth et al. 2012). Sand tempered wares with similar decorative styles have been recovered from the Timucua mission province. Worth (1992) has revised the ceramic typologies for this sand tempered pottery under the Lamar series.

San Marcos also is a mission period series associated with the Guale of east Georgia and Northeast Florida. San Marcos pottery is also consistently found on Yamasee sites along the Atlantic coast from South Carolina to Florida (DePratter 1979; Deagan 1983; Green 1992; Johnson 2018; Thomas 1988; White 2002, Saunders 2000; Worth 2009a). San Marcos pottery was not found at the earliest Presidio Santa Maria, but does appear later in Pensacola at Presidio Santa Rosa (Harris and Eschbach 2006). The appearance of San Marcos pottery in Pensacola may correspond with the arrival of Yamasee Indians and the founding of Mission San Antonio de Punta Rasa during the 1740s (Harris 2007; Johnson 2018; Worth et al. 2011).

John Worth and Jennifer Melcher (2015) have recently defined two additional series from the Mission Escambe pottery assemblages. The Langdon series includes shell tempered pottery that is incised, checked stamped, or complicated stamped. A second series, called Escambia, is defined as pottery tempered with both grog and shell. This second series is also incised, check stamped, or complicated stamped. At this time, the geographic distribution is limited to Northwest Florida (see also Pigott 2015).

Decorated Indian pottery presents a contradiction in terms of high visibility attributes but assumed low contextual visibility in Spanish households. In the colonial period, Florida Indian pottery was modified on the exterior surfaces using incisions, punctuations, brushing, stamping (simple, check, or complicated), and impressions (e.g., corncob marked). As highly visible attributes, these surface modifications were potentially subject to active manipulation, by producers and consumers. Yet, historical archaeologists studying Florida Indian pottery in Spanish colonial contexts generally assume that these wares were used in "private" – that is, locations associated with low visibility domestic contexts, particularly food preparation activities. This discrepancy between highly visible attributes and low visibility of physical location originates with Deagan's (1974, 1983) St. Augustine pattern (see Chapter 2). Deagan reasoned that Indian pottery was primarily adopted into less visible domestic contexts by Indian women. She based this interpretation on the abundance of San Marcos pottery sherds recovered in St. Augustine households. Otto and Lewis's (1975) functional analysis found that San Marcos pottery was used primarily for food preparation (Deagan 1974:55). This pattern of incorporating Indian utilitarian pottery into less visible contexts has since been extended to other Spanish colonial presidios and settlements, encompassing most native pottery (e.g., Ewen 1991, 2000; McEwan 1986). I argue, however, that it should not be assumed *a priori* that all Indian pottery found on Spanish sites in Pensacola were used exclusively for utilitarian purposes, although many certainly were. Rather, this is another assumption that needs reassessment.

Insufficiently Studied Pottery

The most poorly studied wares, ironically, include two categories that are the most ubiquitous at Spanish colonial sites in Pensacola and at the Port of Veracruz: plain and lead-glazed pottery. Plainwares, by definition, have no conspicuous attributes (i.e., decorations) and researchers generally assume that most of these wares are utilitarian, either used as storage containers or in food preparation. While glazes can be a high visibility physical attribute, lead-glazes are typically transparent. When lead-glazes are located only on the interior surfaces, they serve a utilitarian function. These wares also are frequently placed in a utilitarian category. Plainwares and lead-glazed wares, with their lack of decorations and low contextual visibility, are appropriate for examining relational connections. In this section, I also discuss poorly-understood colono ware and slipped/painted pottery. Unlike plainwares and lead-glazed wares, these wares occur in small numbers and have high visibility characteristics or contexts of use.

In Florida, researchers generally assume that hand formed and low-fired plain, painted, or slipped wares were produced locally by Indian groups. When a wheel was used to form these pottery categories or when lead-glaze was added, these pots are interpreted as imports from outside the region. Untested assumptions about ubiquitous pottery categories overlooks potential contributions by casta colonists who made up the majority of the colonizing force in Pensacola. In order to understand the mechanisms involved in colonial transformations, I test assumptions about the production of these wares. Therefore, the categories of pottery described in this section are the main focus of analytical procedures described in the next three chapters. I analyze the technological styles and provenance of all plain, lead-glazed and painted/slipped pottery in order to differentiate between pottery traditions and approximate origin of manufacture.

Plainware Pottery. Plain pottery is one of the least studied pottery categories in colonial Spanish America (Deagan 1987). Most of the pottery in this category is probably utilitarian, although there are some plain tablewares, such as colono ware that are described below. In Pensacola, plain pottery is sorted into two broad categories: local (hand formed or low fired) or imported (wheel-thrown or high fired). Pottery that falls into the first group is classified using the same typologies that are used for regional

Indian types – based on any surface modification (e.g., burnishing) and paste inclusions (e.g., temper). Some plain pottery that is wheel-thrown or appears high fired is grouped into established imported pottery types based on form or paste categories, such as olive jar, Spanish Storage Jars, or grayware (note that these wares are well-studied imports and are not included in subsequent analyses). Most often wheel-thrown or high fired plain wares are classified into a very broad category of "indeterminate coarse earthenware" that researchers interpret as imported.

This classification scheme that is used for sorting plainwares is problematic because it assumes a direct correlation between very broad primary forming and firing techniques, provenance, and the identity of potters. Both hand-formed/low-fired and wheel-thrown/high-fired pottery was manufactured throughout Spanish America and could have been imported or manufactured locally by natives, Africans, or castas from New Spain. For Veracruz, my study represents the first detailed examination of colonial plainwares.

Lead-Glazed Coarse Earthenware. In Veracruz, lead-glazed wares are the most ubiquitous category recovered from the Barrio de Minas and Barrio de las Californias. Lead-glazed wares are the third most abundant ware in Pensacola, eclipsed only by plain wares and majolica tablewares. Yet, aside from olive jars, few studies have been undertaken of lead-glazed coarse earthenwares found at Spanish American sites (e.g., Charlton 1976; Fournier García et al. 2007; Fournier García and Blackman 2008; Iñañez et al. 2010; Reynoso Ramos 2004).

By far the most abundant lead-glazed coarse earthenwares found in Pensacola and Veracruz are called "El Morro" by researchers working in Florida (Deagan 1987:50-51; Smith 1962:68-69), and simply lead-glazed ware elsewhere. El Morro is described by Deagan as wheel-thrown, tempered with quartz sand and some red clay inclusions, and generally glazed only on the interior (Deagan 1987:51), suggesting a utilitarian function. While Deagan (1987:51) describes El Morro as mostly utilitarian, there also are tableware forms, such as *tazas* (cups), *platos* (plates), *escudilla* serving bowls, and pitchers. The provenance of "El Morro" is unknown, but Deagan (1987:51) suggests that this broad category likely includes pottery manufactured throughout Mexico and elsewhere.

Colono ware Tablewares. Colono ware refers to pottery made using traditional African or Indian manufacturing techniques, but crafted in European forms (Deagan 1987). In Florida, colono ware is typically found in tableware forms, such as plates and cups, that are appropriate for individual consumption and European-style commensality (e.g., Vernon 1988:78). Although traditionally decorated Indian pottery is sometimes found in European forms (e.g., Saunders 2000), most often colono wares found at Pensacola are plain, or alternately red painted/slipped. The latter does not have immediate antecedents in the proto- or pre-historic periods (Melcher 2011; Saunders 2000). Saunders (2000:100) suggests that the addition of red slips and paints was a Spanish influence, but it also could have been derived from red-slipped traditions found throughout Postclassic and colonial Mesoamerica (Curet et al. 1994; Charlton et al. 2007; Smith 1990; see also Charlton and Fournier García 2010).

Changes made to traditional Indian pottery forms to suit the Spanish table have been of particular interest to historical archaeologists. In the circum-Caribbean region, these wares are frequently placed in a separate colono ware category, particularly when traditional Indian decorations are absent (Melcher 2011; Vernon 1988; Deagan 1987:103). Melcher (2011) re-analyzed colono ware pottery from the Pensacola presidios and revised local typologies to better incorporate these wares within the existing system of Indian pottery types. One issue with this strategy is the untested assumption that all colono ware found in Pensacola was made by Indians of the Southeastern United States. This assumption is based on the observation that colono ware is found more frequently on Indian mission sites (Deagan 1987:103) and the assumed link between hand-forming/low-firing techniques and Florida Indian potters.

Slipped or Painted Earthenwares. Because of the frequent correlation between red slips, colono ware pottery, and the Spanish mission period, Vernon and Cordell (1993) have suggested that all red slipped, hand-formed pottery should be grouped in the colono ware category. Thus, it is assumed that all of these wares were manufactured by Indians in the Southeastern United States and are routinely included in the Indian typology system. This assumption is problematic because hand-formed painted and slipped pottery is commonly found in Postclassic and colonial Veracruz (e.g., Brüggemann et al. 1991; Eschbach 2009; Medellin 1960) and central Mexico (e.g., Charlton et al. 2007). Colonial period red painted and slipped pottery has received little attention in Veracruz until the current study.

In the circum-Caribbean region, red painted pottery that is wheel-thrown is generally grouped under a type called Mexican Red Painted (Deagan 1987:43-44; Smith 1949). This type is overly broad, and no provenance studies have been published that approximate origin of manufacture. It is likely that wheel-thrown and painted pottery was produced in multiple locations in Spanish America (Deagan 1987:43). Red painted, wheel-thrown pottery also is found in Spain (Charlton and Fournier García 2010; Saunders 2000:100).

Another distinctive red painted and highly burnished pottery is called Guadalajara Polychrome in Florida and Tonalá Bruñida ware in Mexico (Charlton and Katz 1979; Deagan 1987; Fournier García 1990). The ware is of known manufacture from Tonalá, Mexico, and is found at numerous colonial sites in Florida. The pottery was highly valued for its presumed health properties and was frequently shipped through Veracruz to Spain (Fournier García 1990:242).

Brown slipped and white slipped pottery are occasionally recovered from both colonial Pensacola and Veracruz, but have received little attention. Some of the brown slipped wares may actually be self-slipped. The term "self-slipped" refers to the effect of running a wet hand over the surface of the pot, which brings finer particles to the surface before firing it (Rice 1987:151). This effect is often difficult to differentiate from intentionally applied slip, which is a slurry of clay that is applied to the pot’s surface by pouring, wiping, or dipping. White slips are easier to identify as they often are found on pottery with a dark brown or black paste. Hand-formed slipped pottery that is found in the Southeastern United States has typically been classified as part of the Indian typology system, although the origin of manufacture is unknown.

Underlying Assumptions of Provenance, Technological Traditions, and Context of Use. There is no question that tin-glazed earthenwares, stoneware, refined earthenware, and porcelain were imported to Veracruz and Pensacola. Similarly, surface decorations found on Florida Indian pottery supports a local or regional provenance within the Southeastern United States. However, the provenance and identity of the potters who manufactured plain, lead-glazed, and slipped or painted pottery is uncertain. The untested assumption that all hand-formed pottery found in Pensacola is locally manufactured by indigenous people of the Southeastern United States and that all wheel-thrown or high fired pottery is imported overlooks the identity of the majority of colonizers in Pensacola. The colonial population in Pensacola differed significantly from Northeast Florida where the St. Augustine pattern was formulated. Most colonists in Pensacola were castas from New Spain. While Northwest Florida did have Indian missions and other inhabitants, the native population was never as substantial as in the northeast. Castas worked to supplement labor needs in Pensacola (see Chapter 4). To better understand the labor relations and interaction in Northwest Florida, it is necessary to discriminate between pottery manufactured by castas and wares produced by local Florida Indians, as well as between local and imported pottery. Scholars also typically interpret native pottery, except for colono wares, as vessels used for food preparation, storage, or other utilitarian functions. Given the central role of utilitarian wares and serving vessels for operationalizing my theoretical framework, I briefly review pottery forms, functions, and contexts of use in Spain, Mesoamerica, and the Southeastern United States.

Pottery Forms, Functions, and Contexts of Use in Spain, Mesoamerica, and the Southeastern United States

Based on Deagan's (1983) research in St. Augustine, historical archaeologists working in the Southeastern United States typically assign a utilitarian function (i.e., not used for food service and commensality) to most native-produced pottery found on colonial sites. As previously discussed, however, indigenous serving vessels were used in colonial households in Mesoamerica and elsewhere (Charlton and Fournier García 2010; Rodríguez-Alegría 2005a; Voss 2008b). In addition, Norma Harris's (1999:114) analysis of pottery recovered from Presidio Santa Maria indicates that several forms that continued from the pre-Hispanic period (flaring rim bowls, unrestricted bowls, and carinated bowls), may have had flat bases and could have been used as serving vessels.[3] Examination of a limited number of historical ethnographies (e.g., Bennett 1975; Butler 1934; Campbell 1959; Hally 1983; Hudson 1976), as well as functional analyses of late prehistoric Mississippian and early historical period pottery (e.g., Hally 1986; Pauketat 1987; Steponaitis 1984; Wilson et al. 2002) indicate that some of these forms were, in fact, traditionally used as serving vessels. In addition, there is a noted conflict between highly visible surface decorations found on some Florida native vessels and their presumed use in low visibility contexts. Given these contradictions, I briefly reassess evidence for traditional behavior related to food preparation and commensality in Spain, Mesoamerica, and the Southeastern United States.

Food Preparation and Utilitarian Pottery

Jeffery Clark's (2001; see also Carr 1995) survey of ethnographic and ethnohistorical case studies found that food preferences, preparation techniques, and related tools were resistant to change and likely tied to enculturated learning. Many of the basic traditional forms that were used in Spain, Mesoamerica, and the Southeastern United States could have been easily adapted by either castas or natives to produce traditional meals using familiar ingredients and preparation procedures.

Common vessels used in Spain and across both American regions include jars, bowls, and basins. Large basins and bowls were used either as general mixing containers or as cooking pots (*cazuelas*). In Spain and Postclassic Mesoamerica, cazuelas were used for simmering stews and other dishes with a semi-liquid consistency (Card 2007:384; Lister and Lister 1987:102; McCafferty 2001:24). In addition, Spanish cooks used cazuelas to braise meats and deep fry vegetables, fish, meat, and pastries in olive oil or lard (Lister and Lister 1987:102). Ethnographic research in central and southern Veracruz suggests that these latter European cooking methods were adopted in colonial Mesoamerica (Arnold 1988:360-361; Krotser 1974:131; see also Long-Solís and Vargas 2005). In the Southeastern United States, decorated carinated vessels were used as cazuelas for making stews, corn meal mush, as well as for frying vegetables and meat in animal fat (Hally 1986:288-289).

Ceramic jars (*ollas*) were used for storage and food preparation in all three regions. These vessels were used for slow simmering food, such as garbanzos, in Spain (Lister and Lister 1987:102). In Mesoamerica, ollas also were used to make stews and hot drinks, and to soak dry maize in an alkaline solution (*nixtamalizacion*) prior to cooking corn kernals – sometimes in the same pot (Fournier García 1998; Rodriguez-Alegria 2013). Ethnographic research in central and southern Veracruz shows that these uses continued into the twentieth century (Arnold 1988:360-361; Krotser 1974:131). In the Southeastern United States, large jars were used for storing both liquids and solids, such as water, fermented corn soup, bear oil, and parched corn kernels (Hally 1986). Native people used large and medium-sized jars for soaking corn kernels in lye, fermenting corn soup, boiling and parching beans, acorns, and maiz, as well as for rendering animal fat (Hally 1986).

Bowls of varying sizes served multiple purposes as utilitarian vessels in all three regions (e.g., Arnold 1988; Card 2007; Hally 1986; Kroster 1974; Lister and Lister 1987; Reynoso Ramos 2004:86; Venter 2008:102). A vessel form produced in Mesoamerica, but not in the other two regions prior to contact, was a shallow griddle (*comal*) used mainly for toasting tortillas. Comales were a common vessel form found in native domestic assemblages in central Mexico (e.g., Brumfiel 1991; Fournier García 1998) and appearing in central Veracruz beginning in the Middle Postclassic (AD 1200-1350) (e.g., Curet et al. 1994). Colonial accounts document the continued manufacture and sale of ceramic comales in Central Mexico and Veracruz after the Spanish conquest (e.g., Cole 2003:192; Lockhart 1992:187-188). In modern Veracruz, metal alternatives are often employed to make tortillas, but the ceramic comal is still found in many households because people feel that they make better tasting food and do not scorch the tortillas (Arnold 1988; for Central Mexico see also Rodriguez-Alegria 2013).

As previously mentioned, in Florida many presumed utilitarian native wares presents a contradiction between their highly visible surface attributes and their low visibility context of use. However, it is possible that not all of the conspicuous attributes were "decorative" or intended to convey a message. Vessel forms with "roughened" exteriors often were used primarily as large cooking vessels, pots or jars (Pigott 2015:110). Roughening of the pottery surface by either bushing (variety Chattahoochee) or by rolling corn cobs over the surface (variety Wedowee) is commonly associated with the Lamar series and Creek traditions during the eighteenth century (Pigott 2015; see also Knight 1985). As already noted, forms traditionally associated with San Marcos stamped pottery also were utilitarian (Otto and Lewis 1975). In other cases, highly visible surface alterations on the exterior of native pots may have been used in conspicuous contexts to serve food.

Commensality, Serving Vessels, and Tablewares

In contrast with utilitarian vessels, the stark behavioral differences involved in commensality between broad regions at contact required specific vessel forms that were not always readily adaptable. From a modern western perspective, Spanish tablewares are familiar tools for consuming foods *at a table*. In early Spanish America, however, historical accounts of indigenous people using tables for serving food are rare and generally restricted to Mesoamerica.

In a unique account, the conquistador Bernal Díaz del Castillo (1963:226) describes how Montezuma received his meals on a low table that was covered with a white tablecloth, while he reclined on an equally low stool. Other written accounts and depictions suggest that low tables were rare and possibly reserved for the indigenous nobility (Aguilera García 1985:22; Coe 1994:81). Franciscan chronicler Fray Juan de Torquemada (1723:235) describes native commoner households as containing mainly grinding stones, *ollas* (ceramic pots), and *petates* (mats made of woven reeds). The Florentine Codex (Sahagún 1950-1982), Codex Mendoza (1992[1541]), and Codex Magliabechiano (1983) each contain images depicting indigenous people sitting on the ground or on short stools or benches with food served in vessels that were either placed on the ground or on a petate that was used, at times, similarly to a table. While Charles Gibson (1964:336) concludes that "[t]hroughout the colonial period Indian people . . . ate without chairs or tables," some early colonial accounts note that indigenous elites adopted high tables from European colonists (see Menegus 2004:513-514).

While tables were not regularly utilized for food consumption, indigenous people in prehispanic and colonial Mexico did use serving bowls, plates, and cups appropriate for both individual and communal use (Charlton et al. 2007; Coe 1994:74-81; Smith et al. 2003; Venter 2008). In contrast, indigenous people of the Southeastern United States used primarily communal serving vessels (Hally 1986:271). Defining characteristics of late prehistoric and colonial period native serving vessels include: flat bases, relatively shallow depth, and an orifice that is wide enough for the easy removal of liquid or food (Halley 1986; Pauketat 1987; Wilson 2002). Ethnohistorical accounts by early explorers and later colonists, as well as early twentieth century ethnographies consistently describe indigenous people eating from communal vessels. Soups or stews were the most common staple and were eaten from communal jars and bowls using spoons or ladles made of wood, gourds, shells, or animal horns. People generally used their fingers to retrieve solid food from shared vessels (e.g., Campbell 1959:18; Hally 1986:271-272; Swanton 1946:556). Hally (1986) argues that decorated carinated bowls were used not only as cazuelas to heat food, but also as communal serving vessels. Ingredients may have been initially cooked in separate jars and then mixed and reheated in carinated vessels immediately prior to serving. Decorative styles found on these vessels were, therefore, used in a high visibility context with the potential for communicating a message.

As elucidated in this discussion, tablewares were vessel forms associated with European dining behavior that included a table. "Serving vessel," then, is a broader concept that encompasses indigenous vessels that were used in pre-Hispanic Mesoamerica and Florida. Individual dishes with flat bases or podal supports were common in Mesoamerica and were readily adapted to the Spanish table with few changes to vessel forms (see Charlton et al. 2007). This may provide one explanation for why early Spanish households in Mexico City quickly adopted indigenous serving dishes – they were available and easily adaptable to the European table (c.f., Rodriguez-Alegría 2005 and Charlton and Fournier García 2010). In contrast, indigenous people in Florida did not produce traditional serving vessels that were ideal for individual tableware settings. Many Florida Indian vessel forms required alteration or manufacture of completely new forms, particularly for individual place settings – resulting in colono ware pottery in the Southeastern United States. In addition, some native vessels that were made using traditional forms, such as decorated and flat-based carinated bowls and jars, could have been adopted as communal serving vessels for the Spanish table.

Differentiating between serving vessels and utilitarian wares is important for tracking the activation of categorical identities and relational connections.

Technological Styles of Pottery Production in Mesoamerica and the Southeastern U.S.

In this section, I briefly describe the technological styles of pottery production that scholars have noted for the Southeastern United States and Mesoamerica. These styles include some techniques introduced by European colonists. I describe each stage of manufacture in the *chaîne opératoire,* from the procurement of raw materials to firing techniques. There has been extensive research on this topic, drawing from archaeology, ethnoarchaeology, and experimental archaeology. I focus primarily on those technological choices observable through the study of small pottery sherds. Although I do not view environmental and functional constraints as deterministic, I agree with Gosselain (1998) that it is important to identify those factors that might limit potential choices. Therefore, I point out potential constraints found at each stage.

Clay Acquisition

The first step in the manufacturing process is the collection and preparation of clay. Clay is a material made up of very fine particles of mostly silica and alumina. There are a number of different types of clay minerals (e.g., kaolinite, illite, smectite), but all are characterized by a crystalline structure that forms sheets. When water is absorbed between these sheets, they slide along a single plane, giving clay its plasticity. Apart from these characteristics, clay is extremely variable in color, workability, plasticity, degree of shrinkage, strength upon drying and firing, and resistance to thermal shock (Arnold

1985:20-24; Rice 1987; Rye 1981:29-31). These properties are caused by grain size, type and proportion of different clay minerals, amount and type of aplastic, plastic, or organic inclusions (Arnold 1985:21).

Potters are very familiar with variations in the physical properties of natural clay and their choices are deliberate (Rye 1981:16-17). Not all clays are appropriate for successfully completing a desired pot, at least in the clay's unaltered state. Some natural clays have better plasticity than others, which means they can be easily formed into a pot and hold their shape. Clays that shrink too much during drying may crack. Firing techniques also must be considered when selecting clays. Most clays that can be low fired (below 800°C) will fracture and warp at higher temperatures (Arnold 1985:21; Rice 1987:60; Rye 1981:16, 31). Clay choice also may relate to aesthetic and utilitarian qualities of the fired clay color. Dark colored pottery is often preferred for cooking pots to better retain heat. In contrast, light colored pottery is reflective and makes excellent storage jars for cool water in hot climates (Lister and Lister 1987:256-257; Rye 1976:113).

Clay preference can influence the distances that potters are willing to travel to collect raw resources. For example, potters at Chuniapan de Abajo will travel up to 4 km to obtain a darker red clay to make comales because they prefer it to nearer yellow clays (P. Arnold 1991). Clay preference may vary depending on the different types of pots made within the same community. In some cases in Melanesia, local clays were preferred for small pots, while more distant clays were imported for larger pots (Nicklin 1979:440). Dean Arnold (1985:39-49) analyzed distances traveled to clay resources for 111 potting communities. He found that while the maximum distance to clay sources was 50 km, in a third of the cases potters traveled 1 km or less. Eight-four percent of potters traveled 7 km or less. Potters could and did travel greater distances for "more suitable clays," but potters could also change their clay processing strategies to improve the suitability of local clays. Rye (1981) demonstrates that by changing processing techniques, most clays can be made suitable for the manufacture of low-fired pots.

Temper Choice and Processing

The workability of clay can be improved by adding plastic, aplastic, or organic inclusions (temper). Organic materials add plasticity to clay, while aplastics reduce the plasticity of overly sticky clays. Temper types found in Veracruz or Florida include sand of various mineral compositions, crushed rock (grit) or pottery (grog), shell, limestone, sponge spicules, volcanic ash, Spanish moss, and reed stem fibers (Rice 1987:118-119; Rye 1981:31-36). Choice of temper also can affect mechanical properties during firing and for finished products. For example, platy inclusions, such as shell, can improve the transverse strength of the pot, but lead to laminar fractures. Angular temper can strengthen the clay body by better bonding with clay particles (Rice 1987:74). The size of temper particles may depend on vessel wall thickness. Thicker walls often have larger inclusion. Thinner walls require smaller temper size. In the colonial period, both the size and amount of temper also can constrain forming techniques. Wheel-thrown pottery generally requires fewer and smaller grain inclusions to avoid damage to the potter's hands (Rye 1981:27, 61; cf. Hauser).

While potters may add temper, they can also remove natural inclusions from the clay by sieving, winnowing, crushing, levigation or by hand removing large organics or gravel. Potters also may leave clay to soak or "sour" in water for long periods of time (Rice 1987: 118-119; Rye 1981:29-31). Other processing techniques may include the mixing of clays. Foster (1948, 1955) reports several instances of clay mixing at Tzintzuntzan, Coyotepec, and at Beriosobal in Chiapas. Mixing of white and black clays also is a common practice in Talavera majolica production in modern Puebla, Mexico.

Some aspects of manufacturing technology are slow to change. However, post-learning interactions and movements of potters may require adjustments, particularly in the selection of raw materials (e.g., Cordell 2001; Gosselain 1998, 2000; Rice 1987:314-315). Casta potters that moved from Mexico to Pensacola needed to adapt to clays and available tempers with very different mineralogy and mechanical properties. Migrant potters could take advantage of similar sources as local Indians or they could develop their own clay recipes based on experimentation and cultural perceptions of how things should be done. When the first presidio was founded, there were few indigenous people living in Pensacola (Harris 1999), requiring potters to experiment and adjust to available resources in a new environment. Technological choices included whether to use local clays that may or may not require additional processing or to travel greater distances to acquire clays that craftsmen deemed more appropriate.

Primary Forming Techniques

My framework for analyzing forming technique relies heavily on Rye's (1981) ethnographic and experimental archaeological research, with additional insights from ethnographic research undertaken in Mesoamerica (e.g., P. Arnold 1991; Bey 1986; Foster 1948, 1955; Krotser 1974; Reina and Hill 1978; Stark 1984) and archaeological investigations in the Southeastern United States (e.g., Harris 1999, 2012; Steponaitis 2009; van der Leeuw 1993). Rye (1981) divides the process of forming a pot into three stages: primary forming, secondary forming, and surface modification. Primary forming involves the transformation of a lump of clay into a shape that roughly resembles the finished pot. Common techniques of primary forming identified by Rye (1981) include: coiling, slab building, pinching, drawing, molding, and wheel-throwing.

Ethnographic and archaeological research has identified details about the use of primary forming techniques used in Mesoamerica and the Southeastern United States. Coiling has been used in Mesoamerica, including central Veracruz (Foster 1955:4; Kelly and Palerm 1952:217; Reina and Hill 1978) and particularly the Southeastern United States (Steponaitis 2009; see also van der Leeuw 193). Using this technique, part or all of the pot is built up by winding ropes of clay around the circumference of the pot.

A wide variety of molds also have been reported in Mesoamerica. Convex molds have been used in central Mexico and central Veracruz (Foster 1955; Stark 1984). Molds that have a handle on the concave side are called mushroom molds. Modern potters sometimes use stone pounders to form circular slabs of clay that are then pressed onto the convex side of the mold (Foster 1955:4-5; Stark 1984). In a lesser-known technique reported in the Tuxtla mountains, the clay is rolled and then suspended to allow the clay to sag over a metal tub (P. Arnold 1991). Flat molds were used to build comales or for the base of a pot that was built up using other techniques (Bey 1986:23; Reina and Hill

1978). Concave molds were sometimes used to form the base of a vessel to which coils were added. In Chiapas and Oaxaca, concave molds were placed on top of an inverted plate or bowl in order to facilitate the rapid turning of the mold. In Coyotepec, the rapidity of turning during the final stage of forming has been compared to the motor patterns of wheel-throwing (Foster 1955:8,23). A single concave mold also was used to form complete unrestricted pots and two concave molds have been used to form two vertical halves that were joined to form the whole pot. Vertical half molds were reported in use in highland Michoacan (Foster 1955:6). In the Southeastern United States, concave molds, likely hemispherical bowls, were used to make bases from slabs of clay. Vessel walls were then built up by coiling. Alternately, two concave bowls were used as horizontal molds and then an opening was cut into the upper half to form the rim (van der Leeuw 1993:251). Finally, it should be noted that anything could have been used as a mold, including ordinary bowls and plates.

Another common technique found in Veracruz involves hand forming a vessel from a single cylinder or cone of clay. The hand is pressed into the top of the cylinder to create a depression which is quickly widened to create the shape of the pot (Arnold 1987:139-143; Foster 1955:3,22; Krotser 1974). I have observed potters using this technique in San Miguel Aguasuelos, a potting town northeast of Xalapa. Drawing techniques have been reported in Guatemala where a corn cob or wooden spool is rolled over the surface to thin the walls, while corn cobs or other implements are used to draw the walls upward (Reina and Hill 1978:23, 201-202). Similar surface scraping, combined with coiling, has been reported from modern Tajin, Veracruz (Kelly and Palerm 1952:217).

The potter's wheel was not introduced until the arrival of Europeans in the sixteenth century. In Mesoamerica, it is primarily male potters who use the wheel (Foster 1955:28; Reina and Hill 1978:21). Foster (1955:8) reports that the wheel is most commonly used in workshops associated with majolica production in Puebla, although it was also used in Hidalgo, Chiapas, and Oaxaca. I have not yet found any ethnographic or historical reports of the potter's wheel in central Veracruz or Florida. Despite the perceived efficiency of the wheel, it was not adopted by many indigenous potters. One important reason for this rejection is that it would require a change in learned motor habits that are required for throwing pots on the Spanish wheel (Arnold et al. 2007).

Shaping and Finishing

Although secondary forming (shaping) and surface modification (finishing) have different aims, I consider these stages together as there is overlap in procedures and material evidence left on the sherds. During secondary forming, the shape of the vessel with appropriate wall thickness and proportions are achieved. Common techniques include beating with a paddle and anvil, scraping, smoothing, trimming, and securing joins and coils (Rye 1981:62). Paddle and anvils were common in the Southeastern United States to thin the walls by beating one side with a paddle and supporting the other with an anvil (Steponaitis 2009). The paddle and anvil technique is less common in Mesoamerica and seems restricted to a few locations in west Mexico, such as Colima and Jalisco (Foster 1955:4-5). Ethnographically, scraping and trimming have been reported for Veracruz (Foster 1955:4; Krotser 1980:130). Trimming also is a common method used on the wheel once pottery reaches a leather hard state (Rye 1981:87).

The goal of finishing techniques is to modify surface texture and improve the aesthetic qualities of the pottery. Finishing procedures may include modification to the existing surface (e.g., scraping, smoothing, burnishing, roughening, incising, or stamping), or adding material to the pottery's surface (e.g., paints, slips, or glazes) (Rye 1981:62). Finishing techniques may have either decorative or utilitarian functions. When applied to less visible interior surfaces, modifications are generally utilitarian. For example, burnishing or glazing a pot's interior will lessen the permeability of the surface for the storage of liquids. Modifications and additions to exteriors or some highly visible interior surfaces (such as with plates) were primarily decorative.

Smoothing and burnishing were widespread in Mesoamerica and the Southeastern United States. Surface roughening could be achieved by brushing, stamping, cob marking, and rouletting. This surface modification could be decorative or functional, aiding in heat transfer or providing a better grip (Rice 1987:138). Roughening was common in the Southeastern United States (see above discussion on Chattahoochee Roughened pottery). Although roughening and texturing was common in pre-colonial Mesoamerica, it appears less frequent in Mesoamerica today (Pool 1990:56-57). From colonial contexts in the Port of Veracruz, I have found a few comales that had roughened bases and molcajetes with scored interiors. Otherwise, texturing appears rare in these colonial contexts. Slips, paints, and glazes are the most common surface additives found in colonial Veracruz and in Pensacola.

Firing Techniques

Pottery must be allowed to dry completely before proceeding to the final stage of pottery manufacture, firing. The purpose of firing pottery is to strengthen the pot through the destruction of the clay minerals. Potters can control three variables to achieve their desired effect: rate of heating, atmosphere, and temperature. Rate of firing is important to ensure that the pot was heated long enough for desired chemical and mineral changes to occur. Firing temperature will depend greatly on the type of clay used and the desired effects (see above). Typically, a temperature of at least 500°C is required for the pottery to reach a solid crystalline phase (Rye 1981:96).

Three types of atmosphere are possible and relate to the ratio of oxygen to fuel. Excess oxygen creates an oxidizing atmosphere that causes organic matter in the pottery paste to burn out. Once carbon is removed, iron oxides are brought to their highest state of oxidation. If sufficient irons are present, the result is a red color. Limiting the amount of oxygen during firing so that complete combustion is not achieved results in a reducing atmosphere. Under these conditions, carbons in the paste will not burn off and irons are reduced to a lower state, producing black or gray colors depending on the amount of organics and iron present. If smoke is produced during firing, soot may be deposited on the pot's surface resulting in "smudging" or a black appearance. Alternately, if just enough oxygen is produced to reach complete combustion, a neutral atmosphere is achieved (Shepard 1956:214-215).

Control over rate of firing, firing temperature, and atmosphere depend on the tools and chosen techniques. There are two major techniques for firing pottery: open firing and kiln firing. Open firing may be set up in as open bonfire or in a simple pit. This technique allows for less control over the firing conditions and generally allows for lower sustainable temperatures (600 to 850°C) (Rice 1987:153-157). Because pots frequently come into contact with burning fuel, fire clouding is common. Rapid changes in temperature can lead to cracking or over-firing. Once the fuel is ignited, it burns fairly quickly. After the fire is out, pots can be removed immediately or allowed to cool before they are removed from the ash. When smudging is preferred, it is usually done at the end of an open firing by covering the hot pottery in organics, such as pine straw or sawdust (Rice 1987:153-158). Open firing is common throughout Mesoamerica, including Veracruz (Foster 1955; Reina and Hill 1978). Only open firing was used in the Southeastern United States before Europeans arrived.

Kiln firing allows for better control over higher firing temperatures and atmosphere, resulting in more durable pottery (Arnold 1985:213; Shepard 1980:83; Rye 1981:25). Temperatures within a kiln can reach 1000°C to 1300°C. Most kilns separate pottery from the fuel, mostly eliminating fire clouding (Rye 1981:98-100; Shepard 1980:76). Because of better control and separation between pots and the firing box, kilns are generally used for glazed pottery (Rice 1987:155). Although there are definite advantages to using a kiln, their construction requires more labor, and kilns often need more fuel than open firings (Rye 1981:25). In the updraft kiln, which is common in Mesoamerica, the chamber is located directly over the firebox. Because of the location of the firebox and vertical drafts, temperatures are unevenly distributed and over-firing on one side of vessels is common (Rice 1987:173-174; Rye 1981:100). A reducing environment is more difficult to achieve in updraft kilns, though smudging is possible by sealing the kiln (Rye 1981:100).

Summary

In this chapter, I described my approach for using material culture, specifically pottery, in order to assess relational connections and the active expression of social categories. I argue that low visibility attributes were the result of enculturation and slow to change, providing an avenue for discriminating between Florida Indian and casta pottery traditions. Because mundane and inconspicuous utilitarian wares were often locally produced and exchanged within regions, they are appropriate for tracking relational connections. In contrast, pottery that has decorative attributes and was used in high visibility contexts, particularly tablewares and other serving vessels, were recognized at large scales and are suitable for assessing the communication of categorical membership.

Next, I described current approaches and limitations of pottery typologies. I detailed the main categories of pottery found in Veracruz and Pensacola. European-style tablewares, Asian porcelains, and decorated Florida Indian wares have been well-studied. Plain, lead-glazed, and slipped/painted pottery have received less attention and, thus, are the focus of technological and provenance analyses in the next three chapters.

Finally, given the importance of contextual visibility and enculturated technological traditions for assessing relational and categorical modes of identification, I briefly reviewed research on food processing and utilitarian pottery, commensality and serving vessels, and technological traditions used in Spain, Mesoamerica, and Northwest

Florida. My approach for assessing relational connections and social categories from the archaeological perspective is implemented in the next four chapters. I begin in the next chapter by detailing my methods for data collection and laboratory analysis.

[1] Extensive cross-cultural research suggests that in preindustrial society there are often gendered divisions in the organization of production (see Arnold 1985:225-227; Arnold et al. 2007; Murdock and Provost 1973; Rice 1991:436). Household pottery production typically falls within the realm of female activities, although men and whole families may be involved the process. Full-time production or manufacture outside the household, such as in workshops, often shifts the labor to men. This division also correlates with the use of the wheel in pottery production, which also is generally male-related work.

[2] This pattern correlates with historical research in colonial Mexico that suggests that heavy low-value goods were exchanged within regions (Garner 1993:84, 91-99). Municipalities had the authority to regulate trade within their jurisdictions, but generally they were not very effective in this endeavor (Garner 1993:175). Outside the formal system there was also a large volume of exchange through informal barter that occurred in cities, towns, and throughout the hinterlands. Because informal transactions were not officially regulated, they are impossible to track consistently with documents (Garner 1993:176). Archaeology, therefore, offers a line of evidence for examining relational connections that are poorly documented historically.

[3] Jennifer Melcher (2011) argues that because carinated bowls had rounded bottoms and incurvate rims, they were not well-suited for the Spanish table. Harris (1999:113) notes, however, that the small number of identifiable "Indian" pottery bases (n=26) recovered from Santa Maria were either flat or had a foot ring. The total absence of rounded bases may be due to the fragmentary nature of the Indian pottery assemblage that would make flat bases easier to differentiate from the curved sidewall of small body sherds.

CHAPTER 6

ARCHAEOLOGICAL DATA AND LABORATORY METHODS

In the previous chapter, I described an archaeological approach for examining relational and categorical modes of identification. Pottery from archaeological contexts is central to this study because it is the most ubiquitous material from Spanish colonial sites and can reflect social interaction at multiple scales, as well as the manipulation of formal and regional categories of identification in Veracruz and Pensacola. This approach requires that I first discriminate between pottery produced by castas and Florida Indians. Because less visible technological styles are more resistant to change, they are a better gauge of the continuity of pottery production by castas than traditional typologies that are defined based upon decorative styles (see Clark 2001:6-22; Gosselain 2000:193; Stark et al. 1998). Analysis of pottery provenance is used to discriminate between pottery made by castas in Pensacola and wares imported to the presidios from New Spain.

In this chapter, I describe strategies and procedures for collecting data that relates to the technological style and provenance of plain, lead-glazed, and painted/slipped pottery. Analysis of these categories of pottery will advance our understanding of the production, consumption, and exchange of ubiquitous pottery categories that are currently of uncertain attribution in Spanish colonial contexts. I begin by describing sampling strategies for selecting raw clays from the Basin of Veracruz and Northwest Florida that are used in the provenance study. I then provide my sampling strategy for selecting pottery from the Port of Veracruz, Pensacola presidios, and Mission Escambe. All of the pottery examined for this project comes from excavations undertaken by UWF archaeologists. I provide a brief description of the archaeological contexts at each site with a rationale for my choices. Finally, I describe the laboratory procedures used to collect data on pottery provenance and each stage of pottery manufacture (described in Chapter 5).

Environmental Settings and Clay Sampling Strategies

As no comparable chemical characterization studies have been published for Northwest Florida or near the Port of Veracruz, I collected approximately 10-15 clay samples within 50 km of both the Pensacola presidios and the Port of Veracruz. Ethnographic research suggests that 50 km is the maximum distance that potters will travel to collect raw clay, though often distances are far less (see Arnold 1980:149, 1985:39-49; Rice 1987:115-116). Examination of clays within approximately 50 km of the port and presidios provides a general understanding of clay availability. Chemical characterization of clay sources is used to approximate the location of raw resources used in pottery manufacture. In Veracruz, I also collected clay near Tlacotalpan and Xalapa, even though these locations were more distant from the port, as both towns were known to produce pottery that was likely sold in Veracruz (Worth 2009).

Basin of Veracruz

The Port of Veracruz is located within a basin that is bordered by the Sierra Madre Oriental to the west, the Tuxtla Mountains to the southeast, and the Sierra de Chiconquiaco to the northwest (Figure 6.1). The region can be divided into three distinct zones: dunes, coastal plain, and piedmont (Sluyter 1995:69). The piedmont was formed by an alluvial fan from surrounding mountain ranges. The Sierre Madre Oriental consists primarily of Jurassic and Cretaceous limestone that were uplifted by Tertiary volcanism. Composite peaks of andesite formed, and basalts and tuffs covered earlier Mesozoic sediment (Sluyter 1995:69). Debris flows and dissecting rivers redeposited limestone and igneous sediment, forming the basin's piedmont (Sluyter 1995:70). Later episodes of volcanic activity during the Quaternary added another layer of igneous sediment (Sluyter 1995:70). As sea levels rose during the Holocene and floodplains aggraded, the coastal plain formed as a narrow band east of the piedmont (Sluyter 1995:78). The port was established within the third zone, a narrow band of transverse dunes that date to the Pleistocene or Holocene, and which separates the coastal plain from the Gulf of Mexico (Sluyter 1995:67). The dunes were formed by aeolian processes, as strong north winds (*nortes*) impacted the region during dry winter months (Sluyter 1995:73).

I used three strategies for collecting clay samples within the basin of Veracruz. First, I collected samples along three major rivers that dissect the basin: La Antigua, Jamapa, and Cotaxtla (see Figure 6.1). My second strategy was to locate clays near colonial towns where pottery may have been manufactured, such as near Tlacotalpan, Jalapa, Cempoala, La Antigua, and Medellin de Bravo. Finally, I consulted ethnographic accounts of potters from the 1950s (Foster 1955) and 1970s (Krotser 1974; Stark 1984) to seek out potters who were still working in the region. Potters provided samples from their stock or, preferably, led me to their source so that I could collect my own samples. These strategies were complimentary as many colonial towns and modern potters often were located near major rivers.

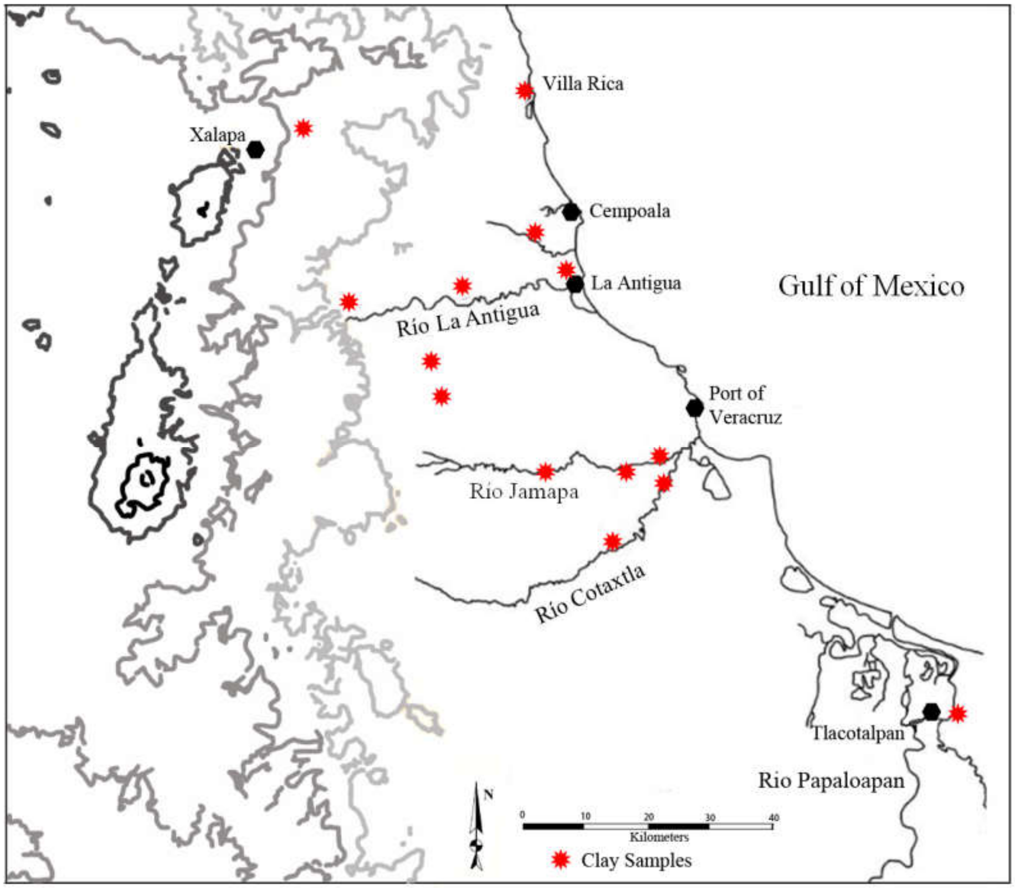

Figure 6.1. Map of the Basin of Veracruz Indicating the Provenance of Clay Samples

In the fall of 2012, a total of 14 clays were collected in Veracruz (see Figure 6.1). All clay samples were collected using methods recommended by Hegmon and Neff (1993). All tools were cleaned with distilled water prior to collection. At least 2 pints of clay were collected from each location and sealed in an unused plastic bags. I used a Garmin GPSmap 76CSx to determine coordinates. Each sample was assigned a unique identification number in the field. Sample location, clay and context descriptions were recorded on standardized forms.

Northwest Florida

Located adjacent to the Gulf of Mexico, the environmental setting of Northwest Florida shares some qualities with Veracruz, but geologically the regions are distinct. West Florida is situated within the East Gulf Coastal Plain (Fenneman 1938; Hunt 1974). This physiographic province is characterized by clay, sand, and gravel from the Citronelle Formation, an alluvial fan of siliciclastic sediments that coalesced on the coastal plain during the Plio-Pleistocene (Puri and Vernon 1964). During the last million years, a series of glacial and interglacial climatic periods alternately lowered and elevated sea levels, forming marine terraces (Marsh 1966). Rivers deeply incised the coastal plain during glacial periods. When sea levels rose rapidly during interglacial periods, aggrading streams flooded bays and river valleys, reworking existing Citronelle deposits and depositing new but similar upland sediments. In the study region, the Citronelle Formation is made up mostly of quartz sand, muscovite, lenses of kaolinite and smectite clays, and limonite cemented sandstone (Marsh 1966:75-76; Steponaitis 1996:563).

In the fall of 2011 and the summer 2012, I collected 12 clay samples in Northwest Florida and in Alabama (Figure 6.2). Clay collection strategies and methods were similar to Veracruz. I collected samples from major bays and river drainages (Perdido, Escambia, and Blackwater). Where possible, I also collected samples in the vicinity of the colonial presidios and missions. Because most Apalachee and Yamasee Indians left Florida with the Spanish, there are no traditional potters currently in Florida that are descendants from these groups. However, modern potters and other local informants were valuable in locating clay sources.

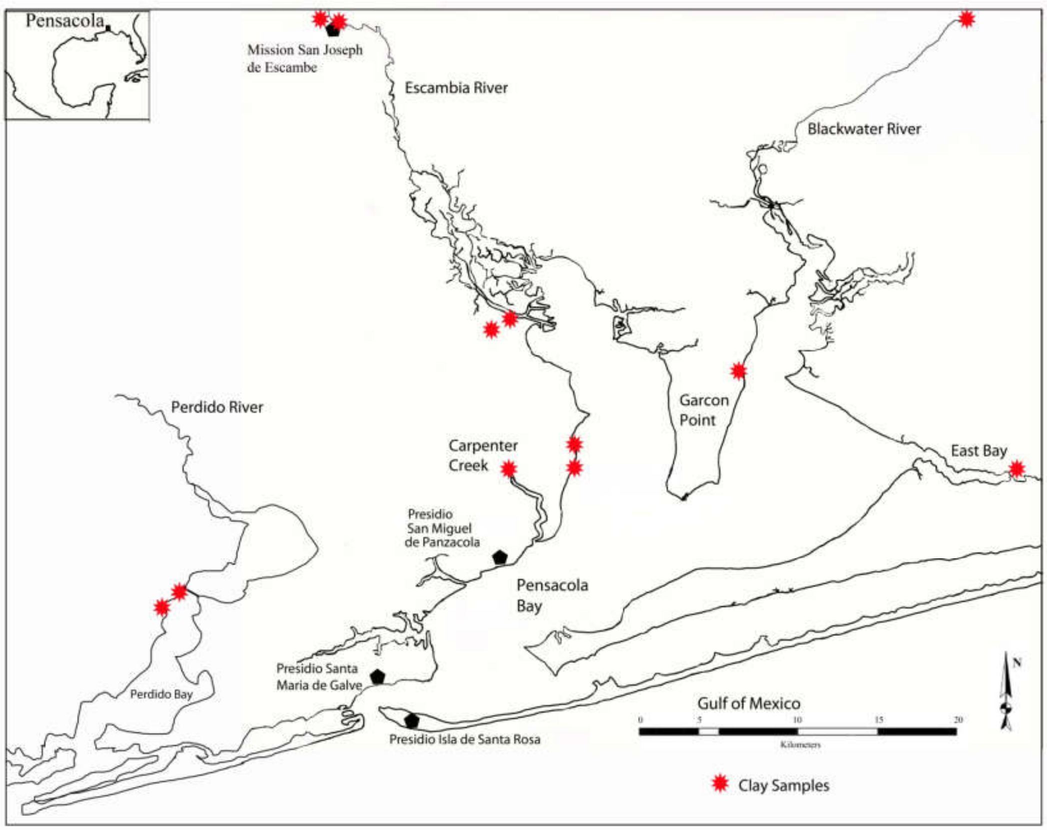

Figure 6.2. Map of Northwest Florida Indicating the Provenance of Clay Samples and the Locations of Spanish Presidios and Mission.

Pottery Sample Selection Strategy

Before selecting pottery samples, I divided Pensacola and Veracruz assemblages into short temporal periods using TPQs (*terminus post quem* - time after which) to assess general trends in the trajectory of technological choices and pottery consumption. Veracruz assemblages were divided into three temporal periods: seventeenth century (1599-1700), early eighteenth century (1700-1762) and late eighteenth century (1762-1800). Better controls are possible in Pensacola due to formation processes and the changing location of presidios. For Pensacola, I separated assemblages into four temporal periods based on location and pottery TPQs: Presidio Santa María (1698-1719), Presidio

Santa Rosa (1722-1740 and 1740-1756), and Presidio San Miguel de Panzacola (1756-1762).

I took a stratified random sample of approximately 200 sherds from each temporal period with the proportion of pottery categories (i.e., plain wares, lead-glazed, and painted or slipped pottery) equal to the proportions in the total assemblage recovered from each context (Table 6.1). Efforts were made to sample pottery assemblages that were excavated from sealed contexts in locations interpreted as living areas for lower status castas, based upon independent sources of evidence (e.g., historical documents, architectural features, and non-pottery artifacts). In Veracruz, I sampled assemblages taken from house lots in Afromestizo neighborhoods. In Pensacola, I analyzed sample assemblages from living areas associated with convicts and conscript soldiers. A small sample of approximately 200 additional sherds were taken from two higher status areas of the Pensacola presidios, as well as 100 decorated indigenous sherds from the nearby Escambe Mission for comparative purposes (see Worth et al. 2015).

This sampling strategy was aided by pottery data that were digitally accessible at UWF through separate relational databases created for each individual project.[1] I used these databases to determine the total proportions of plain, lead-glazed, and painted/slipped pottery found in features and sealed midden. I then conducted database queries to generate separate lists of all plain, lead-glazed, and slipped/painted pottery from each context and temporal period. I used random number tables to select sherds from each pottery list with the proportions of pottery categories equal to the total proportion found at each context. For example, a total of 183 plain, lead-glazed, and slipped sherds were recovered from midden and features associated with the convicts' barracks at Presidio Santa Maria. Most of these sherds were plain (n=143; 78.1 percent), but there also were some lead-glazed (n=38, 20.8 percent) and very few painted or slipped sherds (n=2, 1.1 percent). I therefore selected 78 plain sherds, 20 lead-glazed, and 2 painted/slipped sherds from the convicts' barracks. Samples were carefully examined to avoid selecting sherds that were broken from the same vessel.

Table 6.1. All Pottery Samples Analyzed for this Study

Context	**Plain**	**Lead-Glazed**	**Painted/ Slipped**	**Decorated Indian**	**Total**
Port of Veracruz					
17th Century	128	51	21	NA	200
Early 18th Century	107	76	18	NA	201
Late 18th Century	88	100	18	NA	206
Subtotal	**323**	**227**	**57**	**NA**	**607**
Pensacola - Presidio Santa Maria					
Convicts' Barracks	78	20	2	NA	100
Soldiers' Barracks	78	16	2	NA	96
Officers' Barracks	69	30	12	NA	111
Decorated Native Pottery	0	0	0	1	1
Subtotal	**225**	**66**	**16**	**NA**	**308**
Pensacola - Presidio Santa Rosa					
1722 Central West Area	43	51	3	NA	97
1722 East Area	71	23	4	NA	98
Post-1740 East Area	54	41	5	NA	100
Post-1740 Northwest Area	56	33	9	NA	98
Post-1740 "King's House"	42	46	4	NA	92
Decorated Native Pottery	0	0	0	14	14
Subtotal	**266**	**194**	**25**	**12**	**499**
Pensacola - Presidio San Miguel					
Commanding Officer's Compound	78	88	20	NA	**186**
Mission San Joseph de Escambe		0	0	100	**100**
Grand Total	**892**	**575**	**118**	**111**	**1700**

There were three issues with this sampling procedure that required some adjustments during selection. First, there was a consistently low percentage of painted and slipped pottery found at each of the presidios and in Veracruz. In order to bolster sample sizes in this category, I selected additional slipped and painted pottery sherds of sufficient size whenever possible. Second, smaller sherds provide less information for attribute analyses and would not provide adequate samples for later chemical and mineralogical analyses. Therefore, I selected first from sherds weighing more than 5 grams, introducing some sampling bias based on weight. Third, I added a sample of San Marcos Stamped pottery from Presidio Santa Rosa, as these wares were likely made by the Yamasee who were living at Mission Punta Rasa in Pensacola. A full explanation for including these decorated sherds is discussed in the section on Mission Escambe. In the following sections, I describe the specific contexts chosen for sampling with a rationale for my choices.

Archaeological Contexts: Colonial Port of Veracruz

In the early 2000s, Judith A. Bense of UWF began a collaborative relationship with Judith Hernandez Aranda of the Central Veracruz Instituto Nacional de Antropologia e Historia. Together, Bense and Hernandez (2007) conceived of the Colonial Connections Project (CCP) to examine the homeland contexts of castas that relocated from urban areas in New Spain to the Pensacola presidios. UWF research at the Port of Veracruz followed decades of investigations at the Spanish presidios of Pensacola. For this study, I analyzed assemblages from two colonial neighborhoods as a baseline for discriminating the technological styles of plain, lead-glazed, and painted or slipped pottery manufactured by castas.

The Port of Veracruz was established in its current location in 1599. Founded along the shore of the Gulf of Mexico, Veracruz was built in a dunal environment very similar to areas of transverse dunes that are still visible north of the port. Today, the colonial remains of the port are located beneath the streets, sidewalks, shops, office buildings, and parking lots of Zona Central in downtown Veracruz. Hernandez has conducted most of the colonial archaeology excavations at the port for the last three decades (Hernández Aranda 1993, 1994, 1995, 1996a, 1996b, 1996c, 1996d, 1996e, 1996f, 2000, 2002, 2006a, 2006b; see summary in Hernandez Aranda 2009). Because most of INAH's projects involved salvage work with limited contextual controls, I sampled only from pottery recovered from the 2008 UWF collections.

The UWF project area included the colonial Barrio de Minas and the Barrio de las Californias. The boundaries of these neighborhoods were defined by modern streets: Calle de Constitución to the north, Calle de E. Morales to the south, Calle de 5 de Mayo to the east and Calle de Nicolás Bravo to the west (Figure 6.3). As defined, this area is approximately 675 meters north/south and 325 meters east/west and covers 0.22 km^2. The terrain slopes east toward the modern shoreline, as it did in the colonial period (Eschbach 2009).

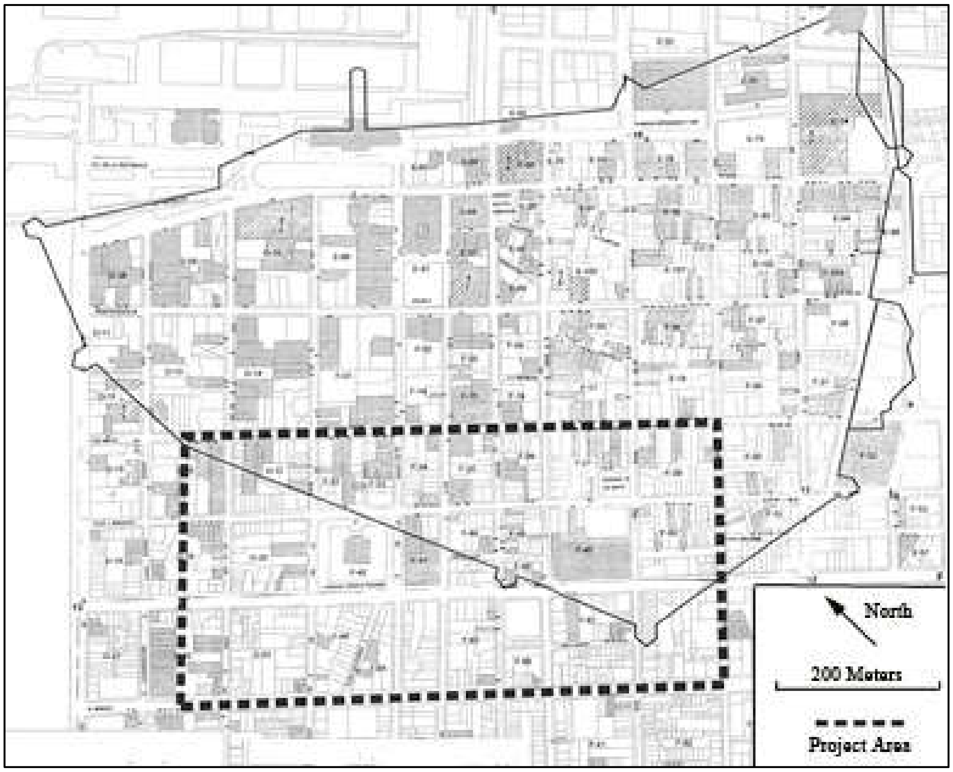

Figure 6.3. Modern Map of Veracruz with the Location of the Town Wall and Study Area Indicated (Adapted from Eschbach 2009:11)

Examination of maps dating to 1705, 1786, and 1878 indicates that the town plan within the city walls changed little in the eighteenth and nineteenth century (Figure 6.4; Eschbach 2009:16). An 1878 map was completed just prior to the demolition on the city wall in order to expand the city's grid system. In contrast to earlier maps, the nineteenth century document depicts structures outside the wall. The neighborhood outside the northwest wall was identified on the map as the Barrio de las Californias. The structures in the neighborhood were oriented with the northwest wall, rather than the city's grid system (Figure 6.4). Remnants of this organization are still visible in the Callejón de California, which is aligned with the colonial barrio rather than the modern grid system.

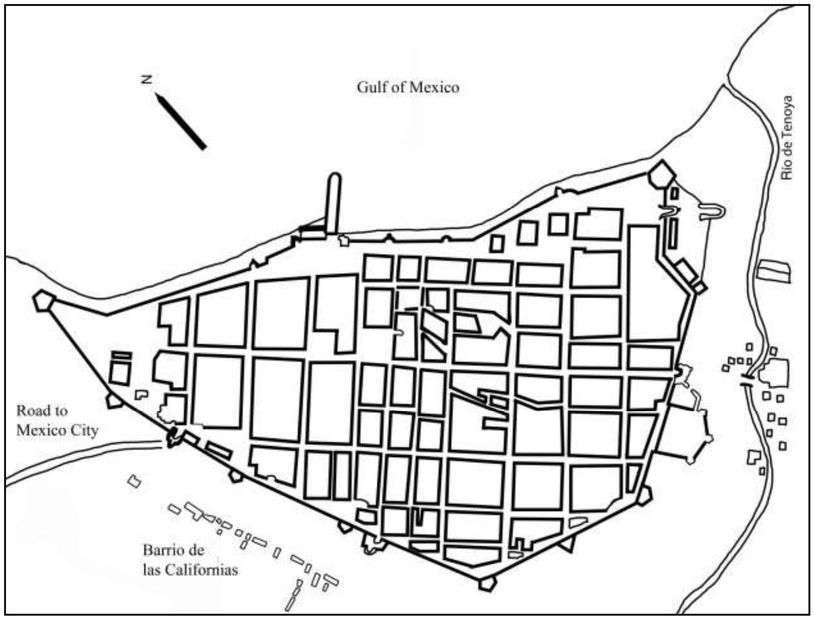

Figure 6.4 Eighteenth Century Town Plan of Nueva Veracruz Based on a Composite of Several Historical Maps. *Note:* Settlements outside the wall are often left out of historical maps. The representation of the Barrio de las Californias is based on a 1878 map that includes the neighborhood.

Other remnants of the colonial town include a military hospital that was built in the 1760s and still stands in the UWF study area. Several segments of the old city are hidden within city lots, where they serve as structural walls and boundaries between lots. The eighteenth century Baluarte Santiago and an exposed foundation of the city wall at the Museo Histórico Naval de Veracruz also provide important colonial markers. UWF archaeologists used these markers to orient eighteenth and nineteenth century maps to a map of the modern city in order to project the location of the colonial wall within the project's study area (see Figure 6.3; Eschbach 2009).

Archaeologists with the project excavated seven units inside the wall in the Barrio de Minas and ten units outside the west wall in the Barrio de las Californias (Figure 6.5). From these excavations, archaeologists recovered more than 54,000 artifacts from colonial contexts. Artifacts included ceramics of European, Asian, and New World origins, architectural materials, personal items (such as jewelry, buttons, bone dice, and tobacco pipes), and the faunal remains of cow, chicken, goat, pig, fish, and turtle (Eschbach 2009).

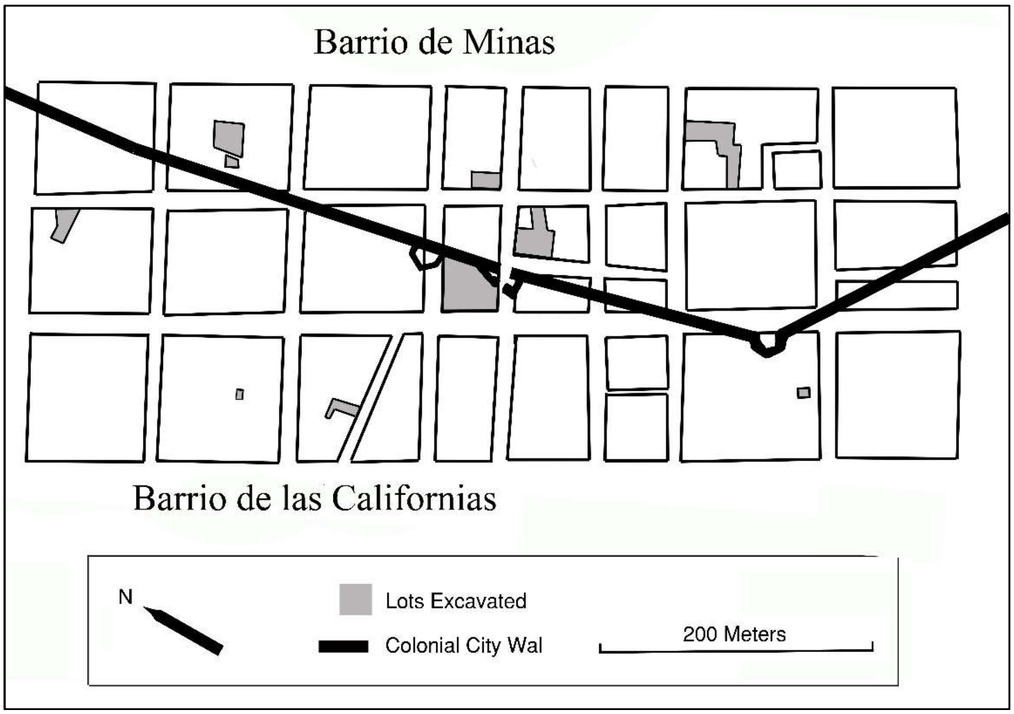

Figure 6.5. Map of the Study Area Indicating the Locations of Modern Veracruz Lots Excavated for the 2008 Colonial Connections Project.

Although the barrios were adjacent, different natural and cultural site formation processes differentially impacted the archaeological contexts. Unprotected by the city wall, fences, and denser cluster of structures, seventeenth century and eighteenth-century deposits were buried by 1.5 to 2 meters of construction fill and aeolian deposits from seasonal *nortes* (Eschbach 2009). While colonial features and midden outside the wall were better protected below modern developments, they were also ephemeral and difficult to locate. The only map to include the Barrio de las Californias was from the late nineteenth century. Because buildings were not constructed on formal lots, it is unknown how much of the neighborhood's organization had changed since the eighteenth century. Lots were targeted in the area of structures depicted on the 1878 map with an attempt to sample different parts of the study area. Final unit placement was constrained by modern development and the permission of property owners (Eschbach 2007).

Inside the city wall, colonial deposits were documented within a meter (often far less) from the surface. Although shallow and less protected from modern developments, undisturbed colonial deposits were easier to isolate than outside the city wall. Many of the units were placed within late eighteenth-century structures with few modern alterations. While wall foundations clearly disturbed the features beneath them, earlier eighteenth and seventeenth century deposits were often undisturbed beneath the floors of structures.

In both neighborhoods, most deposits were clearly stratified by alternating midden, features (such as floors and compact occupation surfaces), and aeolian deposits. Units were excavated using natural strata and 10 cm arbitrary levels. Following the project's laboratory analyses, I assigned a TPQ for each stratum and feature based upon superposition and known or estimated manufacturing dates of majolica and faience styles, stoneware, creamware, pearlware, and whiteware (Deagan 1987; FLMNH 2008; Miller 2000; Waselkov and Walthall 2002). I grouped contexts into three temporal periods for sampling: seventeenth century (before 1700), early eighteenth century (1700 to 1762), and late eighteenth century (1762 to 1800). A list of the units and lots sampled for each temporal period are given in Table 6.2. For each period, I attempted to select samples evenly between neighborhoods. This was not possible for the seventeenth century. Only one unit outside the wall contained a seventeenth century context, and it had few associated artifacts.

Table 6.2. Contexts Sampled by Temporal Period at the Port of Veracruz

Barrio	Lot	Unit	Unit Size (m)
17th Century (1599 to 1700)			
Californias	31	4	1 x 1
Minas	2	14	2 x 1
Minas	6	8	2 x 1
Minas	23	7	2 x 1
Minas	49	12	1 x 1
Early 18th Century (1700 to 1762)			
Californias	12	13	1 x 1
Californias	18	1	0.7 x 0.8
Californias	18	2	0.7 x 0.8
Californias	31	4	1 x 1
Californias	32	3	1 x 1
Californias	38	3	1 x 1
Minas	2	14	2 x 1
Minas	6	8	2 x 1
Minas	23	7	2 x 1
Minas	49	12	1 x 1
Late 18th Century (1762 to 1800)			
Californias	12	13	1 x 1
Californias	31	4	1 x 1
Californias	32	3	1 x 1
Minas	6	8	1 x 1
Minas	26	11	1 x 1

Archaeological Contexts: Pensacola Presidios

UWF archaeologists have been investigating the Spanish presidios since the 1980s (see Bense 1999, 2003; Harris and Eschbach 2006; Benchley 2007a; 2007b;

Benchley et al. 2007). Most early research was contract archaeology, undertaken in downtown Pensacola where Presidio San Miguel was located. More targeted research-based archaeology began in the mid-1990s when Bense undertook four years of investigations at the first presidio of Santa Manta de Galve (1698-1719) (Bense 2003). Survey, mapping, and excavations were conducted during 13-week field schools over the summer months of each consecutive year. In 2002, following the successful completion of work at Santa Maria, Bense led three years of investigations at the second presidio of Isla de Santa Rosa (1722-1756). Investigations at Santa Rosa followed a similar pattern, with three cycles of 13-week field schools. At the same time, contract work continued downtown through UWF's Archaeology Institute under the direction of Elizabeth Benchley. While this contract work has recovered material remains of the Presidio San Miguel, the assemblage analyzed for this project comes from more recent work at the Commanding Officers' Compound, which was excavated as part of UWF's field schools during the summers of 2005 and 2006. In the following sections, I briefly describe the archaeology at each of the presidios with an emphasis on contexts chosen for sampling.

Presidio Santa Maria de Galve (1698-1719)

The remains of the first presidio are located on the Naval Air Station along a 10 to 30-foot bluff adjacent to the shoreline of Pensacola Bay (see Figure 6.2)[2]. In the colonial period, the site overlooked Pensacola Pass, but the entrance to the bay has since migrated over a mile to the west and the bluff has eroded at least 80 feet (Bense 2003:84-87, 93). The site terrain is relatively flat, but gently slopes southward toward the bluff's edge. At the time of UWF investigations, the study area was covered with landscaping, residences, administrative buildings, roads, parking lots, and sports facilities (Bense 2003:87). These modifications left little surface evidence of the presidio.

After Santa Maria's destruction in 1719, the precise location of the site was forgotten until Chad Braley (1979) rediscovered it while searching for Civil War features associated with nearby Fort Barrancas. Braley collected some eighteenth-century artifacts and reviewed archival documents, which led him to suggest that he had found Santa Maria. In 1986, a Navy civilian employee collected Spanish artifacts from the backfill of several utility trenches excavated in a ballfield (Bense 2003:84-85; Bense and Wilson 1999:16). Alerted to the finds, Thomas Garner conducted surface surveys and recorded the site as 8ES1354 in the Florida Master Site File. A few months later, Bense and Garner recorded eighteenth-century midden and features in a trench that was excavated into the site for an electric utility line. Subsequent monitoring by archaeologists with the U.S. Army Corps of Engineers identified additional features containing artifacts dating to the early eighteenth century (Bense and Wilson 1999:16-17). Almost a decade later, UWF's excavations positively identified the site as Presidio Santa Maria.

In order to form working hypotheses about the organization of the presidio, historians and archaeologists studied eighteenth-century maps and texts. Colonial descriptions of Santa Maria were relatively consistent (Bense and Wilson 2003:85). Fort San Carlos de Austria dominated the west side of the presidio. Spanish military engineer Jayme Franck described the fort as a square structure with four bastions. Based on measurements provided by Franck, historian Albert Manucy estimates that the fort was approximately 145 varas (122 meters) from the point of each bastion (Childers et al. 2003:44; Manucy 1959:234). Inside the fort, there was a hospital, church, warehouse, and barracks.[3] To the east of the fort, administrators planned the construction of a village and church complex (Wilson 2000:29). While town planning required the settlement to be laid out on a grid, adaptations were often made to the local environment. Rather than organize along a grid, the village was made up of small dispersed buildings (Clune et al. 2003:43; Wilson 2000:29).

UWF archaeologists, led by Bense, identified structures and specific areas of the site by correlating documentary evidence with artifact concentrations and architectural features (Bense and Wilson 1999:92-98). Systematic shovel testing at 100 foot (30.5 m) intervals were excavated across an arbitrary grid that covered 76 acres (4046 m^2) (Bense and Wilson 2003:92). This strategy established the boundaries of the site and was used to project the location of the fort. The fort walls were positively identified through a series of trench excavations. A road grader was used to remove the overlying clay and plowzone to reveal the remains of the northwest bastion (Bense and Wilson 2003:93). The archaeologically documented fort wall was digitally compared with Franke's 1699 map, Le Maire's 1713 map, and a 1719 French map (Figure 6.6). Inconsistencies between the maps were digitally adjusted using the actual archaeological location of the bastion and curtain walls (Bense 2003:98; Bense and Wilson 2003:93,98-99). These adjusted maps were used to guide the excavation of key structures, including the barracks, warehouse, hospital, church, and the village.

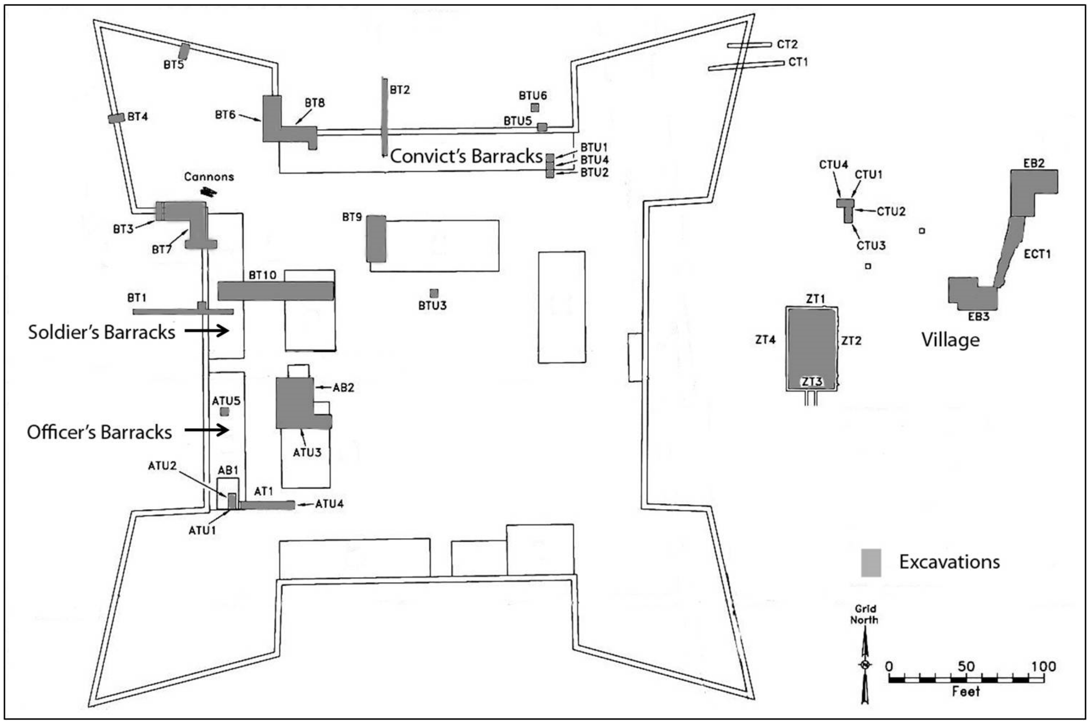

Figure 6.6. The Fort at Santa María de Galve Based on a Composite of Franck's 1699 Map, Le Maire's 1713 Map, and a 1719 French Map with the Location of UWF Excavation Units Indicated (Adapted from Bense and Wilson 2003:98,100, Figures 4.12, 4.13)

For this project, I sampled from structures that served as living areas for low status castas within the fort. Though low status castas also lived in the village, I chose not to sample from this area for several reasons. First, the village was only occupied intermittently, particularly in later years when Creek Indians allied with the British frequently attacked the settlement. For an 8-year period (1707-1715), people living in the village moved into the fort for increased security (Bense and Wilson 2003:160-161). Second, when the village was occupied, it was a mixed community that included casta soldiers, higher status officers, and Indians (Bense and Wilson 2003:161). Finally, the deposits in this area were ephemeral and disturbed by erosion and modern construction projects (Bense and Wilson 2003:161). These factors made isolating midden and features related to the living areas of low status castas problematic.

Convicts' and Soldiers' Barracks. In contrast to the village, the living areas within the fort were clearly segregated by rank and class. There were three barracks identified in the 1713 Le Maire Map and excavated by UWF archaeologists (see Figure 6.6). The 1713 map labeled the two barracks located along the north and northwest walls as "soldiers' barracks." Two trenches (B2 and BTU1, 2, and 4) were excavated across the center and eastern edge of the north barracks. Two additional trenches (B1 and B9) were excavated across the northwest barracks. Archaeologists identified structural features for wooden post-in-ground frameworks for both structures (Bense and Wilson 2003:128,132). Postholes for the northernmost structure were less substantial. Few artifacts associated with arms, clothing, and activities were found in the northern barracks, and there were proportionally fewer tablewares than any other community area at the site. Based upon historical, architectural, and artifact evidence, Bense and Wilson (2003:132-133) convincingly argue that the north wall barracks was occupied by conscripts.

Excavations across the northwest soldier's barracks documented a more substantial structure with larger postholes and wall trenches, particularly along the back wall. The structure was burned -- probably by the French in 1719 -- and fragments of *in situ* timbers overlay the foundation, dirt floor, and subfloor features of the structure (Bense and Wilson 2003:128-130). Aside from pottery, a number of artifacts of particular interest for this project were recovered from this barracks, including a groundstone mano (probably from Mexico) and a cache of unmodified clay that was possibly for ceramic manufacture (Bense and Wilson 2003:131-132). Artifacts such as lead sprue from the manufacture of shot, shot fragments, gunflint, and the hilt of a sword support the interpretation that military men occupied the structure. Bense and Wilson (2003:132) argue that some "Mexican Indian" women also occupied the structure. However, evidence such as manos, unmodified clay, and a retouched glass fragment also could have been employed by castas from New Spain.

Officers' Barracks. A third barracks was labeled on the 1713 Le Maire map as soldier's barracks and on a 1719 French map as officer's quarters (Figures 5.6 and 5.7). Six units were excavated within and across the projected location of the structure (Trench A1, Block A1, and Test Units A1, A2, A4, And A5). Within these units, archaeologists documented almost a meter of sand overlying presidio deposits. This fill was laid down in the late nineteenth century in preparation for the construction of U.S. Army officers' quarters and protected underlying features and midden (Bense and Wilson 2003:113,115). Beneath the sandy fill, there were burned architectural features similar to the northwest soldiers' barracks. However, material evidence suggests that this was a higher status structure. The building is the most well-built of the three barracks, with a post-on-sill construction, a wooden floor, glass windows, and, possibly, a covered porch (Bense and Wilson 2003:115-118). In addition, a significant number of luxury goods were found in features and midden associated with the southwest barracks, such as silver and gold brocade, brass and silver jewelry, stemmed glasses, and porcelain tablewares

(Bense and Wilson 2003:122-123). Documentary, architectural, and artifact evidence all support the interpretation that this barracks housed higher status officers.

Pensacola: Presidio Isla de Santa Rosa (1722-1756)

Presidio Isa de Santa Rosa (8ES22) is the second of the Pensacola Presidios, situated on the west end of a 50-mile long barrier island that separates Pensacola Bay from the Gulf of Mexico (see Figure 6.2). The site is located within the boundaries of the Gulf Islands National Seashore and maintained by the National Park Service. The site is characterized by a ridge and swale topography. In 2004, the maximum elevation was only two meters above mean sea level (AMSL), resulting in permanent and intermittent wetlands, as well as additional flooding during the wet season (Harris and Eschbach 2006:3).

The colonial environment was similar to today, but natural and cultural alterations have impacted the site. Erosion along the north shoreline was a continuous problem, alluded to in colonial maps and firsthand accounts (Harris and Eschbach 2006). A 1756 map depicts the fort near the north shore with only two southern bastions, suggesting the northern bastions were washed away (Harris and Eschbach 2006:11). Examination of USGS maps from 1949 and 1953 document increasing erosion to the east of the site (Harris and Eschbach 2006). When the State began dredging Pensacola Pass, particularly after 1959, spoil was deposited on the north site of the island. In some areas, dredge spoil extended the north shore by more than 150 meters and to a depth of 10 meters (Tesar 1973). Sigüenza Slough was channelized in the 1960s or 1970s to remove standing water that was accumulating due to blockage from the dredge spoil. A mosquito control ditch was excavated east-to-west through the site, from Sigüenza Slough to Blackbird Marsh and connected with another ditch to drain into the bay (Figure 6.7; Harris and Eschbach 2006:6). In 1931, a narrow-gauge railroad was installed parallel to the ditch. Today, the remains of the railroad bed are covered with shell and serve as a bike path (Harris and Eschbach 2006:6).

G. Norman Simons of the Pensacola Historical Society rediscovered the site in the early 1960s (Harris and Eschbach 2006). Since then, there were two excavations at Presidio Santa Rosa. The first was led by Hale Smith of Florida State University who undertook large block excavations in 1964 (Smith 1965). Unfortunately, most of the documentation and artifacts from this early fieldwork were lost. In the 2000s, UWF archaeologists attempted to reanalyze the collection, but they could only locate approximately one-third of Smith's artifacts (Harris and Eschbach 2006:15). Therefore, this study relies on the second investigation directed by Bense.

UWF investigations began in 2002 and continued for three 13-week field seasons. The goals of the first year were to map the site, identify site boundaries, determine the integrity of archaeological remains, and investigate subsurface deposits. To accomplish these goals, a grid was established, the site was mapped and then surveyed using remote sensing and shovel test excavations (Harris and Eschbach 2006:49-50). Seventy-six shovel tests (1.5-foot square) were excavated along the arbitrary grid at 50-foot intervals (see Figure 6.7). An additional 25 shovel tests were excavated judgmentally (Harris and Eschbach 2006:49-50). Analysis of artifact distribution and remote sensing data were used to identify areas for large block and trench excavations that began in 2003 and 2004 (Figure 6.7; Harris and Eschbach 2006).

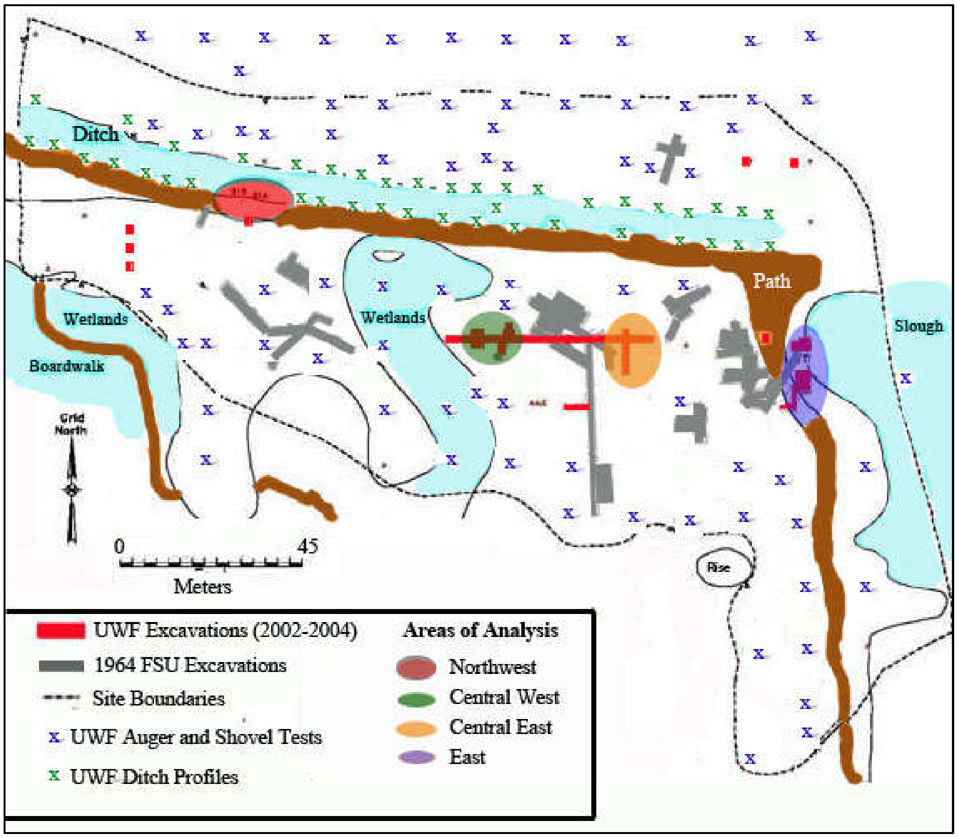

Figure 6.7. UWF Excavations at Presidio Isla de Santa Rosa (1722-1756) (Adapted from Eschbach 2007, Harris and Eschbach 2006)

Unlike Santa Maria, historians have not located detailed maps or consistent descriptions of the presidio's organization. The most detailed depiction of the settlement is a panoramic sketch drawn by French adventurer Dominic Serres in 1743. Serres's sketch was published more than 20 years later in a British periodical, *Universal Magazine* (see Figure 4.13; Harris and Eschbach 2006:36-37). If this representation of the settlement is accurate, it likely depicts only one incarnation of the site's organization. Firsthand accounts and reports by Spanish officials document at least eight major storms with tidal surges that flooded, damaged, or destroyed structures (Harris and Eschbach 2006:37). Most structures were built of wood, also requiring regular repair and rebuilding. Multiple building episodes and repairs were documented archaeologically in the form of overlying structural features (Figure 6.8). Examination of historical documents, architectural features, and artifact distribution suggests that the site shifted to the southeast as the north shoreline eroded (Eschbach 2007; Harris and Eschbach 2006:153).

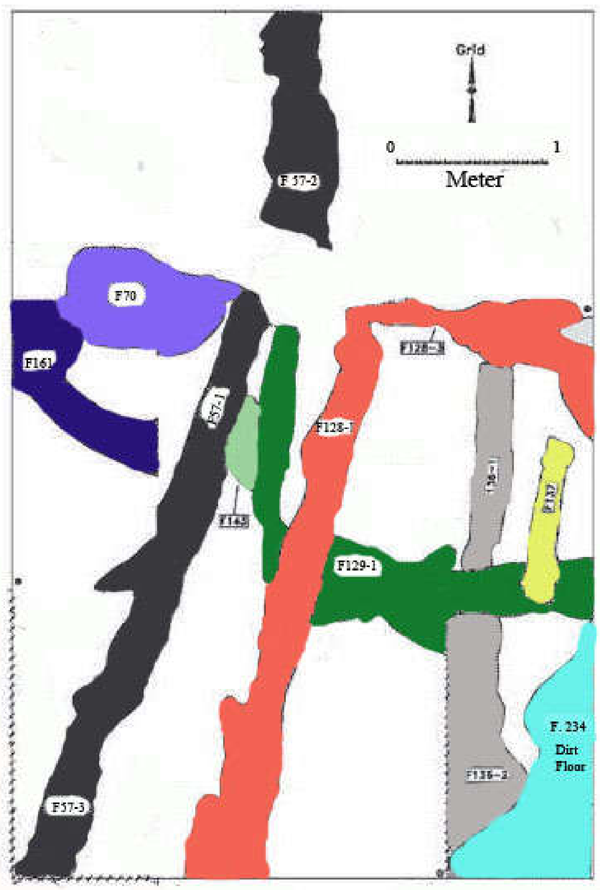

Figure 6.8. Overlapping Wall Trench Features as Evidence of Rebuilding at Presidio Isla de Santa Rosa (East Area of the Site). *Note:* Adapted and simplified to highlight architectural wall trench features from Harris and Eschbach 2006:152, figure 79.

Because of site formation processes, contexts were chosen for sample selection based upon prior analyses of architectural features and artifact distribution with little aid from historical documents (Eschbach 2007). Given the shift in the settlement, midden contexts were not ideal for targeting low status castas. A single area of the site could be alternately occupied by Indians, castas, and officers, with midden in the area reflecting a mix of those occupations. Therefore, I only selected pottery sherds from sealed features.

While the site's dynamic organization presents challenges, it also yields an opportunity to analyze changes in social relations over a short time. Correlation between the dates of major storms and rebuilding, archaeological evidence of overlapping architectural features, and known dates of manufacture for some imported tablewares provides an avenue for sorting many features into two or three temporal periods (Eschbach 2007). For this project, I have identified contexts that date to early in the site's occupation (post-1722) and those that date to a later period in the site's occupation (post-1740). As discussed in Chapter 4, this temporal division is significant as it was after 1740 that there was a rapid increase in the number of families arriving at the presidio. For the earliest period, two areas were interpreted as residential or military occupations with low to moderate status inhabitants (Eschbach 2007:157).

Post-1722 Contexts in the Central West Area. In the Central West area of the site, UWF archaeologists documented the remains of two early structures within an 80 x 5 foot trench (Trench 13 West; Figure 6.7). Lieutenant Colonel Alejandro Wauchope's (1723) described 24 small buildings that housed soldiers and convict laborers when the presidio was first founded. Based on the domestic and military characteristics of feature assemblages, and the early and unsubstantial construction of the structures, I suggest that these were two of the houses described by Wauchope (Eschbach 2007:158).

Features 40 and 60 were parallel wall trenches with corner posts located only a foot apart. Feature 40 was shallow with a series of postholes and a deep corner post. The feature was capped with midden and contained few artifacts (n=25), suggesting the structure was built early in the site's occupation. Feature 60 was a little more substantial with a higher artifact density, indicating that it was built later, probably as a repair wall (Eschbach 2007:122). The entire structure was not excavated, but was between 7 and 10 feet long (Harris and Eschbach 2006:219). Materials recovered from the repair wall likely reflects discard by individuals living in the structure or from the general area. Pieces of tin-glazed tablewares, lead-glazed and plain utilitarian wares, and fauna suggest a residential function (Eschbach 2007:157, 345-346)

Approximately 10 feet to the west of this structure, beneath a layer of storm surge, archaeologists documented the debris from a small burned building (Features 86/154). Beneath the debris, an associated wall trench (Feature 138) contained only 11 artifacts, indicating that it too was an early construction. The building was unsubstantial like its neighbor (Eschbach 2007:126). Artifacts from the burned building were very similar to Feature 60, including ceramic tablewares and utilitarian vessels, intermediate bone, bottle and glass tableware, lead shot, and gunflint flakes (Harris and Eschbach 2006:183-184). Based on architectural evidence, its location, and artifact assemblage, the structure was interpreted the same as its neighbor.

Post-1722 Contexts in the East Area. Approximately 250 feet to the east of Trench 13 West, excavation of Block 1 South uncovered the remains of several wooden structures (Figure 6.7). Wall trenches frequently overlapped, allowing for the identification of the earliest structures in a sequence of six building episodes. Features 128, 129, and 136 were the earliest wall trenches and each had a TPQ of 1722. However, artifact density of the feature fill suggests a somewhat later date (Harris and Eschbach 2006:221). Seven feet of Feature 136 were documented and excavated. A total of 560 artifacts was recovered from its fill. Feature 129 was the corner of a later structure that cut into Feature 136. UWF documented and excavated 4.9 feet of the north/south wall and 6 feet of the east/west wall. A total of 777 artifacts were recovered from the feature fill. Feature 128 was the final wall trench in the sequence with a TPQ of 1722. This later structure was much more substantial than earlier structures, at least 16.5 feet long. For this study, I treat the fill from these features as a sample of the midden from this area at the time the structures were built.

I have previously identified this area as either the location of low status casta or Indian activities that date early in the presidio's occupation (Eschbach 2007:150). This was based primarily on the large number of Indian ceramics recovered from the fill of Feature 136 (n=87; 48.9 percent of ceramics) and Feature 129 (n=97; 58.3 percent of ceramics). This is far higher than both the site average and later features in this area (between 24.5 to 37.0 percent Indian ceramics). Ceramics were identified as "Indian" based upon the UWF classification system that includes all plain and slipped hand-formed wares in the "Indian" category. This dissertation questions this attribution. Only three sherds from Feature 129 and ten sherds from Feature 136 had decorations that are common to Southeast Indian traditions. The rest are plain or red slipped. There were few tin-glazed tablewares (n=23) and no porcelain recovered from the features.

The later wall trench (Feature 128) suggests a shift in the occupation of the area, access to different materials, and/or an attempt to build longer-lasting structures. The structure was more substantial than earlier features, though it only had a dirt floor. As with the earlier features, I treat the fill assemblage as evidence of the midden at the time of construction and not as an indication of the occupants of the associated structure. Therefore, artifacts are more representative of the occupants of earlier less substantial structures. Still, there was an increase in the proportion of tin-glazed tablewares (17.9 percent) and lead-glazed wares (14.9 percent), but only one piece of porcelain. There were also more military-related materials, including gunflint flakes and lead shot.

Post-1740 Contexts in the East Area. Artifact assemblages from wall trench features cannot be used to analyze later occupations at the site. These features are considered a mix of materials that accumulated across the area over the course of the site's occupation up until the buildings were constructed. Therefore, efforts were made to select features that more likely represented discard in later periods only. Feature 128, the more substantial structure described in the previous section, was directly associated with a dirt floor (Feature 234) that was chosen for sampling this later period. The dirt floor is capped by a layer of storm surge and it is therefore assumed that artifacts found in the feature were related to the occupants of the structure.

Like the wall trench, Feature 234 had a TPQ of 1722 based only on the artifact assemblage. However, the sequence of construction episodes suggests a later date. All other building episodes documented in Block 1 South have a TPQ of 1750. Official reports on Presidio Santa Rosa document five major storms and episodes of rebuilding in the 1750s. Later architectural features are likely related to these storms and shifts in the settlement (Eschbach 2007). Importantly, there was a major storm in 1740, which required extensive rebuilding of the entire settlement (Eschbach 2007:174). I suggest that the larger structure that is associated with Features 128 and Feature 234 was part of that reconstruction. Ceramics dating to the 1740s, such as Jackfield pottery, are rare at Santa Rosa. Ceramics dating to the 1750s, such as Aranama Polychrome, are more common. Additional evidence for the date of this structure may be found in a deep posthole that cut into Feature 128. This was a later addition and a single sherd of Aranama Polychrome was recovered from its fill. If this was a repair post, it would suggest that the structure was still standing in 1750, only to be replaced by a later series of construction episodes during the last few years of the site's occupation.

A total of 436 artifacts were recovered from the dirt floor of the structure. Based on architectural characteristics and artifacts, it was likely occupied by low or mid-level status occupants (Eschbach 2007). Tin-glazed tablewares, lead-glazed and plain kitchenwares, wine bottle glass, and some cattle bone suggest a residential function. A few military artifacts were also found, including gun flint flakes and lead shot.

Post-1740 Contexts in the Northwest Area. On the northwest periphery of the site, just south of the dredge spoil, there was more evidence for rebuilding and a shift in the organization of the site (Figure 6.7). Public structures or high-status residents were found here in the earliest years of the site. However, later in the site's history, these structures and people were replaced by lower status individuals and buildings. It is likely that lower status people moved into the area after higher status individuals abandoned areas closer to the shoreline to escape encroaching floodwaters (Harris and Eschbach 2006:133). A combination of archaeological and historical data is used to demonstrate this shift and to provide a rationale for sampling from later features and upper midden in this area.

In the Northeast Area, a 10-foot unit was excavated into the south wall of the mosquito control ditch. The earliest features from this unit were three wall trenches. Feature 127 was a very shallow trench and contained only three colonial artifacts, indicating that it was constructed early in this area of the site. A later more substantial wall trench (Feature 121) partially interrupted Feature 127. Feature 121 contained abundant artifacts, indicating that it was added after the area had been occupied for some time. A third contemporary wall trench (Feature 122) ran parallel to Feature 121. These parallel wall trenches were likely contemporary, but Feature 122 was less substantial and was likely a fence.

Above these features was a layer of storm surge and midden, separating the remains of the earliest structures from later Features 23 and 35. Feature 23 contained hearth debris that was deposited into a shallow depression. The feature contained charred wood, a large number of kitchen-related artifacts, and animal bones. Feature 35 was a pit feature located just to the east of Feature 23 and included a large number of kitchen-related artifacts and some arms, such as lead shot. In contrast to previous areas at Santa

Rosa, I also sampled from midden documented to the east of Feature 35. UWF archaeologists noted a change in the characteristics of assemblages between earlier structures and this later midden and features (Harris and Eschbach 2006:133). Notably, there was a much greater proportion of tin-glazed tablewares (n=23; 57.5 percent) and very few examples of decorated Indian pottery (n=3) in earlier features (Eschbach 2007:143). Later midden and features contained far more decorated Indian sherds (22 percent of diagnostic ceramics). This percentage is probably a low estimate as some plain body sherds may also have come from otherwise decorated pots. Of course, this shift could represent a change in availability of different types of pottery, rather than a shift in the habitants. Other independent evidence is needed.

There were no architectural features documented in this unit, but 18 feet to the south there was a wall trench in a 5 x 5 foot unit. The feature was at roughly the same elevation as Features 23 and 35 and is evidence that construction continued in this area later in the site's occupation. Field observations described substantial postholes, but not enough of the structure was excavated to determine its dimensions (Harris and Eschbach 2006:136).

Based on evidence from all areas of this site, I and others have argued that the settlement shifted southeast away from the eroding shoreline (Harris and Eschbach 2006; Eschbach 2007). This trend supports a change in the occupation in this area, probably following major storms in the early 1740s. The 1743 Serres drawing may provide additional clues about the eastern periphery of the site after the 1740 hurricane. In the drawing, larger residential structures were located in rows in the center of the settlement, while smaller structures were located on the eastern periphery (see Figure 4.13). I argue that the later midden and features in this areas date to after the 1740 storm and the rebuilding and reorganization of the site. In the later years, this area was the site's periphery where lower status castas and/or presidio Indians resided (Harris and Eschbach 2006:133).

Post-1740 "King's House." As with Presidio Santa Maria, I analyzed samples from a high-status structure. In the Central West Area of the site, earlier structures were replaced by a much larger building after the 1740 storm. Based upon historical, architectural, and associated artifact assemblages, I have argued that this was the "King's House" where the Spanish governor resided and also served as the paymaster's office (Eschbach 2007:164). The King's House was a later structure that was identified in Serres's 1743 sketch in the center of the settlement (see Figure 4.13).

Correspondingly, in the Central West Area of the site, archaeologists documented a substantial structure that was the most well-built of all the structures excavated by UWF. Feature 62 was built using a post-on-sill construction. This involved placing a board in the trench to increase stability of the wall posts. The recovery of a large number of bricks, tiles, and nails, but no large spikes, suggests that the structure was at least partially constructed of brick. Window glass was found in the surrounding midden and likely came from this structure (Harris and Eschbach 2006:175). To the west of Feature 62, the terrain sloped downward. In this lower-lying area archaeologists found a pile of burned architectural remains and artifacts (Feature 186) interpreted as the demolition debris from the same structure (Eschbach 2007:163).

The ceramic based TPQs of the wall trench and "push pile" indicate that the structure was built after the 1740 storm and was torn down sometime after 1750. According to official accounts, the King's House was one of only two or three structures that survived the 1752 storms, probably because it was built of brick and stone (Clune et al. 2006; Eschbach 2007:164). A large number of tin-glazed tablewares, some porcelain, drinking glass, and butchered cattle and deer bone, suggest a residential function (see Parker 2006 for complete fauna analysis). Unusual metal artifacts also were recovered, including a brass ring and horse tack. Personal clothing items include glass clothing beads, pewter hook and eye, and a pewter button. Bricks, oyster shell mortar, and window glass link the demolition debris to the post-on-sill structure. If the structure survived the 1752 storms, it may have been torn down in order to salvage bricks for the construction of a new presidio on the mainland.

Pensacola: Presidio San Miguel de Panzacola (1756-1763)

The establishment of a final presidio on the mainland was protracted. The population began moving to the mainland after the 1752 storm, construction of the presidio started in 1754, and the presidio was formally established by the viceroy of New Spain in 1756 (Faye 1941:163). The settlement was constructed on a low sandy ridge on the shore of Pensacola Bay near a warehouse built after the 1740 storm (Benchley 2007b:9). Because the remains of Santa Miguel are found beneath downtown Pensacola, many small segments of the presidio have been excavated through contract archaeology and UWF field schools (Baker 1975; Benchley 2007a, 2007b; Benchley et al. 2007; Long

1976; Magie 1972; Schaeffer 1971; Stringfield and Benchley 1997; Sutton 1976). However, locating residential areas associated with low status castas is problematic.

Elizabeth Benchley and her colleagues at the UWF Archaeology Institute have spent years examining maps associated with the first Spanish, British, and second Spanish settlements of downtown Pensacola (Benchley 2007a, 2007b; Benchley et al. 2007). Maps show little change in the organization of buildings between 1756 and the Spanish abandonment of the presidio in 1763 (Benchley 2007b:18). Structures included the Governor's house, church, warehouses, individual houses, officers' barracks and soldiers' barracks (Benchley 2007b: 18; Childers et al. 2007). A 1756 map shows buildings without the palisade wall. Due to disagreements in the planning of the fort, construction of the wall did not start until 1757 and was not completed until 1760. A major storm hit the settlement in 1760, requiring the rebuilding of the palisade and some buildings in 1761 (Benchley 2007b:18). After the palisade was built, most colonists lived within the fort out of fear of attack by Creek Indians (Tallapoosa and Alibama) (Childers et al. 2007:30).

I consulted UWF archaeologists and examined a master's thesis and numerous reports generated by contract work and UWF field schools in an effort to isolate deposits associated with low status castas at San Miguel (e.g., Benchley 2007b; Benchley et al. 2007; Joy 1988; Stringfield and Benchley 1997; Williams 2004). Pottery from the first Spanish occupation (1698-1763) was recovered from many of these projects, but contexts were often mixed with later periods. Because we do not have good temporal controls for plain, lead-glazed, and painted wares, it is not be possible to separate earlier wares from later British (1763-1781) and second Spanish (1781-1821) sherds. For example, excavations conducted by Leora Sutton in the 1970s were specifically targeted because of their location in the area of a soldiers' barracks. With the help of UWF graduate student Jackie Rogers, I examined bags of artifacts from the Sutton collection. Some provenience information was written on the bags and somewhat corresponded to field notes curated at the UWF University Archives and History Center. Unfortunately, artifact bags contained a mix of artifacts from multiple periods.

After exploring several options, I determined that it was better to sample sealed contexts that were of known first Spanish context and not necessarily low status casta. Therefore, all my samples come from the commanding officers' compound, located behind the T.T. Wentworth Building (Figure 6.9). British hearth and oven features were identified here in 1993 (Bense 1999), and UWF archaeologists conducted field schools in the same area in 2005 and 2006. During the first Spanish period, this was the location of a walled compound near the southwest corner of the fort (Benchley 2007b:18). The Ortiz and Feringan map of 1763 identifies the compound as the residence of Captain of the Calvary, don Luis Joseph de Ullate (Benchley 2007b:18). In 2005 and 2006, Bense and Benchley directed block and trench excavations to explore a series of wall trenches and barrel wells (Benchley 2007a, 2007b). Five features from Block 1 South were chosen as sampling contexts. These features were chosen because all diagnostic sherds recovered from the fill of these features date before the British occupation in 1763. Features 136, 191, and 236 were fill from the construction of barrel wells. Features 235 and 243 were the remains of a subterraneous cold storage facility.

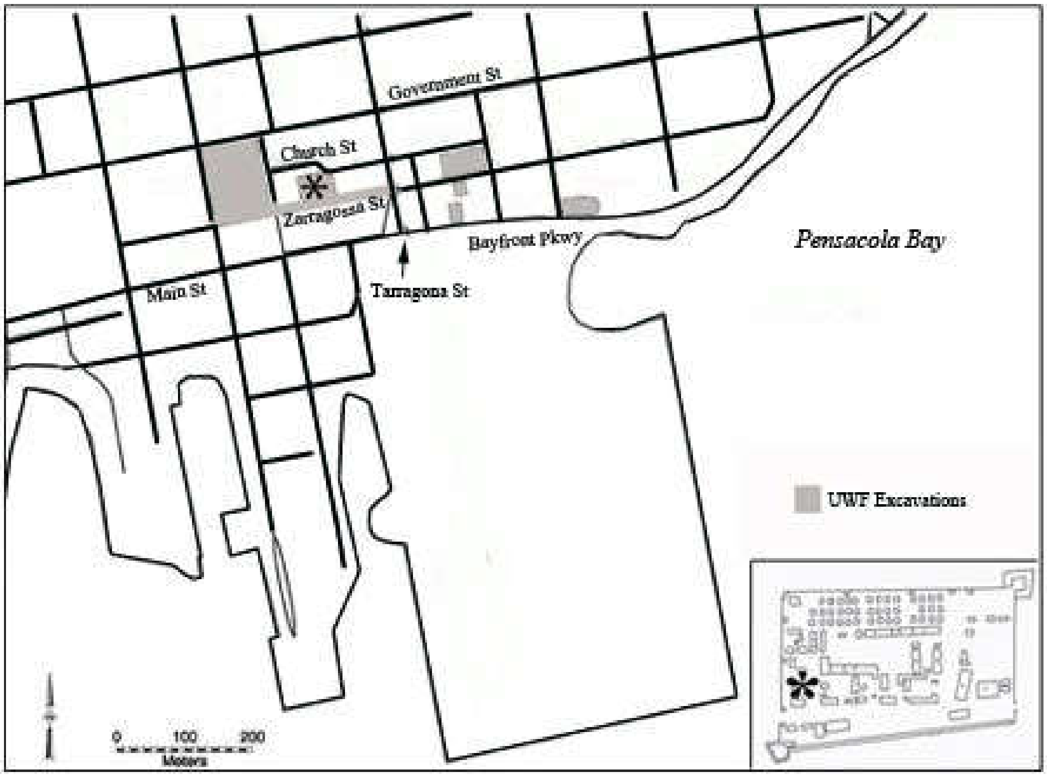

Figure 6.9. UWF Excavations at Presidio San Miguel (1756-1763) in Downtown Pensacola (Adapted from Melcher 2011:45); Inset map is a digital composite of two 1763 maps by Ortiz and Feringan (see Figure 4.14). Commanding Officer's Compound is indicated.

Archaeological Context: Mission San Joseph de Escambe (1741-1761)

The task of discriminating between wares made by castas and pottery manufactured by Florida Indians requires a comparative understanding of manufacturing techniques used by local Indian potters. To develop a baseline for comparison, I selected 100 decorated Indian sherds from contexts associated with Mission San Joseph de Escambe. The mission is located along the Escambe River in Molino, approximately 35 kilometers north of Presidio San Miguel de Panzacola (see Figure 6.2). Christian Apalachee established the mission in 1741, though they were living in Pensacola since at least 1718 (Worth et al. 2012).

Worth and his co-authors (2012) estimate that between 30 and 50 Apalachee Indians and a single Franciscan friar lived at the mission. After 1750, four Spanish soldiers also resided there due to concerns over interaction between mission residents and Creek Indians allied with the English. Another 15 cavalry soldiers and a single officer stayed at the mission in 1760. Despite a small intermittent Spanish presence, Apalachee Indians dominated the settlements population for most of its history. Worth and his co-authors (2012) estimate based upon "person-years" that 91 percent of the site's habitants were Apalachee Indians.

Through archival research, colonial map analysis, and archaeological testing, Worth located the mission in 2009 and has conducted UWF summer field schools at the site (Worth et al. 2015). At the time samples were selected, only sherds collected between 2009 and 2011 were available for analysis. The sampling strategy used for Mission Escambe differed from previous sites. At the time of my analysis, most intensive excavations had taken place in the mission's central core and Apalachee residences had not been identified. Therefore, I did not target specific colonial contexts, though efforts were made to sample from a variety of contexts. My objective was to select larger decorated sherds that were representative of all decorated types found at the mission and the presidios.

Locating Indian pottery at the mission was not difficult as these wares made up 98 percent of the assemblage by count (Worth et al. 2012). Worth describes decorative styles and ceramic pastes as most similar to wares found in the "Apalachee homeland" to the west (near Tallahassee), the Lower Creek territory to the north, and Mississippi Valley cultures to the west. According to Worth et al. (2012), the Apalachee may have adopted Creek and Mississippian decorative styles while living among the Creek and/or in French Mobile between 1704 and 1718. Based on UWFs classification of the pottery sherds from the 2009, 2010, and 2011 field season, I selected 100 sherds that represented 14 types based on decoration and paste. These types are further characterized by 25 varieties (Table 6.3). Most varieties were represented by only a small number of sherds recovered from the mission and many sherds were too small for analysis. Both these factors created constraints that made it impossible to sample equally from each type. As a result, final sample selection in more reflective of relative abundance of different types found at the site.

Importantly, San Joseph de Escambe was not the only Spanish colonial mission established in Pensacola. The Apalachee residents of Escambe were relocated from an earlier mission that was founded by chief Juan Marcos Isfani (also known as Juan Marcos Fant) near the mouth of the Escambe River (Worth 2008). Yet another mission was contemporary with Mission Escambe. Mission Punta Rasa, located on Garcon Point, was established for Yamasee Indians after the English burned St. Augustine in 1740 (Worth et al. 2011). No collections were available from Punta Rasa at the time of my analysis, but at least some of the San Marcos Stamped pottery recovered from Presidio Santa Rosa may have been manufactured by Yamasee potters living at the mission (see Johnson 2018 for the recent discovery of the site of Punta Rasa). Therefore, I selected 11 large sherds of San Marcos Stamped pottery from the Presidio Santa Rosa collection for analysis. I also included four decorated native sherds from the presidios that I analyze for a pilot study.

The sample size for San Marcos Stamped and other types from Escambe and the presidios are relatively small. However, my goal was not to determine variability within types or to document the distribution of these types. My objective was to assess the range of variability in local Indian pottery, in order to discriminate technological styles between potters from two distinct regions (Florida and Veracruz).

Table 6.3. Pottery Samples from Mission Escambe

Pottery Type and Variety	Count
Chattahoochee Roughened variety Chattahoochee	31
Chattahoochee Roughened variety Wedowee	2
Escambia Check Stamped variety Leon	1
Escambia Incised variety Columbia	3
Escambia Incised variety Ocmulgee Fields	4
Escambia Roughened variety Escambia	1
Escambia Roughened variety Molino	3
Jefferson Check Stamped variety Leon	13
Jefferson Complicated Stamped variety Pine Tuft	2
Jefferson Complicated Stamped variety Unspecified	1
Jefferson Incised variety Columbia	3
Jefferson Incised variety Ocmulgee Fields	3
Jefferson Roughened Brown Slipped	1
Jefferson Roughened variety Blackwater	4
Jefferson Roughened variety Conecuh	4
Lamar Check Stamped variety Leon	2
Lamar Complicated Stamped variety Unspecified	2
Lamar Incised variety Unspecified	1
Lamar Incised variety Columbia	3
Lamar Incised variety Ocmulgee Fields	8
Langdon Incised variety Ocmulgee Fields	2
Langdon Incised variety Unspecified	1
Pensacola Incised variety Unspecified	1
Walnut Roughened variety McKee Island	3
Walnut Roughened variety Spanish Fort	1

Laboratory Procedures for Determining Technological Style and Provenance

Archaeological and ethnographic research suggests that technological characterization can link material culture with community origin and social identity (e.g., Gosselain 2000; Hauser 2008; Lechtman 1977; Lemonnier 1993; Stark et al. 1998). This study used several laboratory procedures to collect data on each stage of the *chaîne opératoire* and to approximate the provenance of pottery (Table 6.4). I completed a macroscopic analysis of visual attributes for all pottery samples. Smaller representative samples were then chosen for proton induced x-ray emission spectrometry (PIXE), instrumental neutron activation analysis (INAA), x-ray diffraction (XRD), and petrography. In this section, I describe the laboratory procedures used for data collection. Data analyses and results are presented in Chapter 7 and Chapter 8, as well as in Appendices B, C, D, E, F.

Table 6.4. Methods for Assessing Pottery Provenance and Steps in Manufacture

		Macroscopic	PIXE	INAA	XRD	Petrography
	Pottery Provenance		x	x		
Manufacturing Stages	Clay Acquisition	x				x
	Temper Choice & Processing	x				x
	Primary Forming	x				x
	Vessel Form & Function	x				
	Shaping & Finishing	x				
	Firing Technique	x			x	

Macroscopic Analysis of Visible Attributes

The goal of the macroscopic analysis was to examine attributes that together would elucidate every stage of the *chaîne opératoire.* Attribute variables were chosen based on ethnographic studies (Rye 1981), experimental archaeology (Shepard 1956), and prior intensive studies of pottery conducted in the Spanish Borderlands (e.g., Cordell 2001; Peelo 2011) and pre-Hispanic Veracruz (e.g., Pool 1990). As many as 16 attributes were recorded for every pottery sherd selected during initial sampling procedures (Table 6.5). Visual attributes were recorded using only the bare eye or a 10x hand lens under florescent light. All data were recorded on standardized forms using key codes to maintain consistency in data acquisition. Analysis of the attribute data is presented in Chapter 7.

Table 6.5. Technological Attributes Documented by Macroscopic Analysis and the Stages of Manufacture Elucidated

	Attributes	Vessel Form/Function	Clay Acquisition	Temper Choice/ Processing	Primary Forming	Shaping/ Finishing	Firing Technique
Some sherds	Vessel Form	x			c		
	Rim Form	x					
	Rim Diameter	x					
	Base Form	x			c		
All sherds	Surface Colors		x				x
	Paste Colors		x				x
	Inclusion Type		x	x			
	Inclusion Size & Density		x	x	c		
	Surface Treatment					x/r	
	Surface Texture				x	x/r	
	Surface Topography				x		
	Sidewall Thickness				x		
	Fractures/Cracks				x		
	Firing Core						x
	Fire Clouding						x
	Soot	x					

Proton Induced X-Ray Emission Spectrometry (PIXE)

In order to approximate the provenance of pottery, a total of 26 clay samples (Veracruz: n=14; Pensacola: n=12) and a representative sample of 506 sherds (Veracruz: n=203; Pensacola: n=303) were analyzed by PIXE. Sample preparation was carried out at the LeRoy Eyring Center for Solid State Science (LE-CSSS) at ASU. Approximately 1-2.5 gram samples were cut from each sherd using a diamond tip wafering saw. All surfaces of these fragments were then removed using an alumina burr. This process was necessary to remove potential contaminates, paints, and glazes. The samples were then brushed under deionized water and sonicated in isopropyl alcohol to remove loose sediment and solution. The samples were dried overnight in an oven at 100°C. Once cool, samples were stored in sealed glass vials to protect them from humidity until they were ground into powder.

I prepared clay samples for grinding by first removing gravel or obvious organics. Approximately 2 pints of each clay were levigated with deionized water in a sealed container until the clay settled. Excess water was decanted and laboratory wipes were secured over the openings while the clay dried to a workable consistency. Each clay was then hand kneaded for 20 minutes on a clean glass surface. Powder free nitrile gloves were worn while kneading clay to prevent cross contamination. Eight 1 x 2 cm clay tiles were formed from each clay sample. Tiles were allowed to dry for at least one week in a plastic container secured with a laboratory wipe over the opening. Dried clay tiles were then stored in plastic bags to await further processing. One tile from each clay sample was prepared for PIXE by firing the tile to 110°C for 16 hours.

Each clay and pottery specimen was lightly crushed using a steel anvil and then ground for 5 minutes with an alumina ball mill. A portion of the resulting powder was pressed into a pellet using Carver (Model C) hydraulic press under 10,000 pounds of pressure. Pellets were stored in sealed plastic boxes until analysis. Remaining powder was stored in capped glass vials for phase analysis using x-ray diffraction (XRD).

Chemical characterization using PIXE was undertaken at the Ion Beam Analysis of Materials (IBeAM) Facility at the LE-CSSS. Elemental composition was measured in-vacuum using a 1.7 MeV tandem accelerator with a 2 mm^2 beamline. A Cockroft-Walton gas-insulated high frequency device allows either a gas source for ions (H, He, N, O, etc.) or a sputter source for heavy ions (MeV implantation). A Si(Li) detector placed at 90° relative to the beam direction was used to detect x-rays emitted from the sample. The angle between the beam direction and pellet was 45°. Low Energy PIXE (~0.5nA) to a count of 10,000 allowed for the analysis of 15 light elements (Na, Mg, Al, Si, P, S, Cl, K, Ca, Sc, Ti, V, Cr, Mn, and Fe). High energy (~10nA) to a count of 250,000 allowed for the analysis of an additional 12 heavier elements (Zn, Ga, Ge, As, Se, Br, Rb, Sr, Y, Zr, Mo, Pb). At high energy, a 200 micron mylar and chromium filter was placed over the detector to filter out lighter elements. Both red brick (679) and buffalo river (8704) standards also were analyzed for calibration. The GUPIX software package was used to convert spectra data to parts per million (ppm). For statistical purposes, sodium was removed due to its low analytical precision and lead was removed as it was only found in sherds that were lead-glazed and is, therefore, interpreted as a contaminate. Further discussion of statistical procedures used to analyze data recovered by PIXE is presented in Chapter 8.

Neutron Activation Analysis (NAA)

Based on the results from the PIXE analysis, I selected a representative sample of 50 sherds and 10 clays for analysis by INAA at the Archaeometry Laboratory of the Missouri University Research Reactor (MURR). Samples were submitted to MURR for comparison to their database of chemical data from Mesoamerica, the Southeastern United States, the Caribbean, Central America, and the Iberian Peninsula. Samples were prepared using MURR's standard procedures (Glascock 1992; Glascock and Neff 2003). Pottery samples of approximately 1 cm^2 were prepared by removing the surface with a silicon carbide burr. Samples were then rinsed with deionized water and allowed to dry. Clays were fired to 700°C and then both the clay and pottery were ground into a homogenized powder with an agate mortar. Two specimens were prepared from each clay tile and sherd. One sample was exposed to a short irradiation of 5 seconds and the other to a longer 24-hour irradiation. During irradiation, specimens were bombarded with neutrons generated by a nuclear reactor, which produced radioactive isotopes that emit gamma rays. A total of three measurements were taken of the gamma ray emissions of 33 elements with different half-lives. Gamma ray spectra were analyzed to determine the relative abundance of elements. Finally, the relative abundance of 33 elements was converted to ppm.

X-Ray Diffraction (XRD)

Phase analysis using x-ray diffraction (XRD) provides semi-quantitative data on the mineral phases present in sherds' crystalline structure and morphology, from which I infer pottery firing temperatures and, in some cases, firing atmosphere (Maggetti 1981, 1982; Rice 1987). I selected a representative sample of eight clays and 148 sherds based on the analysis of PIXE data. Samples were chosen from chemical groups that included at least one clay sample, which allowed for comparison between chemically similar clays and pottery. Phase analysis was conducted on reserved powder that was initially prepared for PIXE. Additional raw clay test tiles were fired in an electric ceramic kiln in increments of 100°C between 500°C and 1100°C in order to provide a comparative sample for the XRD phase analyses. The kiln was heated from room temperature at a rate of 120°C/hour and then held at the maximum temperature for 1 hour. Once tiles had cooled to room temperature, they were ground into powder using previously described methods.

XRD measurements were taken on powder samples at the ASU CLAS X-Ray Diffraction Facility using a Siemens D5000 X-Ray Diffractometer. The diffractometer uses a CuKa radiation ($\lambda = 1.5406$ A) and the instrument was set at 1.2 kW (40 kV, 30 mA). Spectra were taken from 5° to 65°2Θ, at 2°2Θ/min and a step size of 0.016°2Θ. The minimum angle was the lowest possible for the D5000 and the maximum angle was chosen to capture all crystalline phases that are typically found in clays and pottery. The resulting spectra were evaluated at the XRD facility using the Jade software package and an up-to-date comprehensive database of phases available through the International

Centre for Diffraction Data. Observed phase changes in the clays fired at different temperatures were compared to chemically similar pottery to infer minimum and maximum firing temperatures. The results of the XRD analysis informs the interpretation of technological styles in Chapters 7 and supports the provenance analysis presented in Chapter 8.

Petrography

Petrographic analysis provided data about pottery manufacturing techniques that will be compared between regions. Petrography can provide important data on the amount and nature of inclusions, grain size distribution, and orientation. From these data, I can infer techniques used to prepare paste recipes and form pottery (e.g., Alawneh 2006; Stoner et al. 2008). For example, laminations and clustering of temper may shed light on clay preparation techniques, such as insufficient kneading (e.g., Reedy 2008:180-184; Shepard 1956:182). Consistent patterning in the orientation of elongated aplastics or voids in relationship to the sherd surface, rim, and base (when identifiable) may bolster interpretations of forming techniques, such as wheel throwing, coiling, or drawing (e.g., Reedy 2008:180-184; Shepard 1956:183-184).

I selected a representative sample of 75 sherds for petrographic analysis.[4] Samples were chosen based on the macroscopic inspection, PIXE analysis, and an examination of the freshly cut cross sections of sherds using a binocular microscope with a maximum magnification of 40x. I cut a 0.5 mm wide fragment from each sherd perpendicular to the vessel wall using a diamond tip saw at the LE-CSSS. I then sent fragments to Spectrum Petrographics, Inc. (SPI) for thin section preparation. At SPI, fragments were embedded with epoxy, cut to a standard 30 microns, and then mounted on 26 mm x 47 mm slides. I analyzed the prepared thin sections at the Ceramic Technology Microscopy Laboratory in the School of Human Evolution and Social Change. Qualitative analysis of each sherd was focused on evidence of clay processing, primary forming, and finishing techniques. This analysis was used to refine interpretations based on the macroscopic analysis of the larger sample. The qualitative analysis was completed using an Olympus BX53 binocular microscope with magnifications between 10x and 40x. Observations about the orientation of elongate inclusions, voids, and clay domains, the appearance of the matrix (e.g., variegated, sintered, relic coils), and surface features (e.g., slips and parting materials used with molds) were recorded on standardized forms to ensure analytical consistency.

Semi-quantitative point counting was conducted using a Leica DM EP polarizing microscope with the 10x objective to identify and assess the size and relative abundance of plastic and aplastic inclusions. Grain size was estimated using the Wentworth scale (Rice 1987:38) and estimated percentages were determined following Cordell's (2001:7) categories of abundance: rare (<1 percent), occasional (1-3 percent), frequent (5 percent), common (10 percent), and abundant (20-30 percent). Analysis of the qualitative and semi-quantitative data informed the interpretation of technological styles presented in Chapter 7.

Summary

In this chapter, I have described sampling and laboratory procedures for collecting data relevant to the technological styles and provenance of pottery found at the Port of Veracruz and the Pensacola presidios. Clay samples collected from central Veracruz and

Northwest Florida provide a better understanding of raw resource availability and a comparative sample for determining pottery provenance. Archaeological contexts at each site were carefully chosen so that samples of plain, lead-glazed, and painted/slipped pottery would reflect consumption by castas during short temporal periods in each region. Additional samples from high status residences and Mission Escambe provide important comparative assemblages.

I described laboratory procedures used to collect data from pottery and clay that elucidate technological styles and pottery provenance. Data collected from the macroscopic analysis of pottery attributes, XRD, and petrography are analyzed in the next chapter to discriminate between pottery manufactured by castas and Florida Indians. Data collected using PIXE are analyzed in Chapter 8 to approximate the provenance of pottery and to discriminate between pottery made by castas in Florida and wares that were imported from New Spain. NAA supported the results of the PIXE analysis and helped to approximate the provenance for compositional groups that did not include any of the clay samples from Veracruz or Northwest Florida.

[1] Separate relational databases were created for each project in Microsoft Access and maintained by the Archaeology Institute at the University of West Florida. Jan Lloyd, the Archaeology Laboratory director at UWF provided the most updated copies of each project database in 2012. The relational databases for Presidios Santa Maria and Santa Rosa were originally created using Corel's Paradox, but were later migrated to Microsoft Access. I only used the Access databases for this project. There is also an integrated presidios database that I helped to develop in 2006 and 2007; however, I chose to rely primarily on the individual project databases to ensure all recent updates and raw data were included in my analysis and sample selection.

[2] The U.S. standard system of measurements (e.g., feet and tenths) were used for all length measurements taken by archaeologists at the presidios in Pensacola. The metric system was used in Veracruz.

[3] There were a number of fires, particularly in the early years of the presidio and several structures were destroyed and rebuilt (see Childers et al. 2003:45-49).

[4] Samples included 12 sherds that were chosen for an earlier pilot study of colono wares and decorated Indian sherds in 2011.

CHAPTER 7

DIFFERENTIATING TECHNOLOGICAL STYLES OF POTTERY PRODUCTION

In order to examine social interactions and labor relations in colonial contexts, I differentiate between pottery produced by casta and native potters in colonial Florida. In this chapter, I test assumptions regarding the manufacture of plain, lead-glazed, and painted/slipped pottery. Analyses of the entire chaîne opératoire for Veracruz and Florida Indian pottery provide baselines for quantitatively differentiating between the technological practices used to manufacture presidio pottery. As discussed previously, examination of technological styles can allow for the grouping of pottery based on shared contexts of learning between potters.

In the following sections, I first describe and compare technological choices made at every stage of production for Veracruz and Florida decorated native pottery using macroscopic, petrographic, and XRD analyses (for supplementary data see Appendices B, C, and D). These analyses of baseline data are used to assess attribute variables for inclusion in a multi-stage quantitative analysis of all pottery samples, including sherds from the presidios. This quantitative analysis produced clusters of sherds based on shared technological practices. The inclusion of either Veracruz or Florida Indian sherds in these clusters is key for identifying four resultant analytical groups: casta/imported, likely casta/imported, Florida Indian, and unassigned pottery.

The results of this analysis affirm that native potters did produce some of the vessels represented by plain sherds found in presidio contexts, as has been traditionally assumed. This technological analysis also indicates that some of this pottery was imported or locally produced by casta potters in Pensacola. Discerning between wares that were imported versus locally produced is a dilemma that is addressed through a provenance study in the next chapter. Even so, several lead-glazed sherds demonstrate hybrid technologies, suggesting interaction between Florida native and casta potters, which strongly hints at casta pottery production in Florida. This assertion is supported through chemical characterization in Chapter 8 and discussed in detail through the examination of relational mechanisms in Chapter 9.

Stages of the Chaîne Opératoire for Veracruz and Florida Indian Pottery

I assess Veracruz and decorated Florida Indian pottery in order to establish a baseline for differentiating between technological styles at the Pensacola presidios. Specific sampling procedures are described in Chapter 6. Here, I briefly explain my rationale for using these samples as a baseline for distinguishing between technological styles documented at the presidios. As I discussed in Chapter 4, colonists came to Pensacola from a number of locations, including Veracruz. Yet, as Veracruz was the main port that supplied the Pensacola presidios, any imported pottery or ceramic technologies found at the presidios also were likely found in Veracruz. In addition, I argue that any casta pottery produced locally at the presidios should be more similar to pottery recovered from Veracruz than to decorated Florida Indian wares. Similarly, while most of the Florida Indian samples were probably locally produced, some pottery could be imports from Mobile or from other locations outside of Pensacola. Nevertheless, presidio pottery produced by Apalachee, Yamasee, or other Southeastern Indian potters should be more similar to the decorated Florida Indian samples than to pottery recovered from Veracruz.

To assess technological styles, I use an approach advanced by French archaeologists known as chaîne opératoire (Leroi-Gourhan 1943, 1993). This approach is based on the work of sociologist Marcel Mauss (1935) and archaeologist André Leroi-Gourhan (1943). Mauss described technology as a system that is both technical and social, and styles as *techniques du corps* or "ways of doing something." (Hegmon 1998; Mauss 1935). Building on Mauss's work, Leroi-Gourhan (1993:228-235) argued that human behavior is made up of operational sequences or chaîne opératoire. Viewed in this way, technological choices have more to do with social learning and cultural constraints than with technological efficiency or environmental determinism (Sillar and Tite 2000; van der Leeuw 1993). Following this approach, I examine pottery as the result of a sequence of choices that were framed by unique cultural circumstances. There are five stages in the chaîne opératoire of pottery production that I investigate: (1) clay acquisition; (2) temper choice and processing; (3) primary forming techniques; (4) shaping and finishing techniques; and (5) firing. Before analyzing these stages of production, however, it is worth considering the final product that potters had in mind in terms of vessel form and function.

Vessel Forms and Functions

Potters approach their craft with a mental schema of how a pot should be made and used (Lemonnier 1993:2). Some of these perceptions are based on actual physical and environmental constraints. Other notions about how things should be done are based on traditions of learning and social representations of the finished product. Sander van der Leeuw (1993:243) has successfully demonstrated that an analysis of the chaîne opératoire must begin with a consideration of the final vessel form. I add that it is useful to consider function as it directly relates to form and that sometimes function can be inferred even in the absence of evidence of specific forms. Further, by considering the final product at the outset of an analysis of the chaîne opératoire, some assessment can be made, beyond the current ethnographic and experimental literature, about whether specific technical choices were based on functional constraints, technological style (i.e., functional equivalents [sensu Sackett 1982, 1990]), or some combination of both.

In Chapter 5, I note regional differences at contact in both food preparation and consumption between indigenous people of Mesoamerica, the Southeastern United States, and Spain. These behaviors impacted the vessel forms adopted at later colonial Veracruz and Pensacola. Food preparation is a low visibility activity and tends to be resistant to change. There are three broad utilitarian vessel forms that were common in all three regions at contact: basins, bowls, and jars. Ethnohistorical and ethnographic research in Veracruz has shown that potters continued to manufacture these forms throughout the colonial period, and they are still preferred in some kitchens today (Arnold 1991:360-361; Krotser 1974:131). Ceramic comales (griddles) were an exclusively Mesoamerican tradition that has persisted into the present (e.g., Arnold 1991; Cole 2003:192; Krotser 1974; Lockhart 1992:187-188). In the Southeast, carinated bowls were an important vessel form – used to prepare and serve liquid and semi-liquid dishes — and their use continued at least through the eighteenth century (Hally 1983, 1986).

Behavior involved in food preparation and service resulted in the most obvious differences in vessel forms between regions. In the Southeast, native serving vessels were mainly communal and these vessels often were used to both prepare *and* serve traditional dishes (Campbell 1959:18; Hally 1986:271-272; Swanton 1946:556). In contrast, both individual and communal serving vessels were used in Mesoamerica and Spain (Coe 1994:74-81; Smith et al. 2003). The presence of native serving vessels appropriate for individual settings probably facilitated a greater consumption of these wares in colonial contexts in Central Mexico versus Florida (cf. Charlton and Fournier García 2010; Rodríguez Alegría 2005; see discussion in Chapter 5). Based on similarities and differences in traditional forms, I developed a broad vessel form typology in order to facilitate comparisons between regions (Table 7.1). Pottery recovered from Veracruz should reflect a combination of traditional forms from Spain, Mesoamerica, and possibly Africa. The ceramic assemblage from Mission Escambe should reflect primarily traditional Southeastern forms, although some European or African influence also is possible.

Table 7.1. Broad Vessel Forms for Comparison between Regions

	Function		Regional Traditions		
Vessel Forms	Serving	Utilitarian	Mesoamerica	Spain	Florida
Cups	X		X	X	
Plates	X		X	X	
Simple Bowls	X	X	X	X	X
Jars (*ollas*)	X	X	X	X	X
Carinated Bowls (*cazuelas*)	X	X			X
Carinated Jars	X	X			X
Griddles (*comales*)		X	X		
Bowls or Basins (*cazuelas*)		X	X	X	
Bacin (chamberpot)		X		X	

Veracruz Pottery. There is very little published data on colonial period pottery in central Veracruz (but see Hernández Aranda 1996; Medellin 1960). Given the city's demographics and the port's importance in trans-Atlantic trade, Spanish, indigenous, and possibly African traditions influenced vessel forms. Spanish colonial research in Central Mexico (e.g., Charlton et al. 2007; Lister and Lister 1987; Reynoso Ramos 2004), El Salvador (Card 2007), and the circum-Caribbean region (Deagan 1987) was consulted to assess broad variability in Spanish forms and functions. Postclassic vessel forms in Veracruz reflected Gulf traditions and new central highland forms that appeared in the region by the Middle Postclassic (e.g., Brüggeman 1991; Curet et al. 1994; Daneels 1997). In addition to Spanish and local Gulf traditions, I expect that the royal roads connecting Veracruz to Mexico City would bring at least some wares from the central highlands. This was evident in the Majolica types that have been recovered from colonial contexts (Eschbach 2009). For this reason, I also reviewed studies of vessel forms and functions of pottery recovered in Late Postclassic and colonial Mexico City (Charlton et al. 2007; Rodriguez Alegria 2002a), Puebla (Reynoso Ramos 2004), Cholula (McCafferty 2001), and Morelos (Smith et al. 2003; Smith 2007).

Because the port was not founded in its present location until the end of the sixteenth century, it is not possible to assess initial colonial changes to vessel forms there, as has been studied at other Mesoamerican sites (e.g., Card 2007; Charlton and Fournier García 2007). Ethnographic research conducted in central and southern Veracruz provides additional information on vessel forms and functions and suggests at least some continuity from the colonial period (see Arnold 1991; Krotser 1974). Of the 607 pottery sherds analyzed from the Port of Veracruz, seven broad vessel forms were identifiable for a total of 81 sherds. By combining information on vessel forms with the presence of soot on the exterior of some sherds and the location of surface treatments, I was able to further identify vessel function as either utilitarian or as serving vessels for a total of 308 sherds (Figure 7.1).

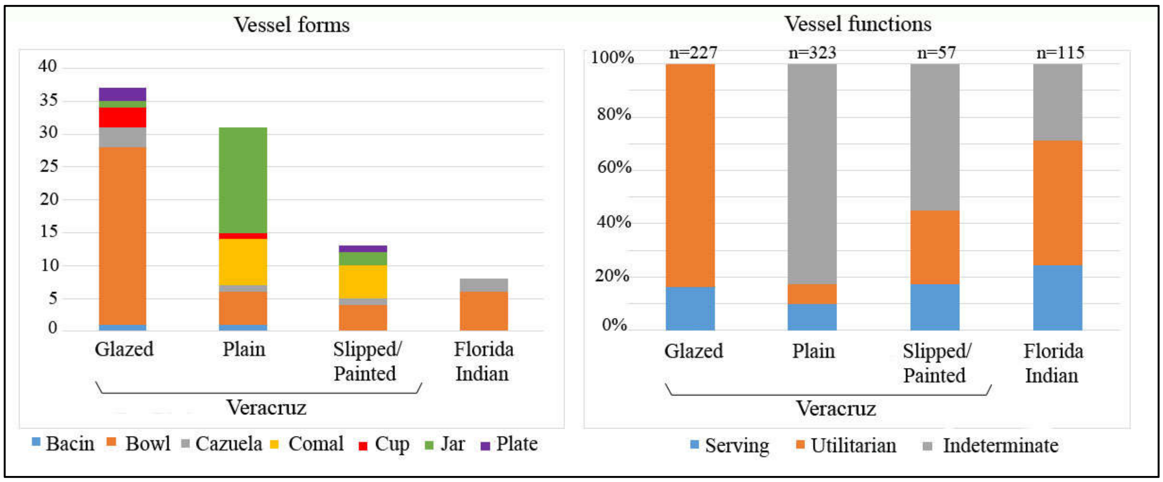

Figure 7.1. Vessel Forms and Functions Identified for Veracruz and Florida Native Samples.

Bowls were the most numerous vessel form and were most frequently lead-glazed. Glazed bowls could be used for service or for food preparation and other utilitarian functions. As Reynoso Ramos (2004) notes, lead-glaze could not be placed directly over a fire and so cooking vessels were typically only glazed on the interior and were, therefore, utilitarian. There were three cazuela cooking pots that were glazed on the interior surface and had some glaze on the exterior near the rim, but it did not continue down the vessel wall. A single utilitarian jar was glazed only on the interior. The few vessel forms that were identified as tablewares (plates and cups; n=5) were glazed on both surfaces. Although there were few identifiable forms, the pattern does consistently support the notion that the location of glaze varied according to general function (i.e., utilitarian or serving). Only two of the bowls seemed to be fully glazed on the exterior, suggesting their primary function was for service. When all samples are analyzed for the location of glaze, most glazed sherds appear to be fragments of utilitarian vessels (n=190), but more than 16 percent represent serving vessels (n=37).

It is important to remember that just because a pottery sherd is plain, this does not mean that the vessel of which it was a part was also devoid of decoration. Nevertheless, of the 323 plain wares that I analyzed from Veracruz, vessel forms were only identifiable for 31sherds. Jars predominated, followed by comales, and bowls. Half of the jars are very similar to what Deagan (1987:43) has called Bizcocho (bisque) ware, fine thin-walled vessels with an off-white paste that originated in Spain and usually occur in non-utilitarian forms. However, in the circum-Caribbean region, these wares were not shipped from Spain after the mid-15th century and, therefore, these vessels could be from a colonial source. These were probably water jars that were used to keep water cool for storing and serving. The remaining jars were heavy thick-walled vessels, likely used for storage, cooking, or food preparation

One of the identifiable plain ware bowls had criss-crossing incisions on the interior, indicating that the bowl was a molcajete (chili grater). Although it is tempting to assume that the other bowls also were utilitarian because of their lack of decoration, the case of the water jars provides a warning. As Hendrickson and McDonald's (1983) review of ethnographic literature suggests, not all serving vessels are decorated. There are

Late Postclassic examples in southern Veracruz of even elites using plain vessels (plates and bowls) as everyday serving vessels (Venter 2008:102). There is at least one identifiable plain cup, indicating that either plain vessels were used for service or that decorations of some sort were located elsewhere on the vessel. Two of the bowls also were likely serving vessels. One was very similar in paste and thickness to the water jars and the other was very thin with a foot ring. The function of the two remaining bowls is uncertain. A single bacin, one cazuela, and the six plain comales served utilitarian functions. An additional six sherds also were identified as utilitarian based on the presence of soot on the exterior.

Slipped and/or painted vessels form a small sample with much variation in vessel forms. Of the 57 sherds analyzed, there were five recognizable forms represented by 15 samples (see Figure 7.1). Six sherds that I identified as comales were covered in the interior with off-white slips. There were nine other sherds that also were slipped in an off-white slurry only on the interior and most appeared to serve utilitarian functions. One additional sherd was completely covered in off-white slip to give the appearance of "Bizcocho ware," but this slip hid a reddish brown paste and was probably a serving vessel.

Most slipped or painted sherds were covered on at least one surface with a red slip or mineral pigment. Identifiable vessel forms included three bowls, one plate, one jar, and two cazuelas. In these cases, the location of the red pigment did not seem to correlate with a vessel's general function. In most cases the pigment was applied only to the exterior. This was the case for both utilitarian forms and for one of the serving bowls.

The slip was applied only to the interior of the plate and to both surfaces of the two remaining serving bowls. Vessels with red slip on both the interior and exterior were likely serving vessels, but this was only the case for two additional sherds of unknown vessel forms.

A small number of sherds (n=6) was slipped with an orange or brown pigment and another was painted in the same color with a circular/dot design in the interior. There also were three painted sherds that may be Tonala Bruñida wares. One was identified as a small jar and another is a bowl, but all are probably serving vessels.

Florida Indian Pottery. My primary goal when sampling from Mission Escambe was to include only sherds that were manufactured by Southeastern Indian potters. Therefore, I only chose pottery that was decorated according to regional native traditions (incised, stamped, brushed, or cob marked). A focus only on decorated vessels, however, introduced limitations for the identification of vessel forms. Rim sherds often are the most informative for identifying form and incisions or punctuations are frequently located near the rim. Other surface modifications, however, are located on the lower half of the pot (i.e., brushing or cob marking), providing little information on the vessel's form. Adding to this difficulty was the small size of pottery sherds recovered from Escambe. Pigott's (2015) analysis of a large sample (n=1,946) found that pottery fragments weighed an average of only 2.6 grams at Escambe. The sampling strategy used for my project included a bias for larger sherds (see Chapter 6). Even so, the average sherd weight in my sample was only 5.1 grams.

Of the 100 sherds that I analyzed from Mission Escambe, vessel forms were only identifiable for 3 simple bowls and 2 carinated bowls. I also examined an additional 15 decorated Indian sherds from the presidios. Three of those sherds were identified as simple bowls.[1]

I noted the presence of soot on the exterior of 3 sherds of unknown vessel form, indicative of cooking vessels (Hally 1983; Skibo 1992:152-157). Limiting the sample to decorated sherds also restricted observations of other morphological characteristics, such as the form of bases. I identified only one sherd that included a base, which appeared rounded.

Despite these limitations, some additional insights regarding vessel function can be inferred from exterior surface treatments. Roughening the surface of a vessel increases the efficacy of heat absorption, particularly when applied to the lower body of a pot (Hally 1986). In the Southeast, roughening was characteristic of eighteenth-century Creek influenced pottery and often was applied to the lower portion of utilitarian vessel forms that were associated with cooking (Hally 1986:280; Knight 1985:188; Pigott 2015:110). Methods for roughening pottery included brushing using straw, reeds, or corn cobs. In some cases, corn cobs were rolled over the surface before firing (cob marked). Most of the “decorated” sherds recovered from Escambe were brushed or cob marked, as were nearly half of the sherds included in this analysis.

Lamar series incising is associated with carinated bowls at Mission Escambe (Pigott 2015:111-112) and at other sites in the Southeast (Worth 1992:192). The two carinated bowls that were identified during the vessel form analysis were both Lamar tradition incised. The three other bowls from Escambe also were Lamar tradition incised and may have been carinated, but the sherds were not large enough to identify if there was an inflection point. As noted in Chapter 5, carinated bowls were used to mix, reheat, and serve food (Hally 1986). These bowls were, therefore, among the most visible of traditional Southeastern wares. Based on surface treatment, vessel form analysis, and the presence of soot, I identified the function of 82 of the pottery samples. Fifty-four of these vessels were utilitarian and likely used for cooking. Twenty-eight were probably carinated and were used for heating food and as communal serving vessels. The function of the remaining pottery sherds was indeterminate.

Clay Acquisition

For the initial baseline, I investigate clay choice by using macroscopic techniques to assess paste colors. Both clay composition and firing techniques (temperature and atmosphere) directly affect the color of pottery. Rice (1987) recommends two different strategies when analyzing clay colors. One method is to differentiate between the effects of composition and firing technique by re-firing fragments of each sherd in an oxidizing atmosphere. This procedure removes the effect of variable firing techniques and standardizes color based upon clay composition alone (Rice 1987:344; Shepard 1965:103-105). Analysis of fully oxidized paste colors reveals general characteristics of the original clays, such as the abundance and distribution of iron oxides (Shepard 1965:103; for an application of this method, see Cordell 2001).

A second strategy that Rice (1987:344) suggests involves firing experiments with local clays in order to examine the range of colors obtainable when firing test tiles at different temperatures. The clay test tiles are then compared to non-standardized sherds. These experiments can lead to inferences about clay choices and firing techniques. Due to the size of the initial pottery sample (n=1,730) and in order to limit destruction of small pottery sherds, the second strategy was chosen for macroscopic assessments of clay choice. This strategy, however, presents some limitations.

With non-standardized pottery pastes, inference about clay composition is best assessed for pottery that is at least partially oxidized on some part of the sherd (i.e., at least on one surface or visible in the cross section). Paste colors that are white, buff, yellow, orange, or red are at least partially oxidized. This means that carbon and other organics were burned off and that iron was already oxidized in the raw clay or the pot was fired in an oxidizing atmosphere. Black, brown, or gray pastes are ambiguous and may represent a combination of the original clay composition (such as the presence of organics), firing methods (such as a reducing atmosphere or smudging), or post-firing use (such as use as a cooking vessel) (Rice 1987:333; Shepard 1965:105; Skibo 1992:145-174). For the macroscopic analysis, the color of the interior surface, exterior surface, and cross section were recorded for every sherd by comparison to Munsell® Soil Color Charts. For the cross section, oxidized colors were recorded whenever present and these were used in the clay choice analysis. Oxidized surface colors were recorded but only were considered when oxidation occurred near the surface, but was too thin in cross section to accurately gauge the Munsell color. Only a single Munsell color was recorded for each clay tile (see Chapter 6).

The Munsell color system, systematically categorizes colors based upon ordinal measures of hue, value, and chroma. The results are nominal values with which archaeologists and geologists are accustomed (e.g., 10YR7/8 yellow). Value (or lightness) is indicative of the amount of carbon remaining in the sample from incomplete oxidation. Hue and chroma are indicative of iron content and development (Rice 1987:343). In ceramic analysis, a range of Munsells often are used to qualitatively describe a ceramic type or mode, but are otherwise analytically cumbersome. For my analysis of clay acquisition, I use an approach based on the work of geologist Vernon Hurst (1977). Hurst developed and tested an equation for converting Munsell color categories into numerical indices of redness for a visual evaluation of the percent of iron oxides found in saprolites (i.e, weathered bedrock):

RI=H*L/C
Where:
H=Value assigned by Hurst based on increasing hue
(5R=5, 10R=10, 5YR=15, 10YR=20)
L=Lightness (value) assigned using Munsell system
C=Chroma assigned using Munsell system
RI=Redness index

The redness index is presently used in environmental sciences and has been adapted for the archaeological study of soils (e.g., Barba and Ortíz 1992; Lucke et al. 2014). A low redness index indicates a high iron content within the sample. Hurst tested the utility of his redness-to-iron index on more than 50 samples of saprolites using atomic absorption technology. These experiments showed that the relationship between the redness index and percent of Fe_2O_3 is approximately logarithmic, due to increased variation in chroma and lightness for samples with a low iron content. [2] I use the above formula to convert Munsell categories for oxidized clays and pottery pastes into interval values that can be quantitatively assessed for the macroscopic study of clay acquisition in Veracruz and Florida.

Veracruz Clay Samples. A total of 14 clay samples were collected from central Veracruz (see Figure 6.1). As described in Chapter 6, eight clay tiles were formed from each clay sample and then fired at 110°C and then at 100°C intervals between 500°C and 1100°C. Associated Munsell colors and redness indices are shown in Table 7.2. Munsell colors change with increasing temperatures and are quite variable. Redness indices, however, reflect predictable patterns and are easier to assess. Clay samples with a high iron content have relatively little variation in their redness index when fired between 600°C and 1100°C. Variation in the index increases with reduced iron content, particularly for samples with a minimum index above 17.5. This logarithmic pattern of variability is consistent with Hurst's (1977) original observations. Because the effects of firing on the redness index are predictable and often limited, Hurst's method provides a useful approach for a semi-quantitative analysis of clay color in the pottery samples.

Table 7.2. Munsells and Hurst's Redness Index for Veracruz Clay Samples

	Munsell Categories							
Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
CV0001A	10YR4/3	5YR5/6	5YR5/8	5YR5/8	2.5YR5/8	5YR5/8	2.5YR6/8	2.5YR4/6
CV0003A	10YR4/2	5YR5/6	5YR5/6	5YR5/8	5YR5/8	5YR6/8	5YR5/8	2.5YR4/6
CV0004A	10YR7/2	7.5YR6/6	7.5YR7/4	7.5YR8/4	7.5YR7/4	7.5YR7/4	7.5YR7/4	10YR7/6
CV0005A	10YR4/2	7.5YR5/4	5YR6/6	5YR5/6	5YR5/6	5YR5/6	2.5YR4/6	2.5YR3/3
CV0006B	7.5YR3/3	2.5YR4/4	2.5YR4/6	2.5YR4/6	2.5YR4/6	2.5YR4/8	2.5YR4/6	2.5YR4/6
CV0007B	10YR4/1	7.5YR6/4	5YR6/6	5YR5/6	5YR6/6	5YR6/6	2.5YR6/8	2.5YR4/6
CV0008A	10YR8/3	7.5YR7/6	5YR7/6	5YR7/6	5YR7/6	5YR7/6	2.5YR6/6	2.5YR6/6
CV0009C	10YR3/1	7.5YR6/4	5YR6/6	5YR6/6	5YR6/8	5YR6/8	2.5YR6/8	2.5YR4/6
CV0010B	10YR7/1	10YR7/3	10YR7/3	7.5YR8/3	7.5YR8/4	10YR8/3	10YR8/3	10YR8/4
CV0011B	2.5Y8/3	7.5YR6/6	7.5YR6/6	5YR7/6	5YR7/6	5YR7/4	10YR8/3	10YR8/3
CV0012A	10YR7/2	10YR8/3	7.5YR8/4	7.5YR8/4	7.5YR8/4	7.5YR8/6	5YR7/8	2.5YR5/8
CV0015A	10YR6/3	5YR6/6	5YR6/6	5YR6/6	5YR6/6	5YR6/8	2.5YR6/8	2.5YR4/6
CV0016A	10YR5/2	7.5YR6/6	5YR6/6	5YR6/6	5YR6/6	5YR6/6	5YR5/8	2.5YR4/6
CV0016B	10YR7/4	5YR6/6	2.5YR5/8	2.5YR5/8	2.5YR6/8	2.5YR6/8	2.5YR6/8	2.5YR5/8

	Hurst's Redness Index							
Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
CV0001A	26.7	12.5	9.4	9.4	7.8	9.4	9.4	8.3
CV0003A	40.0	12.5	12.5	9.4	9.4	11.3	9.4	8.3
CV0004A	70.0	17.5	30.6	35.0	30.6	30.6	30.6	23.3
CV0005A	40.0	21.9	15.0	12.5	12.5	12.5	8.3	12.5
CV0006B	17.5	12.5	8.3	8.3	8.3	6.3	8.3	8.3

Table 7.2 Munsells and Hurst's Redness Index for Veracruz clay samples (continued)

Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
CV0007B	80.0	26.3	15.0	12.5	15.0	15.0	9.4	8.3
CV0008A	53.3	20.4	17.5	17.5	17.5	17.5	12.5	12.5
CV0009C	60.0	26.3	15.0	15.0	11.3	11.3	9.4	8.3
CV0010B	140.0	46.7	46.7	46.7	35.0	53.3	53.3	40.0
CV0011B	60.0	17.5	17.5	17.5	17.5	26.3	53.3	53.3
CV0012A	70.0	53.3	35.0	35.0	35.0	23.3	13.1	7.8
CV0015A	40.0	15.0	15.0	15.0	15.0	11.3	9.4	8.3
CV0016A	50.0	17.5	15.0	15.0	15.0	15.0	9.4	8.3
CV0016B	35.0	15.0	7.8	7.8	9.4	9.4	9.4	7.8

The box plots in Figure 7.2 shows the range in the redness index for each clay sample when fired between 500°C and 1100°C. The overall range in possible colors appears continuous between redness indices of 6.3 (2.5YR4/8) and 53.3 (10YR8/3). Interestingly, clay samples with the highest iron content (redness index between 7.8 and 17.5 or between 2.5YR5/8 red and 5YR7/6 reddish yellow) were collected at relatively low elevations along the coastal plain. Clay samples with moderate to low iron content and a redness index between 17.5 and 53.3 (between 5YR7/6 reddish yellow and 10YR8/3 very pale brown) were collected at higher elevations along the piedmont and slopes of the Sierre Madre. This pattern may somewhat reflect the distribution of marine fanglomerates along the piedmont and alluvium from basalts and tuffs along the coastal plain (see Chapter 6; Sluyter 1995:169-171).

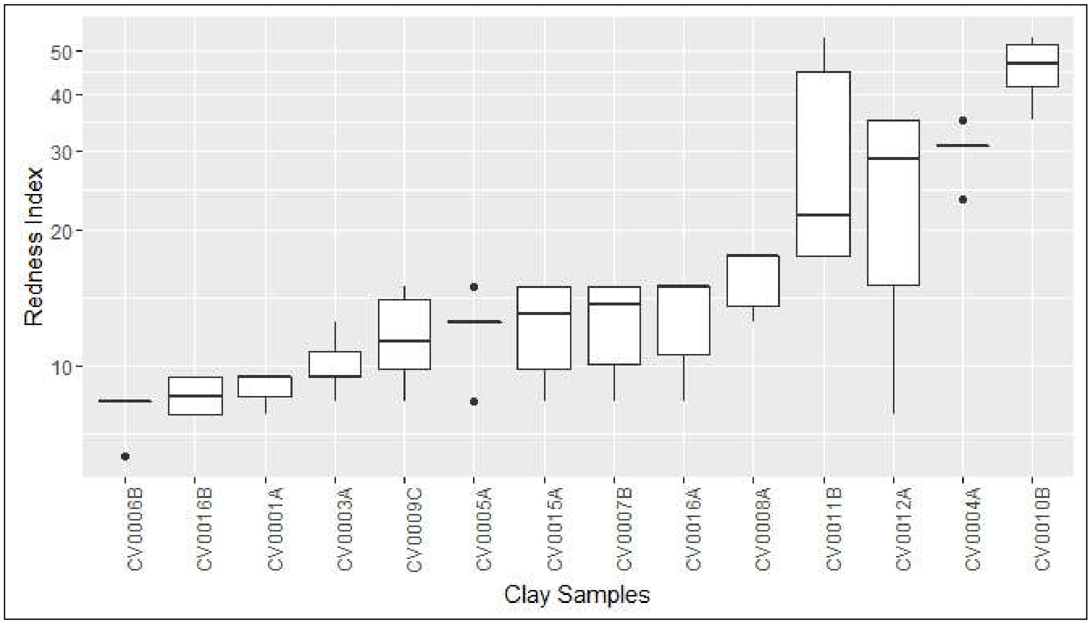

Figure 7.2. Box Plots Showing the Range of Variation in the Redness Index for Veracruz Clay Samples Fired in 100ºC Increments between 500ºC and 1100º

Veracruz Pottery. Of the 607 pottery samples selected for analysis from the Veracruz collection, 550 sherds were fully or partially oxidized. Unlike the clay samples, it is improbable that all of these sherds were produced in central Veracruz. Veracruz was located along a major transportation route that linked transatlantic trade between Mexico City and Europe. This context substantially broadens the variability of potential clay sources represented in the sample. Some clay sources were likely from entirely different regions or even continents, adding complexity to any analysis of clay choice. Nevertheless, this analysis presents a starting point for assessing clay acquisition for the pottery located at the port.

The box plots in Figure 7.3 summarizes the range of colors for pottery recovered from Veracruz. Only a small percentage of the pottery has a very low iron content with a redness index above 40 (equivalent to a Munsell 10YR8/4 or 5YR8/3). Most sherds have high or moderate iron content, with more than 40 percent of sherds having a high iron content with redness index below 20 (equal to a Munsell of 10R8/4). This pattern was relatively consistent across pottery categories.

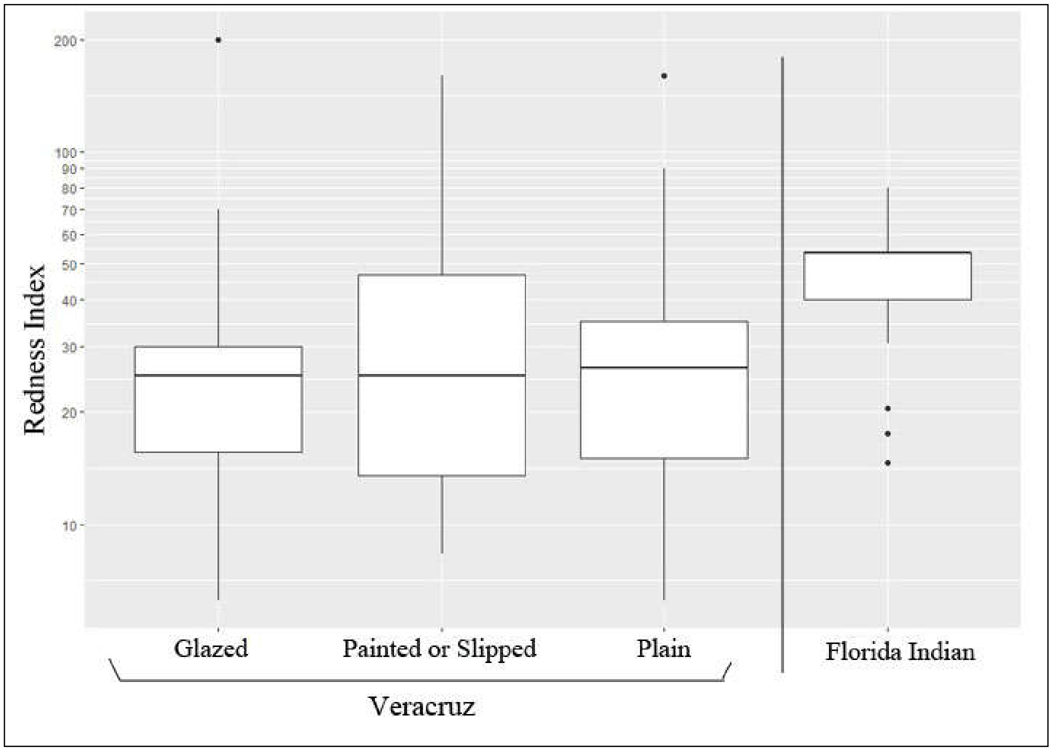

Figure 7.3. Box Plots Showing the Range of Variation in the Redness Index for Veracruz and Florida Native Pottery Sherds.

Florida Clay Samples. A total of 12 clay samples were collected around the Pensacola Bay area and along the Escambia River in Florida (see Figure 6.2). Associated Munsell colors and redness indices are shown in Table 7.3. As with the Veracruz clay samples, Munsell colors change with increasing temperatures, but there is much less variation in the redness index for each of the Florida clays. The box plots in Figure 7.4 shows the variation in the redness index for each clay sample when fired at increasing temperatures, representing three modes. The first mode with the highest iron content has a redness index that ranges from 9.4 to 23.3 (between 2.6YR6/8 light red and 5YR8/3 pink). The mode with moderate iron content ranges from 23.3 to 70 (between 7.5YR8/6 reddish yellow and 7.5YR8/2 pinkish white) and the mode with low iron content ranges between 140 and 160 (between 7.5YR8/1 white and 10YR8/1 white). These modes were likely the result of sampling, but, regardless, the range in colors suggests that Florida potters had access to local clays with a wide spectrum of colors and associated redness indices.

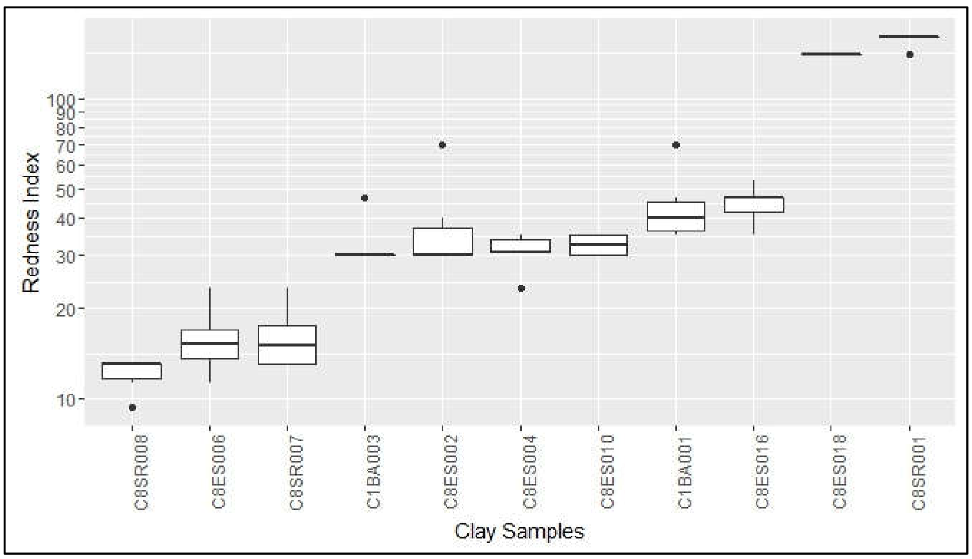

Figure 7.4. Box Plots Showing the Range of Variation in the Redness Index for Florida Clay Samples Fired in 100ºC Increments between 500ºC and 1100º

Table 7.3. Munsells and Hurst's Redness Index for Florida Clay Samples

Munsell Categories

Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
C1BA001	10YR2/1	10YR7/1	7.5YR8/2	7.5YR8/3	7.5YR8/4	7.5YR8/4	10YR8/4	10YR8/4
C1BA003	7.5YR8/2	7.5YR7/3	5YR8/4	5YR8/4	5YR8/4	5YR8/4	5YR8/4	7.5YR8/3
C8ES001	2.5YR6/6	10R6/6	2.5YR6/6	10R6/8	10R6/6	10R6/6	10R7/6	None
C8ES002	10YR8/2	7.5YR8/3	5YR8/4	5YR8/4	5YR8/4	5YR8/4	5YR8/3	7.5YR8/2
C8ES003	5YR7/6	2.5YR6/8	5YR5/8	2.5YR6/8	2.5YR6/8	2.5YR7/8	2.5YR7/8	5YR7/6
C8ES004	10YR6/2	10YR6/4	7.5YR7/4	7.5YR7/4	7.5YR7/4	7.5YR8/4	7.5YR8/4	7.5YR8/6
C8ES006	10YR5/2	7.5YR7/8	7.5YR7/8	7.5YR7/8	5YR6/8	5YR7/8	7.5YR8/6	5YR7/6
C8ES010	2.5Y8/2	7.5YR8/3	7.5YR8/4	7.5YR8/4	5YR8/4	5YR8/4	5YR8/4	7.5YR8/4
C8ES016	10YR3/1	10YR6/2	10YR8/3	7.5YR8/4	7.5YR8/3	7.5YR8/3	7.5YR8/3	10YR8/4
C8ES018	7.5YR8/1	7.5YR8/1	7.5YR8/1	7.5YR8/1	7.5YR8/1	7.5YR8/1	7.5YR8/1	7.5YR8/1
C8SR001	7.5YR8/1	10YR8/1	10YR8/1	10YR8/1	7.5YR8/1	10YR8/1	10YR8/1	10YR8/1
C8SR005	10YR7/6	2.5YR6/8	10R5/8	10R5/8	10R5/8	10R6/8	10R6/8	10R6/8
C8SR006	10YR4/1	10YR7/2	5YR7/3	5YR7/3	5YR8/3	5YR8/3	5YR8/3	5YR8/4
C8SR007	10YR6/2	5YR7/6	5YR7/6	5YR7/8	5YR7/8	5YR7/8	5YR7/6	7.5YR8/6
C8SR008	10YR3/2	5YR6/6	5YR6/8	5YR7/8	5YR7/8	5YR7/8	5YR7/8	2.5YR6/8

Redness Index

Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
C1BA001	40	140	70	46.7	35	35	40	40
C1BA003	70	40.8	30	30	30	30	30	46.7
C8ES001	12.5	10	12.5	7.5	10	10	11.7	
C8ES002	80	46.7	30	30	30	30	40	70

Table 7.3. Munsells and Hurst's Redness Index for Florida clay samples (continued)

Clay ID	110°C	500°C	600°C	700°C	800°C	900°C	1000°C	1100°C
C8ES004	60	30	30.6	30.6	30.6	35	35	23.3
C8ES006	50	15.3	15.3	15.3	11.3	13.1	23.3	17.5
C8ES010	90	46.7	35	35	30	30	30	35
C8ES016	60	60	53.3	35	46.7	46.7	46.7	40
C8ES018	140	140	140	140	140	140	140	140
C8SR001	140	160	160	160	140	160	160	160
C8SR007	60	17.5	17.5	13.1	13.1	13.1	17.5	23.3
C8SR008	30	15	11.3	13.1	13.1	13.1	13.1	9.4

Florida Indian Pottery. Seventy-one of these sherds were fully or partially oxidized, allowing for an assessment of the clay's iron content. With only four exceptions, all of these samples had a redness index higher than 30, suggesting that native potters in Pensacola were selecting clay with a moderate to low iron content for the decorated types included in this analysis (see Figure 7.3). The four sherds with a high iron content were all recovered from Mission Escambe and fall into three different pottery series, representing no obvious pattern between type and variation in clay selection. It is probable that ferruginous nodules that occur naturally in many of the local clays broke apart during processing and stained the clay that was otherwise low in iron. This occurred while I processed some Florida clay samples.

Summary. Most of the Veracruz clays were relatively higher in iron content in contrast to the Florida samples where most clay samples had moderate to low iron content. Even in the case of four Indian sherds with high iron content, the redness index still suggests a lower iron content than was present for many Veracruz sherds. Indian potters seemed to prefer whiter clays, at least for their decorated pottery, despite the availability of clays with high iron content in Florida.

Temper Choice and Clay Processing

In this section, I consider both natural inclusions and tempers that potters added to the clay. While a pot's function may play a role in the selection of temper type, observed variability in temper choices between the two regions suggests that learned behavior also was important. Function and style could have, in fact, overlapped as potters potentially differed in their opinions regarding appropriate temper and clay processing techniques. Although analysis of inclusions may suggest difference in pottery provenance, my discussion focuses primarily on differences in technological choices.

I used a 10x hand lens to identify the category, size, and abundance of inclusions observed in cross sections of all sherds. Inclusions were identified as sand, grog, shell, or calcareous particles. The size of non-incidental inclusions within a sherd were estimated with the aid of a W.F. McCollough sand gauge and according to the Wentworth scale: very fine (<0.125 mm), fine (0.125 to 0.25 mm), medium (0.25 to 0.5 mm), coarse (0.5 to 1.0 mm), and very coarse sand (1.0 to 2.0 mm). Because of the low magnification used in this analysis, fine and medium particles often were difficult to differentiate consistently and so they are combined into a single size category for analysis. Very fine grain sands also were difficult to consistently observe. Sherds that appeared nearly temperless were characterized as having very fine-grained sand inclusions. This assessment was supported by later petrographic analysis of "temperless" sherds.

The density of inclusions was estimated using a particle size and density chart (Rice 1987:349). Following Cordell's (2001:7) methods, an estimated percentage of inclusions was assigned to one of the following ordinal categories: rare (<1 percent), occasional (1 to 3 percent), frequent (5 percent), common (10 percent), or abundant (20 to 30 percent). No estimate of particle density was recorded for sherds with only very fine sand.

Sand may represent natural inclusions in the clay or intentional addition of temper. Specific mineral and rock constituents are indicative of local or regional geology and resources available to potters. In Northwest Florida, sand was composed almost entirely of single crystal or polycrystalline quartz. Sand in the central Veracruz sample was more variable, consisting principally of quartz, feldspar (mostly plagioclase), dark mafic rock (consisting mostly of basalts and intermediate igneous rock), as well as some accessory minerals such as calcite, amphiboles, and olivine. Muscovite and ferruginous nodules were found in pastes from both regions and were likely natural constituents of the clay.

Ceramicists use the term "grog" to refer to pre-fired clay that was intentionally crushed and added to the paste as a tempering agent. Grog here refers specifically to crushed pottery that was used as temper. Grog can sometimes be confused with other argillaceous inclusions, such as poorly processed clay lumps or pellets. Because the presence of grog versus clay pellets suggests very different behavioral processes, I differentiate between these types of plastic inclusions. Grog is identifiable macroscopically by its generally blocky shape with occasional relic surfaces. In contrast, clay pellets are typically well rounded. Shell temper was visible in some sherds, but in most cases shell had dissolved and only platy or blocky voids remained. Other calcareous particles, such as calcite or limestone also were observed.

In addition to the macroscopic examination, a small representative sample of sherds (n=75) were further analyzed using thin section petrography. Samples were chosen from chemical groups identified by the PIXE analysis (see Chapter 8), as well as the macroscopic analysis, and additional paste analysis were made using a binocular microscope on freshly cut cross sections. Analysis of thin sections using quantitative (point counting) and qualitative methods provided a check on observations made with a 10x lens, and also provided data on manufacturing techniques that are not always observable macroscopically.

Veracruz Pottery. Sand was the predominant inclusion observed for sherds recovered from Veracruz neighborhoods (Figure 7.5). This was true for pottery samples as a whole and within each of the main categories (glazed, painted/slipped, and plain wares). The only other inclusions observed were shell (n=4) and other calcareous particles (n=32). While all shell tempered sherds were plainwares, calcareous particles were generally observed in painted or slipped sherds (half of the painted/slipped sherds contained calcareous particles). Grog was not identified in any of the Veracruz samples. Only red clay pellets or ferruginous nodules were observed, particularly as rare inclusions in nearly half of the lead-glazed sherds (n=111; 48.9 percent of lead-glazed wares).

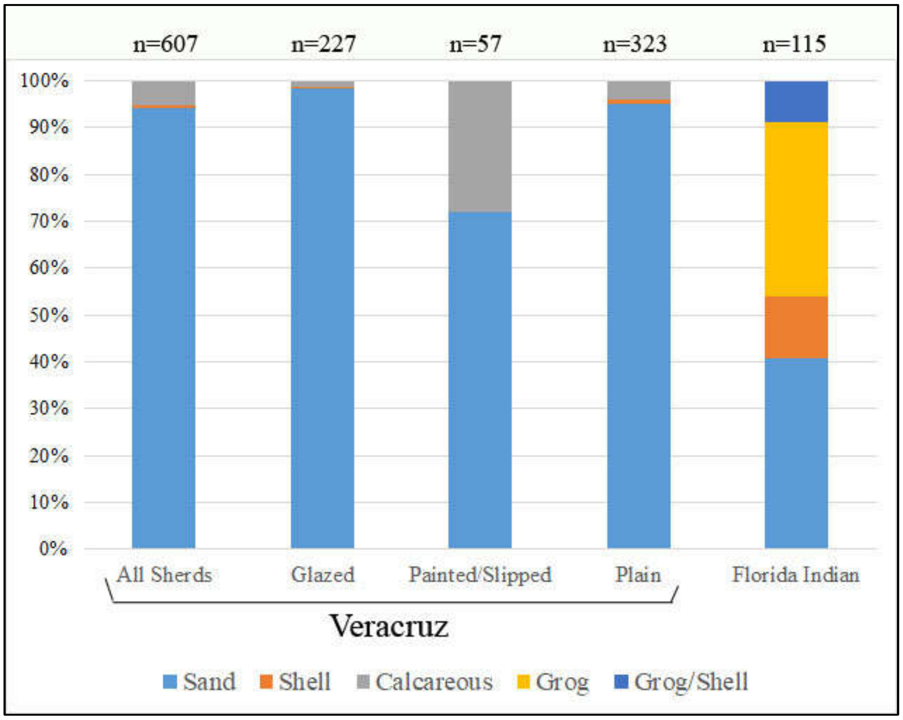

Figure 7.5. Barchart Showing Particle Inclusion Categories Recorded for Veracruz and Florida Native Pottery Samples.

A total of 571 sherds in my sample contained principally sand inclusions. Sand particles observed with a 10x hand lens consisted of quartz, feldspar, ferrugenous nodules, and particles of dark mafic rock or mineral. At this stage of analysis, I did not attempt to document the type, size, or relative abundance of specific rock or minerals inclusions within each sample. First, this variability is dependent at least in part on the local availability of resources, as opposed to technological choices that can be broadly compared between Veracruz and Florida. And second, I argue that this type of analysis required a prior petrographic study of pottery found at the port with higher magnification to aid in the accurate and consistent identification of rock and mineral inclusions. I did, however, note the presence of dark mafic particles as these are particularly distinct from the local Florida geology and pottery samples. The petrographic analysis that was undertaken on a subset of this pottery sample will facilitate more in-depth studies of rock and mineral inclusions in the future.

Of the pottery with only sand, fine-medium grained sand was most typical (Figure 7.6). This was particularly the case for glazed and painted/slipped sherds, with sand typically occurring in occasional abundance. Both fine-medium and coarse-grained inclusions characterized plain pottery sherds in nearly equal proportions. Coarse inclusions were more frequently observed for utilitarian vessels, but fine-medium textured paste was observed for both utilitarian and serving vessels. Both fine-medium and coarse inclusions tended to occur in occasional to common abundance in plain pottery.

When documented, shell and other calcareous particles were not incidental inclusions in sherd paste, but ranged from occasional to common in relative abundance (Figure 7.7). Although sand also was found in many of these sherds, shell and other calcareous particles were the principal inclusions. Only four sherds contained shell with inclusions ranging in size from fine-medium to very coarse. Calcareous inclusions were typically coarser and occurred in greater abundance. Function was determined for only eight of these sherds (6 calcareous and 2 shell tempered vessels) and all of these wares were utilitarian, including three cazuelas and one comal.

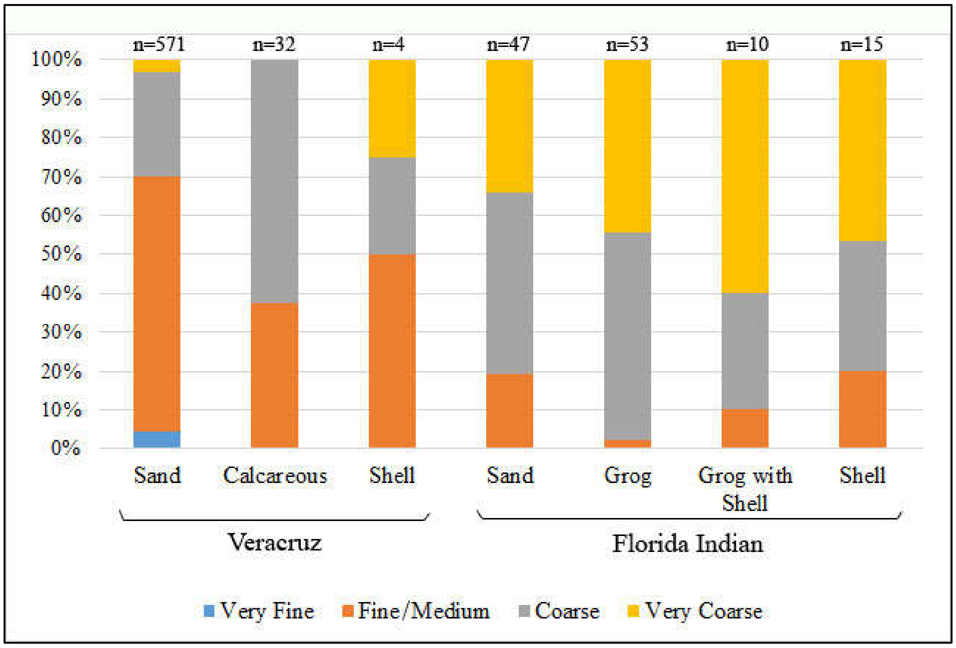

Figure 7.6. Barchart Showing Inclusion Sizes Recorded for Veracruz and Florida Native Pottery

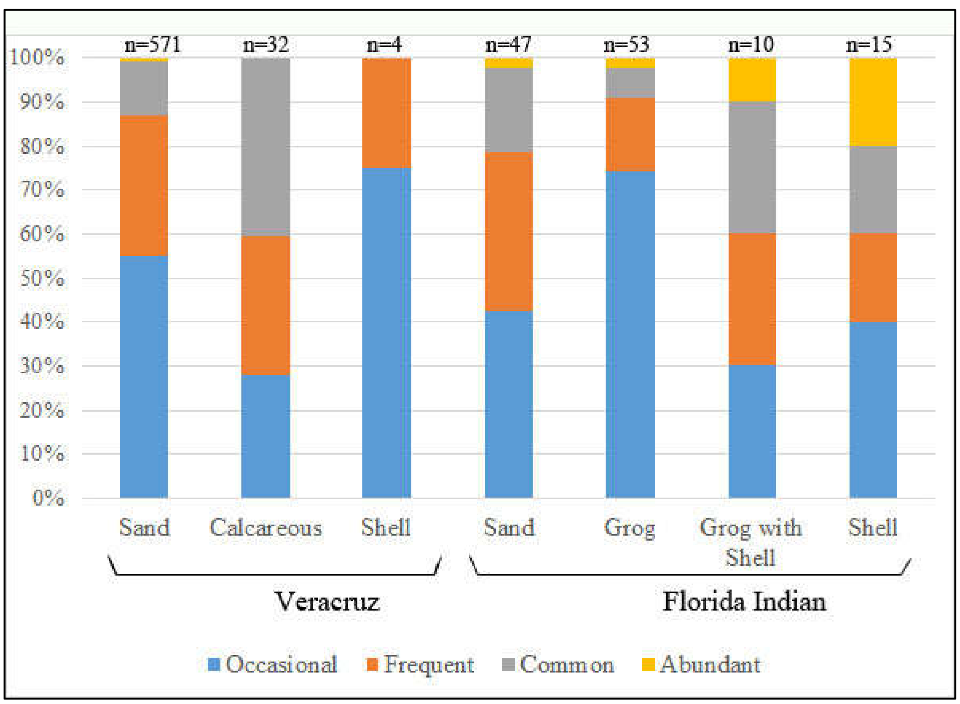

Figure 7.7. Barchart Showing Inclusion Abundances Recorded for Veracruz and Florida Native Pottery Samples

Pottery analysts studying the presidios of Northwest Florida use the presence of dark mafic inclusions as an indication that pottery was imported, probably from Mexico. It is, therefore, important to note that less than half of the sherds from Veracruz had mafic inclusions that were visible using a 10x hand lens. Mafic inclusions were observed for all major pottery and temper categories, except the shell tempered samples.

In addition to the macroscopic study, I undertook petrographic analysis as a check on macroscopic observations and to provide additional information on technological choices. I analyzed thin sections from 19 sherds: 7 glazed, 4 plain, and 8 painted/slipped sherds (see Appendix C).[3] The analysis confirmed that the maximum size of non-incidental inclusions for most sherds were fine-medium grained sands, which tended to occur in occasional to frequent abundance. Silt and very fine inclusions were abundant, but these small sized aplastics are difficult to assess with a 10x hand lens. Five samples included non-incidental coarse or very coarse mineral and rock inclusions. Three of these sherds were plain and two were white slipped utilitarian vessels.

All clay includes some natural aplastic inclusions, and potters may intentionally add temper to improve workability of the clay or performance characteristics. Differentiating between temper and natural inclusions is sometimes difficult, but size distribution and angularity of inclusions provide clues. Bimodal distribution of inclusion sizes does not occur naturally in clays and is evidence that coarser grains have been added to the paste. This is particularly clear if each mode is composed of different mineral or rock inclusions. In addition, potters sometime crush rocks to add to the paste, which results in very angular inclusions. I analyzed grain size and angularity of inclusions during point counting (see Appendix C for point count data).

For 12 sherds, the particle distribution was unimodal and grains were sub-rounded to sub-angular. I argue that these inclusions were naturally occurring in the clay and that potters did not add temper in paste preparation. Natural inclusions included varying amounts of quartz, feldspar (mostly plagioclase), volcanic rock fragments (e.g., basalt and intermediate felsic rock), and calcareous particles (primarily metamorphosed limestone[4]). For two red slipped sherds, calcareous particles were the dominate inclusions, but appeared to be natural to the clay.

A strong bimodal distribution of inclusions was apparent for just two plain sherds and one white slipped sherd, suggesting that potters added quartz for one plain vessel and volcanic rock grains to the others. In four other cases, there was a weak bimodal distribution suggesting quartz sand possibly was added to 1 plain, 2 glazed, and 1 white slipped sherd. Overall, the evidence suggests that potters occasionally added sand to the clay, but for most pottery samples no temper was added during clay processing.

The small petrographic sample from Veracruz was selected to represent the wide variability in pastes for plain, glazed, and slipped/painted wares. This variability is visible in the ternary diagram in Figure 7.8. The relative percentages of clay matrix, natural sands, and silt approximates the volumetric proportions of raw clays used by potters. Although clay texture varied, potters tended to use fine textured clays for painted and slipped wares. Plain and glazed were more varied.

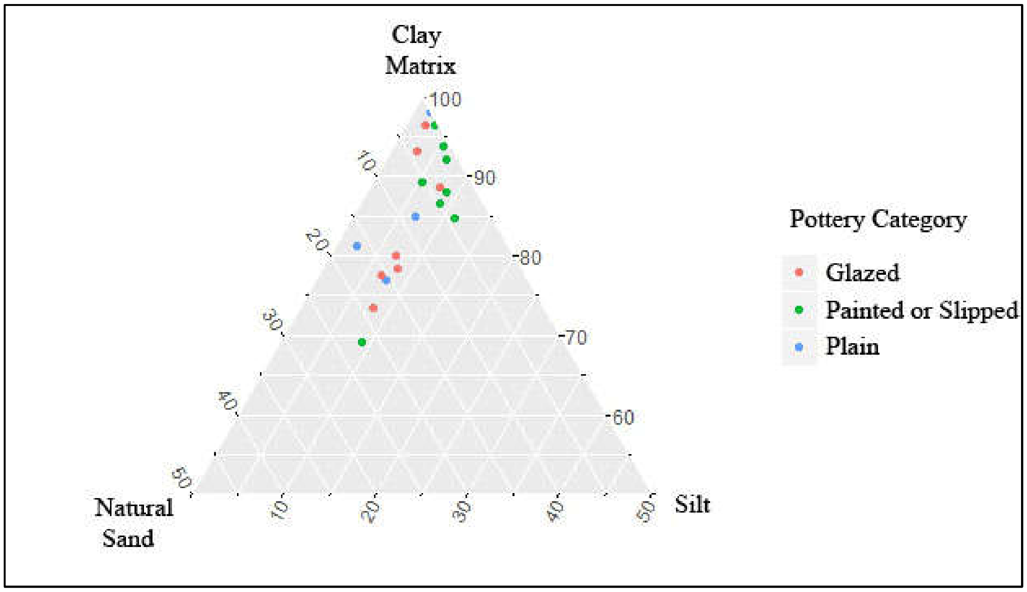

Figure 7.8. Ternary Diagram of the Percent of Clay Matrix, Natural Sand, and Silt in Point Count Analysis of Ceramic Thin Sections of Sherds from Veracruz.

Florida Indian Pottery. Although samples were chosen to represent the range in variability of technological choices made by native potters, due to sampling constraints (see Chapter 6) my sample is closer to a representative sample of decorated pottery types found at Mission Escambe with the addition of some Florida Indian pottery from the presidios. Inclusions identified include sand, shell, and grog. Although sand may be natural inclusions in the clay, non-incidental shell and grog were certainly added by potters. Pigott (2015) reports that for Mission Escambe, sand was most commonly the only inclusion in pottery sherds (43.5 percent). While all sherds had some sand, grog (32.4 percent), shell (14.8 percent), and grog with shell (9.3 percent) also were added to pottery (see Pigott 2015:55). [5] These percentages are similar to my own sample.

Fifty sherds in my sample contained only sand inclusions (see Figure 7.5). Sand observed with a 10x lens consisted entirely of single or multi-crystalline quartz grains. Of these sherds, samples with coarse and very coarse grains were most common, typically in occasional to frequent abundance. Fine to medium grain sand was the predominant inclusion in less than 20 percent of these sherds, generally observed in occasional abundance (see Figures 6.6 and 6.7).

Grog was the predominant temper documented in 53 samples. In nearly all these sherds, the grog tended to be coarse to very coarse and was generally an occasional addition to the paste (see Figures 6.6, 6.7, and 6.8). Similarly, shell or grog with shell was coarse to very coarse in maximum size. The relative abundance of inclusions appeared more variable in these samples, although the sample size for sherds with shell temper was small.

For the petrographic study, I analyzed thin sections for 17 decorated native sherds (10 from Mission Escambe and 7 from the presidios). I chose nine samples with only sand inclusions based upon inspection with a hand lens and then a binocular microscope. Petrographic analysis, however, identified grog temper in three of these sherds. In each case, the grog was very similar to the paste of the surrounding clay matrix, making the grog inclusions difficult to see even with a binocular microscope (Figure 7.9). Although the petrographic sample was small, this analysis suggests that grog may be a more prevalent temper than suggested by the macroscopic analysis.

Figure 7.9. Grog Tempered Florida Native Sherd from Presidio Santa Rosa

Pottery tempered with both shell and grog was the least represented in the total assemblage reported from Mission Escambe (Pigott 2015). At the time of my analysis, only 52 decorated sherds were recorded in the UWF database as Escambia series wares (i.e., grog and shell tempered). During macroscopic analysis, I encountered difficulties identifying both grog and shell temper in a number of these sherds. In addition, most of these samples weighed less than 2.5 grams and were too small for destructive analyses. Only one sherd was large enough for thin section petrography. Interestingly, the petrographic study documented only shell tempered grog; it did not appear that shell was intentionally added as a separate temper.

In light of these results, Ann Cordell's (2001) analysis of Apalachee pottery in Old Mobile is suggestive. In her sample, some grog tempered sherds did contain shell, but this was the result of crushing shell tempered pottery to use as a temper (Cordell 2001:8). In other cases, shell tempered pottery included ferrugenous concretions and lumps of clay from incomplete mixing that may have been mistaken for crushed pottery (Cordell 2001:8,13,19). From the perspective of the technological style analysis adopted for this study, this evidence does not suggest a choice to intentionally temper sherds with both grog and shell; it is possible that some potters preferred shell tempered grog for temper.

In regard to the Pensacola sample, there is insufficient evidence to rule out a combination of grog and shell temper as a technological choice. In addition to decorated pottery, UWF archaeologists also have documented plainwares tempered with shell and grog at Mission Escambe. Additional petrographic analyses are needed to determine if these sherds represent the intentional addition of both grog and shell, the selection of shell tempered pottery as grog temper, or if these were shell tempered pots with clay lumps resulting from incomplete mixing of the paste recipe. For the purposes of this study, my sample includes only ten sherds that appeared to have both grog and shell temper based on low magnification analysis.

Aside from these issues, petrographic point counting using the 10x objective supports macroscopic observations regarding the size and relative abundance of inclusions that were at least fine-medium grain in size. In addition to providing a check on the macroscopic analysis, petrographic methods contribute information about the processing of clays, natural inclusions, and temper. Grog and shell were intentionally added by potters. Pottery with only sand inclusions had a moderate to strong bimodal distribution of quartz inclusions, suggesting that medium to very coarse sand was deliberately added as temper. Sand also was bimodal in half of the grog tempered sherds, implying that both sand and grog were intentionally added to these sherds. Sand temper was sub-rounded to sub-angular, which does not indicate that potters were crushing their temper prior to adding to the clay.

The ternary diagram in Figure 7.10 shows the relative percentages of matrix/silt, natural sand, and temper. This graph suggests that tempers were added in similar amounts regardless of the category of temper chosen by the potters. This may be because the clay used to prepare all of these pots were very similar.

Summary. All sherds from Veracruz and Pensacola contained at least some sand inclusions, but for most Veracruz sherds this was the only inclusion category documented. A relatively small number of sherds contained shell or other calcareous inclusions. While shell is available in both regions along the Gulf Coast, other calcareous inclusions likely originate from limestone uplifts in the Sierra Madre Oriental in Veracruz.

The Florida Indian sample included a greater diversity in broad inclusion categories. Sand was most common, but the technique of adding crushed sherds to pottery paste was a distinct technique restricted to the Florida Indian sample (see Rees and Livingood 2007; Rees 2010; Worth 2015 for antecedent and regional distribution of grog tempered pottery in the Southeastern United States). Shell also was more common and sometimes co-occurred with grog temper.

The inclusion most common to both regions was sand. Quartz and quartzite inclusions are found in pottery from both regions, but feldspar and dark mafic inclusions are only found in the Veracruz sample. Major differences between the regions in rock and minerals are most likely the result of local geological resources rather than an exclusively technological choice. While potters intentionally added temper to clay pastes in both regions, this practice appears more common among Florida Indian potters than those producing vessels for neighborhoods in Veracruz.

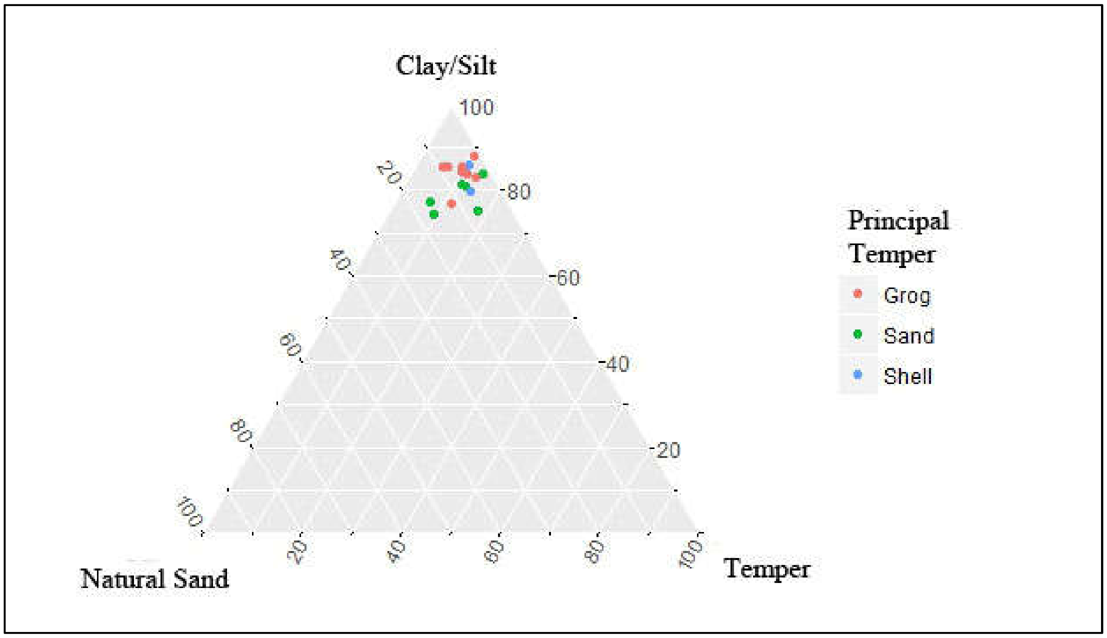

Figure 7.10. Ternary Diagram of the Percent of Clay Matrix/Silt, Natural Sand, and Temper in Point Count Analysis of Ceramic Thin Sections of Florida Native Sherds from Mission Escambe and Pensacola Presidios.

Primary Forming

As previously noted, technological choices that leave only faint or inconspicuous evidence on the final product are resistant to change. Ethnographic research suggests that this is particularly true for primary forming techniques (Gosselain 1998, 2000), likely because change at this stage requires a new set of motor skills (e.g., Arnold et al. 2007). Consequently, identification of primary forming techniques is particularly valuable for discriminating the origin of learned traditions. Unfortunately, a complete understanding of primary forming techniques can be difficult to assesses, particularly when the only evidence is found on small pottery fragments. Multiple techniques are often employed to form different parts of a pot and trace evidence may be removed from the surface of the vessel through handling while the clay is plastic or by secondary forming (shaping) and surface modification (finishing). Because of these challenges, I assessed multiple attributes to identify the choices made at this stage in the chaîne opératoire. Macroscopic assessments were aided by the additional microscopic analysis of a small number of sherds (Table 7.4; see also Table 6.5).

I systematically examined surface texture and topography, sidewall thickness, and characteristic cracks and fractures. In addition, data collected on inclusion size and density and vessel form suggest constraints on forming methods.[6] I draw inferences from ethnographic and experimental archaeology to interpret primary forming techniques from observable attribute data (Foster 1955; Peelo 2011; Rye 1981; Shepard 1965; Stark 1984).

Table 7.4. Macroscopic and Microscopic Attributes for Inferring Primary Forming Techniques Based on Experimental Archaeology and Ethnographic Research (Foster 1955; Peelo 2011; Quinn 2013; Rye 1981; Stark 1984)

Primary Forming Techniques	Attributes
Coiled	Distinctive fractures along coil joins: parallel or step-like, cubic facets Variable wall thickness Unobliterated coils on the exterior or interior vessel surface Sherd edges are meandering and irregular In thin sections, relic coils may be observed by the arrangement and orientation of inclusions and voids
Hand Formed or Drawn	Finger grooves on the interior surface In thin section, elongated inclusions and voids may orient vertically
Mold-Made	Join seams apparent on surface Uniform surface texture on mold side, except for raised or recess areas Other side shows method used for pressing Remnants of "parting material" may be observed embedded in surface on the mold side
Anvil Molded	Same characteristics as other molded pottery Laminar fractures from use of an anvil Anvil impressions on interior or exterior surface In thin section, elongated inclusions may align parallel near the sherd surface and random in the center
Wheel Thrown	Uniform horizontal wall thickness Laminar fractures Horizontal, fine continuous ridges particularly on interior and possibly exterior surfaces "Turning" spiral facets on the exterior Few voids/few very coarse (>2-3 mm) aplastic inclusions Base: Spiral pattern, S-shaped crack, flat or foot ring In thin section, elongated inclusions, voids, and striated b-fabrics may align parallel to the sherd's surface

Veracruz Pottery. Plain wares demonstrate the most variability in primary forming techniques (Figure 7.11). Only 20 vessels demonstrated evidence of wheel throwing. The rest of the plain wares were hand built, although specific methods were not always discernable. The most commonly identifiable hand building technique involved molding or anvil molding. Anvil molded is a term that I employ to describe a specific forming technique used by modern potters in Veracruz and other locations in Mexico (see Foster 1955; Stark 1984). This method involves pounding out a lump of clay into a tortilla shaped disk using a stone anvil. The clay is then pressed over a mold. This technique can leave traces of the anvil on one side of the pot and may result in laminar fractures typical of some slab building techniques (see Rye 1981:72).

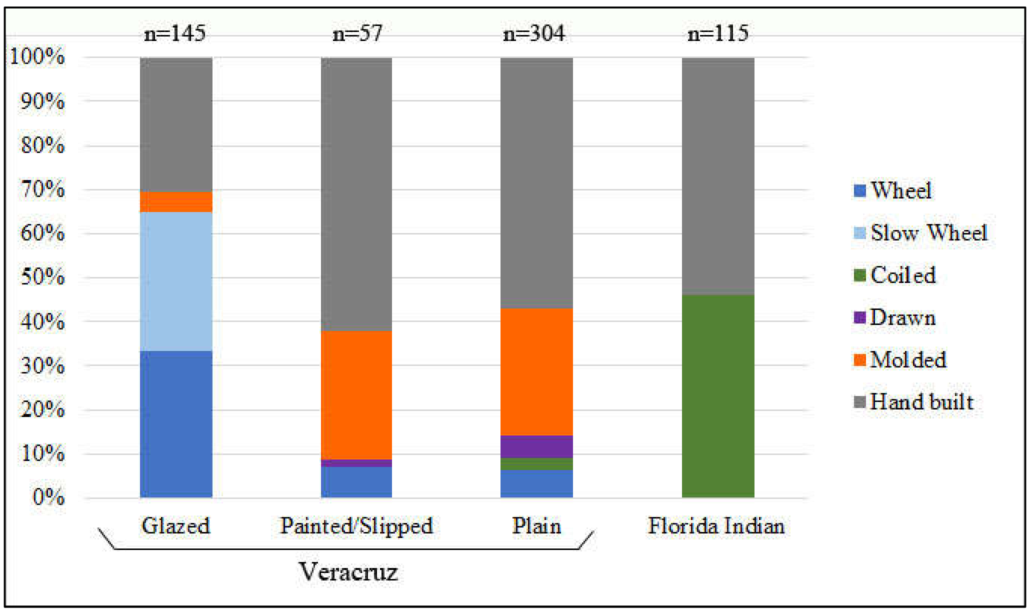

Figure 7.11. Barchart Showing Identifiable Primary Forming Techniques for Veracruz and Florida Native Pottery Samples

In several cases, plain vessels showed evidence of drawing or coiling methods. Rare evidence of coiling methods could suggest that coils were only added to certain parts of vessels, such as near the rim. The addition of coils near the rim has been documented ethnographically in Veracruz (e.g., Foster 1955), and I have observed coiling combined with drawing methods in San Miguel Aguasuelos (near Xalapa, Veracruz).

The addition of glaze during a later stage of production presents some challenges to identifying primary forming techniques. For example, I expected that the wheel was used in the production of at least some lead-glazed vessels. Throwing pottery on a wheel creates fine continuous striations or ridges from the potter's hands or tools pressing against the wet clay. If the potter removes the vessel from the throwing wheel before the clay is completely dry, characteristic throwing marks can smear from the exterior of the vessel by the potter's hands. Throwing marks also can be removed from the exterior surface by later trimming while on the wheel or by other smoothing marks. Interior throwing marks, in contrast, are likely to survive later production stages. Unfortunately, glaze added to a vessel's interior surface can sometimes make these interior marks difficult or impossible to discern.

Despite these issues, I identified evidence of wheel-throwing for 48 lead glazed pottery sherds. In the case of another 45 vessels, a slow wheel or turnette may have been used to hand form pots based on horizontal — though not continuous or regular — smoothing marks in the vessels' interior. Molding techniques were used to make at least an additional 6 vessels. Another 44 vessels were hand built without a wheel, but the specific technique used was not discernable.

Paints and slips, like glazes, typically covered at least one side of a sherd and could hide or obliterate evidence of previous forming techniques. Painted and slipped pottery was most commonly formed without a wheel and, as with plain and lead glazed pottery, most evidence of specific techniques points to the use of a mold of some type (at least in 17 cases). I would caution, however, against assumptions that molding was the most common hand building technique used to produce the Veracruz assemblage. Hand building techniques were not identifiable for most sherds, and it may simply be that molding was more readily identifiable. Drawing methods, for example, are quite common in modern central Veracruz, but if interior surfaces were smoothed, scraped, or burnished in the next stage of production, this forming technique would be difficult or impossible to recognize.

Florida Indian Pottery. Because the exterior surfaces of the Florida native sherds were modified by brushing, cob marking, stamping, or other methods, little evidence of primary forming techniques remained visible macroscopically. Interior surfaces were either too small or evidence was obliterated by later shaping or finishing techniques to yield evidence of primary forming methods. As a result, all evidence of primary forming comes from distinctive fracture patterns that suggests that at least 53 sherds were broken along coil joins (Figure 7.11). Meandering contours along the edges of many of the other sherds also suggests coiling was the primary forming technique used by native potters. No direct evidence of any other primary forming techniques was noted for the indigenous pottery sample, although a single rounded base with no surface markings in the interior could suggest that a mold was used. Coils could have been added for the upper walls of the same vessel. Such techniques were common to the Southeastern United States during the pre-Hispanic and colonial periods (e.g., Steponaitis 2009; Vernon and Cordell 1993).

Summary. In terms of primary forming techniques, the Veracruz assemblage reflects more variability than the Florida sample. Veracruz pottery was both wheel thrown and hand built. In the latter case, molding, drawing, and some coiling techniques were employed. In contrast, there is currently no evidence that native people in Florida ever adopted the wheel. Rather, native potters in Pensacola used primarily coiling techniques.

Vessel Shaping and Finishing

Shaping techniques include methods to refine the shape of the pot using a paddle and anvil or by scrapping off excess clay, typically while the clay is in a soft leather hard state. After the pot is formed and shaped, a potter may use finishing techniques to modify the surface or add slips and glazes. Finishing techniques are more evident than methods used to shape pottery and are typically used by archaeologists to sort sherds into recognizable typologies. In this project my samples were chosen, in part, by finishing techniques that are defined as additives (i.e., glazes, slips, and paints) or by the absence of such additives (i.e., plain sherds).

My focus in this section is on shaping techniques and those finishing techniques that are not as overt (Table 7.5). More than one of these techniques may have been used to shape and finish a pot, but typically it is only the final step that remains evident. Depressions from a paddle and anvil are an occasional exception that can remain visible on both the interior and exterior despite later scrapping, smoothing or burnishing. Other shaping and finishing techniques suggest additional time investments to change the shape, compaction, and appearance of the pot. Different techniques also are frequently applied to the interior and exterior of vessels. For example, the exterior of a pot may only be scrapped, while the interior is burnished to reduce permeability. I, therefore, address shaping and finishing techniques for both interior and exterior surfaces.

Table 7.5. Macroscopic Attributes for Inferring Shaping and Finishing Techniques (Rye 1981; Shepard 1956)

Shaping	**Macroscopic Attributes**
Paddle and Anvl	Rounded casts from the paddle and anvil on pottery surfaces Variable wall thickness Laminar and lens-shaped fractures Star-shaped surface cracks around mineral inclusions Characteristic of large vessels with rounded bases
Scraping	Drag marks and grooves with sharp edges from scraping tool Small pits from the removal of aplastic inclusions Rough Surface texture
Trimming/Turning	Drag mark and grooves similar to scraping, but these surface markings are horizontal and parallel
Finishing	
Smoothing	Fine ridges with rounded contours from smoothing tools (ridges may be parallel but not continuous) Small pits from the removal of aplastic inclusions
Burnishing	Luster Shallow troughs

Veracruz Pottery. As noted in the previous section, no additional shaping techniques were used to alter interior surfaces of pottery that was thrown on a wheel. In the case of most lead glazed and plain vessels, potters also did not attempt to trim or smooth the exterior surfaces after initially forming the pot (Figure 7.12). This may suggest that these potters possessed sufficient skill in using the wheel that they did not need to refine the shape or exterior texture of vessels after initially forming them. In other cases, the exterior surface was scraped or smoothed to further refine the shape and texture after initial forming. All of the pottery that may have been made on a slow wheel were scraped or smoothed on the exterior.

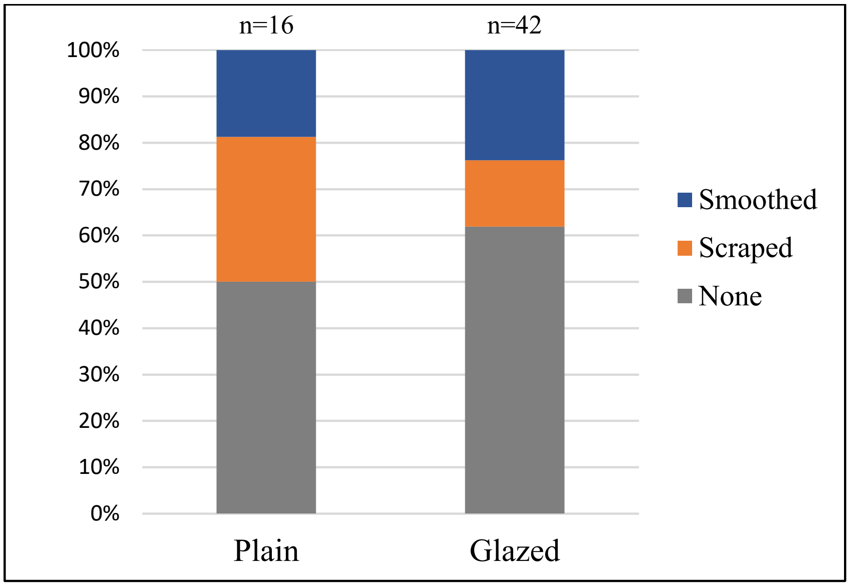

Figure 7.12. Exterior Shaping and Finishing for Wheel Thrown Pottery from Veracruz

For hand-built pottery, smoothing techniques were most common on both the interior and exterior of vessels (Figure 7.13). Scraping techniques also were quite common on the exterior of vessels, particularly for plain and lead glazed wares. Evidence does not suggest that the paddle and anvil was used to shape vessels after initially forming them. Rather, occasional evidence of anvil depressions likely was related to primary molding techniques. Burnishing was rarely observed for the Veracruz sample and was most commonly found in combination with slips and paints that were applied to both the interior and exterior of vessels. In half of these cases, burnishing was poorly done, leaving behind evidence of shallow troughs from where the tool was applied (i.e., "tool burnished").

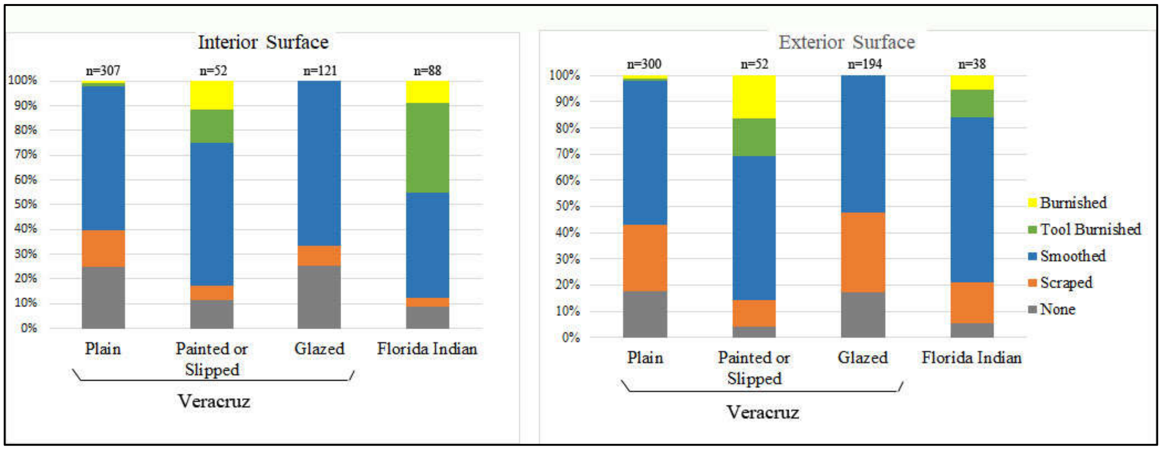

Figure 7.13. Shaping and Finishing Techniques for Veracruz and Florida Native Hand-Built Pottery. *Note:* Paddle and anvil also were used for shaping Florida native vessels, but this techniques is considered separately.

Florida Indian Pottery. Shaping techniques documented for Florida native samples were typical for the southeastern United States. A paddle and anvil was used to thin vessel walls in at least 15 cases, probably after using coiling to initially form the pots. Potters also used a scraping technique to remove excess clay while the pottery was leather-hard. This technique was used in at least some cases in combination with the paddle and anvil (Figure 7.13).

Native potters used a variety of techniques to modify or decorate the surface of their pots. Incising, stamping, brushing, and cob marking were overt and I have used these markings to identify sherds as Florida Indian pottery. In addition to these more obvious techniques, native potters also invested time smoothing or burnishing the surface of their vessels. Smoothing and burnishing were equally common in the sample. Smoothing techniques were applied to the interior, exterior, or both. Burnishing, however, was a method applied almost exclusively to the interior of pots. In the six cases where the exterior of a pot was burnished, the interior also was burnished. In most cases, burnishing was done poorly and tool marks were clearly evident. Based on these patterns, I suggest that burnishing typically served a utilitarian function, meant primarily to decrease the permeability of the vessel. Burnishing was used on vessels that were roughened, stamped, and incised on the exterior, suggesting no obvious correlation between decorative techniques (or specific function) and the burnishing of the interior of the vessel.

Summary. Scraping, smoothing, and burnishing were documented for both the Veracruz and Florida Indian assemblages. Exterior scraping seems to be a more common method for shaping in Veracruz, while the paddle and anvil was preferred among Florida Indian potters. Burnishing was a more common technique for finishing Florida Indian sherds, even if often poorly applied.

Firing Techniques

Choice of firing technique presents a final opportunity for a potter to alter the appearance of their product. Because firing atmosphere and temperature can change a vessel's surface color — a highly visible attribute — firing methods may not be as resistant to change as other techniques, such as primary forming methods. Nevertheless, vessel function, economic constraints, and other cultural and logistical factors can discourage change in firing strategies, even in a new environment (see Chapter 5).

Ethnographic and experimental research has led to methods for assessing firing atmosphere based upon macroscopic attributes. In this section, I analyze pottery cross sections and firing cores. Variation in a sherd's firing core is due primarily to the removal of carbon in an oxidizing atmosphere or the addition of carbon in a reducing atmosphere.

Rye (1981:114-118) has correlated distinctive firing cores with firing atmosphere, cooling rate, and even the apparatus used (i.e., open fire or kiln). I build on Rye's work in order to classify sherd firing cores and to infer firing atmosphere and, in some cases, the firing apparatus used by potters (Figure 7.14 and Table 7.6). Inferences made from analysis of firing cores must be used with caution as cooking also can leave carbon deposition on a vessel surface (see Skibo 1992:145-171). I use criteria established by Hally (1983:9) to differentiate between carbon deposited through original firing methods and post-firing alterations (see also Rye 1981:114-118; Skibo 2015). Sherds that showed evidence of possible post-firing alterations were not included in this analysis.

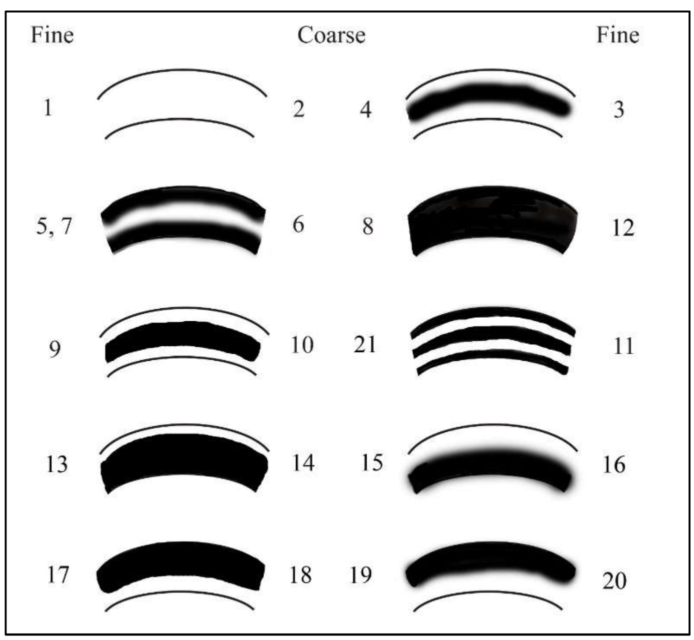

Figure 7.14. Idealized Drawings of Cross Sections for Fine and Coarse Textured Pottery (Adapted and Expanded from Rye 1981: fig. 104).

Table 7.6. Interpretations of Firing Cores Presented in Figure 7.14 (expanded from Rye 1981: fig. 104).

Firing Core	Atmosphere	Oxidation	Cooling Rate
1,2	Oxidizing	Fully	Slow or Rapid
3, 4	Oxidizing	Partially	Slow or Rapid*
5, 6, 7	Reducing	Partially	Slow
8, 12	Reducing	None	Slow
9, 10	Reducing	Partially	Rapid
11, 21	Reducing	Partially	Rapid
13, 14	Reducing	Partially	Rapid
15, 16	Possible post-firing alteration		
17, 18	Reducing	Partially	Rapid
19, 20	Possible post-firing alteration		

*Cooling rates are interpreted as "slow" for glazed vessesls, which were likely produced in a kiln and, regardless, could not be easily removed for rapid cooling without damaging the glaze.

In order to assess firing temperatures, I also analyzed a representative sample of 156 sherds using x-ray diffraction (see methods described in Chapter 6). This sample included 95 sherds drawn from baseline assemblages. Clay and pottery sample selection were informed by the provenance study described in chapter 8. Using XRD, pottery was compared to clay samples that fell into elementally similar compositional groups. I compared the mineral assemblage of each sherd to the XRD patterns for chemically comparable clays collected from Northwest Florida (n=2) and Veracruz (n=6). XRD analysis of differentially fired clay tiles reveals changes in the mineral phases at increasing temperatures. By comparing the mineral assemblages of pottery to chemically (and mineralogical) similar clay samples, I was able to infer minimum and maximum firing temperatures. In the following sections, I discuss the results of this analysis (see Appendix D for XRD data for clay and pottery samples).

Veracruz Pottery. Before assessing original firing atmosphere, I first removed 27 samples with interior and exterior soot that suggested post-firing alteration. Another 80 sherds had carbon in the paste on only one side of the sherd cross section, which could have resulted from intentional smudging, partial oxidation during vessel firing, or post-firing use. Following recommendations by Rye (1981:116), I removed these sherds from evaluation of firing atmosphere. The cross sections of the remaining 500 sherds provided data for assessing the original firing atmosphere of pottery recovered from Veracruz.

As shown in Figure 7.15, only a small percentage of pots were fired in reducing conditions. More than 90 percent were firing in oxidizing conditions. This trend was consistent across all pottery categories. More than half of the sherds were fully oxidized, meaning there was no carbon core remaining. This effect can result because organics were not originally present in the clay or because the carbon was completely removed during firing. Full oxidation was most common for glazed and slipped/painted pottery. Partial oxidation was most common among plain ware sherds, but some glazed, slipped, and painted sherds were also partially oxidized. Partial oxidation suggests that carbon was originally present in the clay. Firing in an oxidizing environment removed carbon from the paste closest to the surface, but left behind a carbon core with a diffuse boundary.

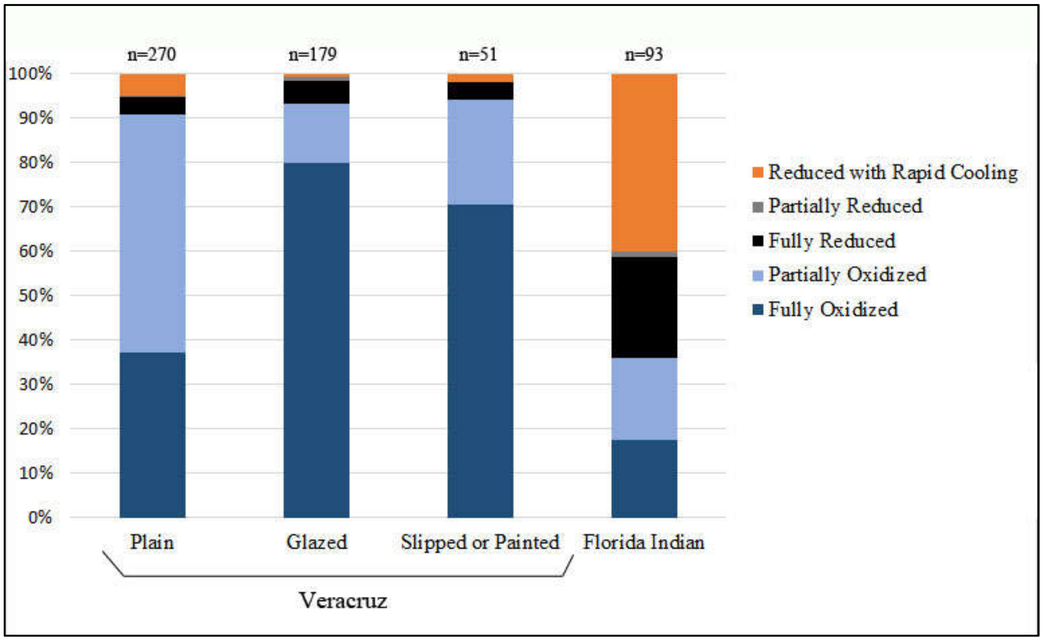

Figure 7.15. Firing Atmosphere for Veracruz and Florida Native Pottery

In several other cases, the carbon core had a sharp boundary, consistent with pottery that was fired in a reducing atmosphere and then rapidly cooled in air. Because kilns must be cooled slowly, observable core boundaries should be diffused. A sharp core boundary, therefore, is distinctive of pottery that was fired in a pit or open fire (Rye 1981:118).

Firing temperature was assessed using XRD for 75 sherds, including 15 glazed, 29 painted or slipped, and 31 plain ware sherds. This analysis resulted in a range of temperatures, rather than a single value. The spread between minimum and maximum temperatures was largely dependent on the mineralogy of the clay body. Some common minerals, such as quartz or plagioclase, do not undergo phase changes at temperatures that are typical for the earthenware ceramics that I analyzed. Among the samples that I analyzed from Veracruz, the spread varied between 50° and 500°C. Generally, a spread less than 300°C provided a useful estimate of firing temperatures. Fifty-one samples had this temperature spread (Table 7.7).

The range of firing temperatures show that pottery manufactured in Veracruz was fired at low (ca. 500 to 600°C), moderate (ca. 800 to 900°C), and high temperatures (>900°C). Plain wares reflect the most variability in firing temperatures, while glazed vessels were typically fired at moderate to high temperatures. The latter is consistent with previous studies of lead glazed pottery in modern and ancient settings, which has placed firing temperatures between 800 and 1050°C (Tite et al. 1998:252). Finally, painted and slipped pottery was fired at low (<800°C) and moderate (ca. 800 to 900°C) temperatures.

Table 7.7. Firing Temperatures for Veracruz Pottery Based on the Analysis of XRD Data and Aided by the Occasional Presence of Calcareous Inclusions

Spread	**Min °C**	**Max °C**	**Count**
100	500	600	5
300	500	800	11
300	600	900	2
200	700	900	1
250	700	950	9
300	700	1000	1
100	800	900	17
200	900	1100	3
50	1050	1100	2

Note: Only shows cases with a spread ≤ 300°C).

Florida Indian Pottery. After removing sherds with surface soot or evidence of reduction on only one surface, a remaining 92 sherds were assessed for evidence of firing atmosphere. In contrast to the Veracruz sample, decorated Indian pottery was frequently fired under reducing conditions (64.1 percent of sherds; see Figure 7.15). After firing the pottery in a reducing atmosphere, many of the vessels were immediately removed to cool rapidly in the air — producing a sharp core boundary that is typical of open firing methods. Only about a third of the Indian pottery was fired in oxidizing condition and only half of those were fully oxidized.

XRD phase analysis of 21 Florida Indian sherds was limited by the largely siliciclastic alluvium found in the region. Despite constraints, my analysis found that Indian pottery was relatively low fired, which is consistent with previous studies (e.g., Steponaitis 2009). Clays and pottery pastes were composed primarily of kaolinite, quartz, muscovite, and some hematite. The presence of muscovite in all samples establishes a maximum firing temperature of 950°C. Kaolinite was found in three samples, supporting a very low firing temperature between 500°C and 625°C (see Appendix D). Also supporting low firing temperatures is the use of shell temper in Florida Indian pottery. Pots tempered with shell, limestone, or coral become unstable when fired above 800°C (Rye 1981:114). Based on a combination of XRD analysis and firing experiments, Steponaitis (2009:33) estimates that Mississipian shell tempered pottery at Moundville, Alabama, was fired between 550°C and 750°C. This temperature range is consistent with available evidence for decorated Indian pottery recovered from Mission Escambe and Pensacola presidios.

Summary

Firing atmospheres and temperatures differed between Veracruz and the Florida Indian pottery assemblages, but as with previous stages of production, there also was overlap. Most pottery from Veracruz was fully or partially oxidized either using open firing methods or a kiln. This is in contrast to the Florida Indian samples, which were mostly reduced using open firing methods and then either left to cool slowly while covered in embers or removed for rapid cooling. Some Florida Indian sherds, however, showed evidence of oxidation. This could be because pastes were already oxidized, because sherds were fired in an intentionally oxidizing atmosphere, or because of an overall variability in the open firing techniques used by Florida Indian potters. Regardless, these attributes overlap with the Veracruz pottery sample, which could have been fired in a kiln or in the open. Some Veracruz sherds also were clearly fired in reducing environments.

In terms of firing temperatures, Florida Indian sherds were likely all fired below 750°C and in some cases, between 500 and 625°C. A third of the Veracruz sherds (plain and slip/painted wares) that were analyzed using XRD also fall into this low temperature range. Other Veracruz sherds, however, were fired at moderate temperatures above 800°C and even high temperatures above 1050°C.

Differentiating between Casta and Florida Indian Pottery at the Northwest Florida Presidios

The preceding analysis of baseline data from the Port of Veracruz and the Pensacola Missions suggests diverging trends in technological choices at every stage of the *chaîne opératoire.* At the same time, the range of variation at each stage demonstrates some overlap between assemblages. In order to discriminate between Florida Indian, casta, and other imports I use a strategy that takes all stages of production into account. I employ a multivariate analysis adapted from the fields of genetics and biological morphology, which is used by researchers for quantitatively identifying groups of closely related species (Dibble et al. 1998; Goncalves et al. 2008; Hawkins et al. 1999; Moeller and Schaal 1999; see also Foss 2016). This method has been used previously for measuring technological similarities in pottery recovered in the prehispanic Southwestern United States (Peeples 2018).

I selected eleven variables that reflect technological choices made at each stage of pottery production (Table 7.8). Variable selection was informed by the foregoing analysis of baseline data, evaluated by assessing the relationship between variables, and then further assessed using iterative analyses to determine the usefulness of variables for discriminating pottery based upon the baseline data.[7] This approach employs five stages of analysis outlined in Table 7.9.

Table 7.8. Technological Variables Used to Discriminate Presidio Pottery

Variable	Variable Types	Variable States
Sidewall Thickness	Continuous	Average thickness of sherds based upon two measurements (excluding basal sherds)
Redness Index	Interval	Calculated from munsells of oxidized pastes using Hurst's (1977) methods, then transformed to base 10 logarithms
Inclusion Type	Categorical	Sand, grog, shell, other calcareous (probably limestone)
Abundance	Ordinal	Occasional, frequent, common, abundant
Size	Ordinal	Very fine, fine/medium, coarse, very coarse
Primary Forming	Binary	Hand-built, wheel thrown
Interior Shaping/ Finishing	Ordinal	None, scraped, smoothed, poorly burnished, burnished
Exterior Shaping/ Finishing	Ordinal	None, scraped, smoothed, poorly burnished, burnished
Firing Atmosphere	Binary	Oxidizing or reducing
Oxidation	Categorical	None, partially, or fully
Cooling Rate	Binary	Slow or rapid

Table 7.9. Summary of Analytical Procedures for Discriminating Presidio Pottery

Stages of Analysis		Descriptions of Procedures
1	Data Preparation	Evaluate cases for inclusion in quantitative analysis
2	Detection of Variable Correlation	Goodman-Kruskal's λ coefficient to detect highly correlated variables
3	Assessment of Relative Technological Similarity	Gower's coefficient of similarity for mixed mode data
4	Reduction of the Dimensionality of the Distance Matrix	Principal Coordinates Analysis (PCoA)
5	Define Analytical Groups	K-medoids cluster analysis based upon first three PCoA axes
6	Evaluation of Analytical Groups	Evaluate analytical groups based on original quantitative variables and independent attributes

Stage 1: Data Preparation

Before proceeding with the quantitative analysis, I first examined all cases from the Veracruz and Florida assemblages. Cases were removed if data were missing for more than half of the selected variables or for more than half the stages of production. In addition, I removed all Veracruz sherds that were recovered from late eighteenth-century contexts. These vessels were possibly produced after the presidios were abandoned and may represent changes in trade or production techniques that are not represented in the Pensacola assemblages. The final sample assessed in the quantitative analysis included all of the Florida Indian sherds (n=115), pottery from seventeenth and early to mid-eighteenth century Veracruz (n=392), and pottery from all three Pensacola presidios (n=1,001).

Stage 2: Detection of Variable Correlation

I checked for relationships among variables that were highly correlated to ensure that none of the selected variables consistently determined the outcome of other attributes. Such relationships between variables would skew the results of the quantitative analysis by effectively counting some technological attributes twice. In addition, I tested the variables in Table 7.8 against known vessel forms and functions to determine that all selected variables were functionally equivalent.

For this stage of analysis, I used the Goodman-Kruskal's λ coefficient, which measures the association between nominal variables by examining the predictability of a dependent variable based upon a known independent variable (Goodman and Kruskal 1954, 1959). Because the quantitative analyses only include one continuous and one interval variable, I transformed these data to nominal categories (for this stage only) in order to test these variables for association.[8] Goodman-Kruskal's λ coefficient ranges from 0 to 1, with higher numbers indicating an increasing predictability of the dependent variable. A λ value of 0.80, for instance, suggests an 80 percent chance of predicting a dependent variable based upon the knowledge of an independent variable. Goodman-Kruskal's λ is an asymmetrical statistic and so the analysis was performed on each variable twice.

This analysis resulted in low to moderate associations between variables used in the quantitative analysis. In the case of moderate associations, relationships also were asymmetrical. For instance, among all Veracruz samples there is a 39 percent chance of predicting the atmosphere based upon knowledge of the cooling rates. There is zero chance, however, of predicting the cooling rate based upon knowledge of the atmosphere. I also found low to moderate asymmetrical associations between technological variables and vessel forms and functions. This latter analysis suggests that the technological choices used in the quantitative analysis do reflect functional equivalents.

Stage 3: Assessment of Relative Technological Similarity

The next analytical procedure was to construct a similarity matrix that compares every pottery sherd to every other sherd based on the 11 variables described in Table 7.8. Gower's general coefficient of similarity is well-suited for the multivariate analysis of datasets with mixed variable types (nominal, interval, or continuous) and can include missing data (Baxter 1994:152-153; Gower 1971; Howell and Kintigh 1996:547). For continuous and interval variables, Gower's coefficient (G_{ij}) is defined as:

$$G_{ijk} = 1 - \frac{|X_{ik} - X_{jk}|}{r_k}$$

i, j = pairwise cases

r_k = absolute range of values for the kth variable

For all other variable types, G_{ijk} is calculated by adding the number of variables for which pair-wise cases have identical values and then dividing the total by the number of variables that do not have missing data. All the variables are then summed. The final pair-wise value of Gower's coefficient is then calculated by dividing the sum of variables for each case by the total number of variables for which both cases have data. This procedure creates a symmetrical pair-wise matrix of similarities with coefficients ranging between 0 (no similarity) and 1 (identical similarity). Finally, these data are transformed into a distance matrix by subtracting the similarity coefficient from 1. Because the resulting pair-wise matrix has hundreds of columns and rows, it is cumbersome to analyze. I, therefore, used principal coordinates analysis to reduce the dimensionality of the distance matrix.

Stage 4: Reduction of the Dimensionality of the Distance Matrix

Principal coordinance analysis (PCoA) functions similarly to principal components and correspondence analysis, except that it is typically applied to a distance matrix rather than raw data. The procedure creates a low-dimensional space by reducing the correlation effects of all pair-wise values to a small number of axes that together explain most of the variation in the data set. Patterns showing strong associations between cases can then be more easily examined (Shennan 1997:345-347).

In Figure 7.16a, I display a scatterplot of the first two axes of the PCoA for all variables included in the quantitative analysis. Each point on the graphs represents a single pottery sample and the distance between these points is a visual representation of technological similarity between sherds. I have color coded the points to correspond to baseline data (sherds recovered from Veracruz or Florida Indian pottery) and unknowns (plain, slipped/painted and lead-glazed sherds recovered from the presidios). Sherds recovered from Veracruz tend to group together, as do most of the Florida Indian pottery, but there also is some overlap in the overall similarity of sherds from each region. This pattern demonstrates graphically the potential difficulties in discriminating between Florida Indian, imported, and locally made casta pottery at the presidios even when all stages of pottery production are considered in the analysis.

Examination of multiple scatterplots based on subsets of cases (e.g., different pottery categories) or the systematic removal of individual variables suggests that patterns seen in the above scatterplot of all pottery data are quite stable and robust (see for example Figure 7.16b). The final stage of analysis will identify groups of pottery that are similar and allow for the assignment of presidio sherds to groups associated with either Veracruz (casta or other imports) or Florida Indian pottery.

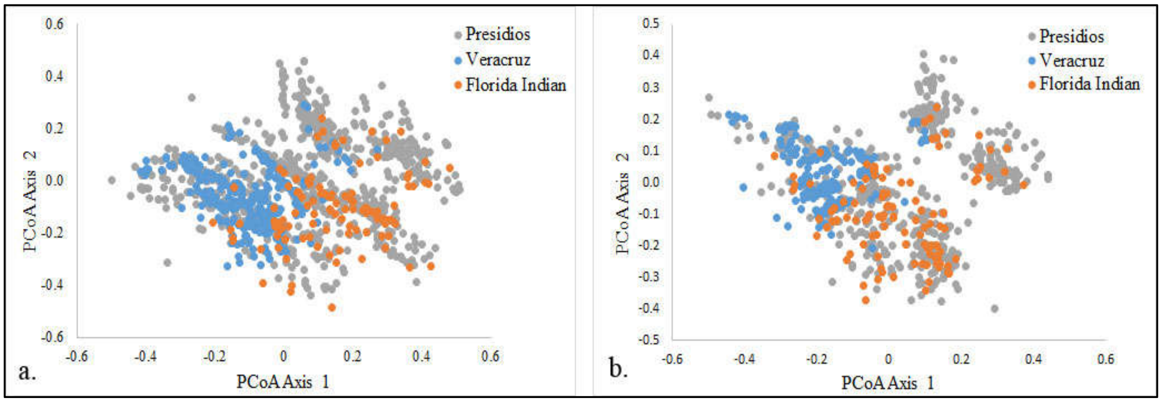

Figure 7.16. Principal Coordinates Plot Based on the Gower Measure of Similarity of 11 Variables for A.) All Cases Used in the Quantitative Analysis; b.) Only Plainwares and Decorated Florida Native Pottery

Stage 5: Definition of Pottery Groups

Groups of similar pottery were identified by carrying out cluster analyses on the first three PCoA axes that resulted from the above procedures. I used K-medoids cluster analysis for this stage because it is particularly robust for data sets with outliers or noise (Kaufman and Rousseeuw 1990; Zhang and Couloigner 2005; see also Peeples 2018). K-medoids is closely related to the K-means algorithm and also is a non-hierarchical method of cluster analysis based on Euclidean distances, maximizing the distance between clusters while also reducing the distance between individual cases and the center (or medoid) of each cluster.

As with K-means, the analyst must first determine the number of clusters to be computed by the K-medoids algorithm. I employed several methods for determining an appropriate number of cluster solutions. First, examination of multiple scatterplots generated in the previous step, suggests the presence of one large and two smaller clusters. This pattern was particularly clear in a scatterplot of only plainware sherds and Florida Indian sherd pottery, which somewhat mirrors the graph with all pottery sherds (see Figure 7.16). Next, following methods recommended by Kintigh and Ammerman (1982), I generated a scree plot that shows the relationship between increasing cluster solutions and within group sum of squared errors (SSE). This plot also compares the actual data to 250 randomized matrices based on the original data set (Figure 7.17a). As the number of cluster solutions increases, the SSE for the actual data decreases more rapidly than the random data, suggesting that clustering is present. However, there were no strong inflections or "elbows" in the data set that would typically suggest a potential cluster solution. As an alternate method, I generated a second scree plot that reflects the absolute difference between the actual and random SSE against the first 25 cluster solutions (Figure 7.17b). In this case, the most obvious peak in the distribution of difference suggests a potential three cluster solution.

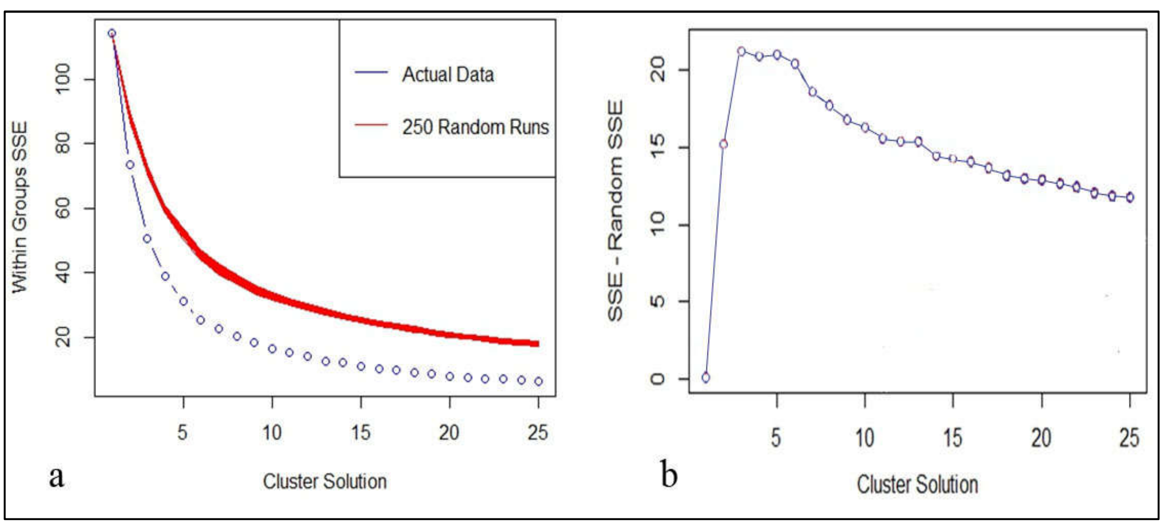

Figure 7.17. Plots of the Sum of Squared Error for All Cases for: A.) Actual and Randomized Data against the First 25 Cluster Solutions; B.) Difference in SSE between Actual and Randomized Data for the First 25 Cluster Solutions

The scatterplot in Figure 7.18 displays the three cluster solution assignments for each pottery sherd against the first two dimensions of the PCoA. Rather than identify two smaller clusters and one large, the cluster solution splits what appeared to be a larger cluster into two regions and clusters the two smaller groups together. A similar result was found when applying K-medoids to subsets of the data (e.g., only plainwares). This result is characteristic of K-means and K-medoids clustering methods, as both procedures tend to split clusters into equal-volume regions (Raykov et al. 2016). Regardless, the initial attempt to cluster the data in a way that discriminates between sherds from Veracruz and the Pensacola Missions was somewhat successful. More than half of the Veracruz sherds were grouped in the second cluster, with only seven Florida Indian sherds. The other clusters included most of the Florida Indian sherds, but also many sherds from Veracruz, warranting refinement to the quantitative analysis.

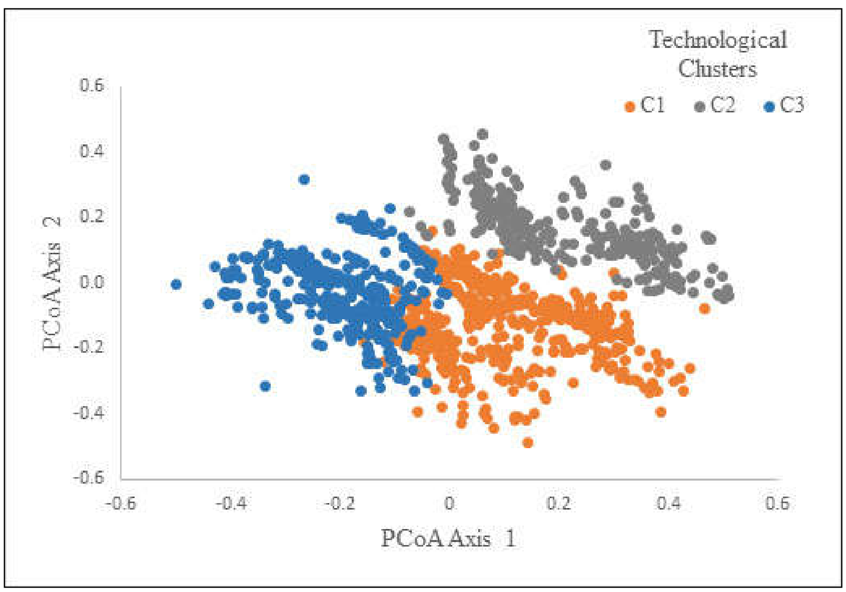

Figure 7.18. Principal Coordinates Plot Showing Cluster Assignments for All Cases Used in the Quantitative Analysis

Given the large size and variability within the data set, as well as the small number of clusters initially identified, I next split out the clusters to examine them separately in order to highlight less obvious structure in the data (see Beardah et al. 2002:265). Based on an examination of the three clusters displayed in Figure 7.18 and the characteristic results of K-means and K-medoids methods noted above, I parsed out the raw data into two subsets that combined the clusters 1 and 3 (Subset A) and a second data set that included all sherds from cluster 2 (Subset B). I then reapplied all statistical procedures to each subset separately. This additional step in the analysis allowed for the identification of a large number of clusters within the data.

When analyzed separately, Data Subset A continued to demonstrate overall grouping of Veracruz and Florida Indian sherds (Figure 7.19). As before, I generated two scree plots. The first shows the relationship between increasing cluster solutions and within group SSE and a second plot shows the absolute difference between the actual and random SSE (Figure 7.20). Both scree plots suggest a 16-cluster solution. In Figure 7.21, I display the cluster assignments for each case in Data Subset A on the first three dimensions of the PcoA. Five of these clusters are overwhelmingly similar to the Veracruz assemblage, suggesting that the associated presidio sherds (n=271) were either imports or locally manufactured using techniques brought by castas (Table 7.10). Another five clusters included Florida Indian sherds, suggesting that associated presidio sherds (n=188) also were manufactured using techniques commonly employed by Florida Indian potters. The remaining six clusters were not as clearly associated with either baseline assemblage. Three of these clusters were similar to a substantial number of

Veracruz sherds, but there was enough Florida Indian pottery included in these clusters to introduce uncertainty. As a result, I designate presidio sherds in these clusters "likely casta/imported" (n=97). Presidio sherds associated with the remaining three clusters were left unassigned.

Data Subset B produced similar results, with a smaller number of Veracruz and Florida Indian sherds skewing toward different sides of a scatterplot of the first and second PCoA axes (Figure 7.22). A scree plot between increasing cluster solutions and within group SSE, as well as a plot showing the absolute difference between the actual and random SSE both suggest an 8 cluster solution (Figure 7.23). In Figure 7.24, I display the cluster assignments for each case in Data Subset B on the first three dimensions of the PcoA. Two of these clusters definitively group presidio and Veracruz sherds together (Table 7.10), while four clusters clearly associate presidio sherds with Florida Indian pottery. Presidio sherds associated with the two remaining clusters are ambiguous and remain unassigned.

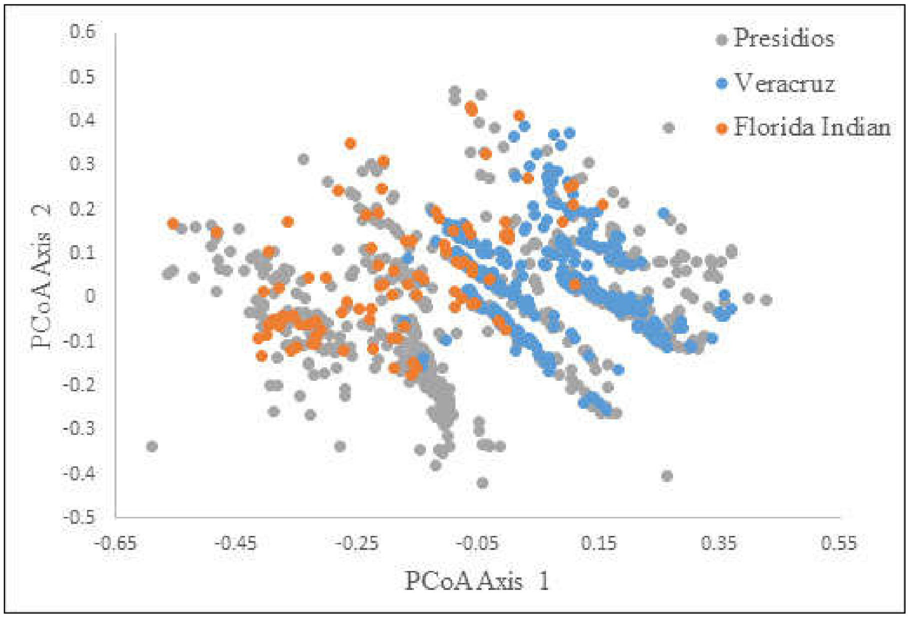

Figure 7.19. Principal Coordinates Plot Showing Cluster Assignments for Data Subset A

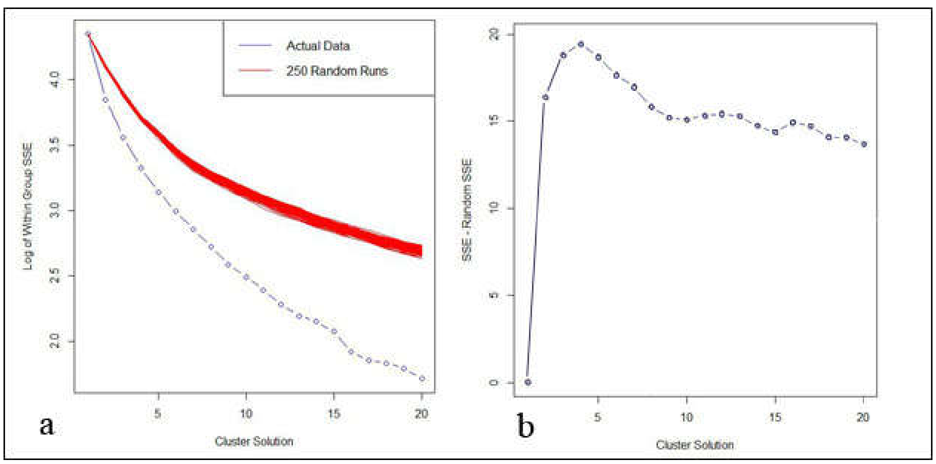

Figure 7.20. Plots of the Sum of Squared Error for Data Subset A for: a.) Actual and Randomized Data against the First 25 Cluster Solutions; b.) Difference in SSE between Actual and Randomized Data for the First 25 Cluster Solutions.

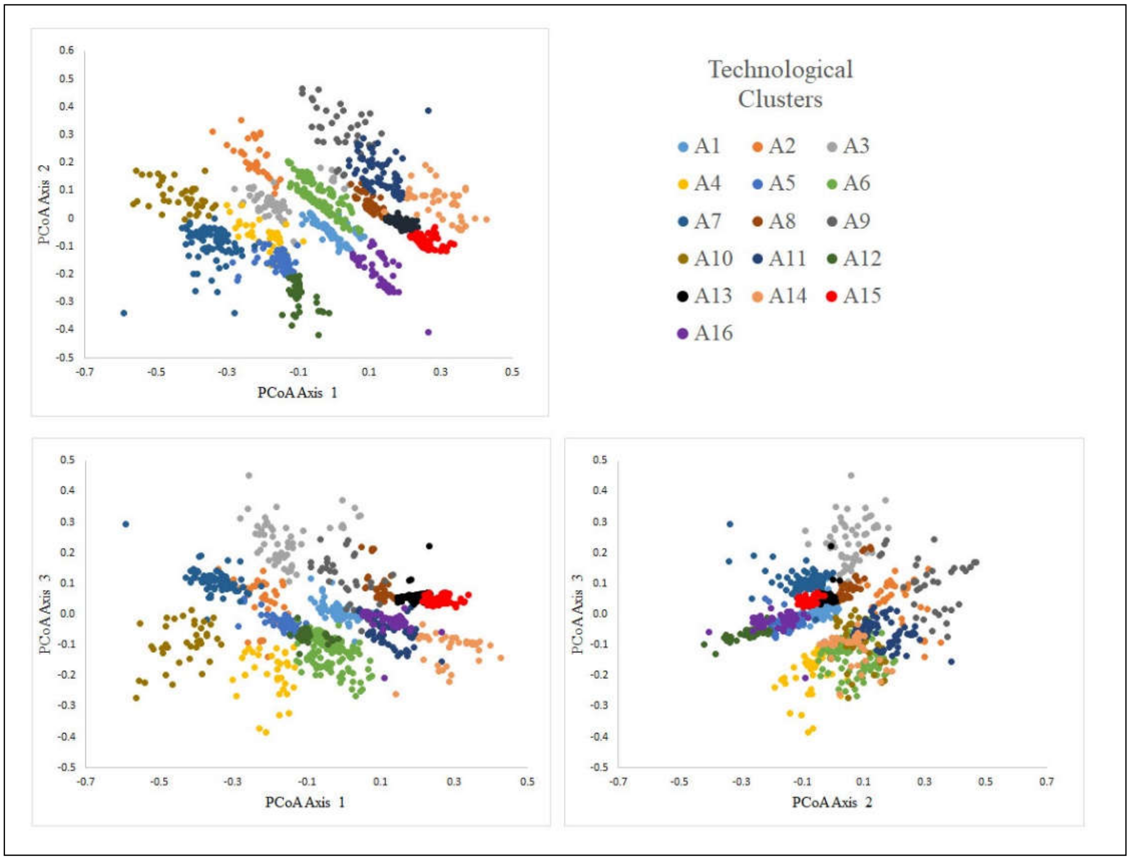

Figure 7.21. Principal Coordinates Plot Showing Cluster Assignments for Data Subset A

Table 7.10. Cluster Assignments and Analytical Groups for Data Subsets A and B

Analytical Group	Cluster	Florida Indian	Veracruz	Presidios
Data Subset A		n=	n=	n=
Casta/Imported	A8	1	44	18
Casta/Imported	A13	0	39	117
Casta/Imported	A14	0	8	36
Casta/Imported	A15	0	30	60
Casta/Imported	A16	0	16	40
Florida Indian	A2	7	1	27
Florida Indian	A3	16	2	37
Florida Indian	A4	7	1	30
Florida Indian	A7	20	0	62
Florida Indian	A10	7	0	32
Likely Casta/Imported	A1	7	49	31
Likely Casta/Imported	A6	14	126	41
Likely Casta/Imported	A11	5	48	28

Unassigned	A12	0	0	49
Unassigned	A5	7	3	45
Unassigned	A9	5	13	18
Data Subset B				
Casta/Imported	B2	1	8	41
Casta/Imported	B7	0	85	2
Florida Indian	B1	6	0	25
Florida Indian	B3	6	1	29
Florida Indian	B4	3	0	73
Florida Indian	B5	2	0	13
Unassigned	B6	1	1	41
Unassigned	B8	0	0	23

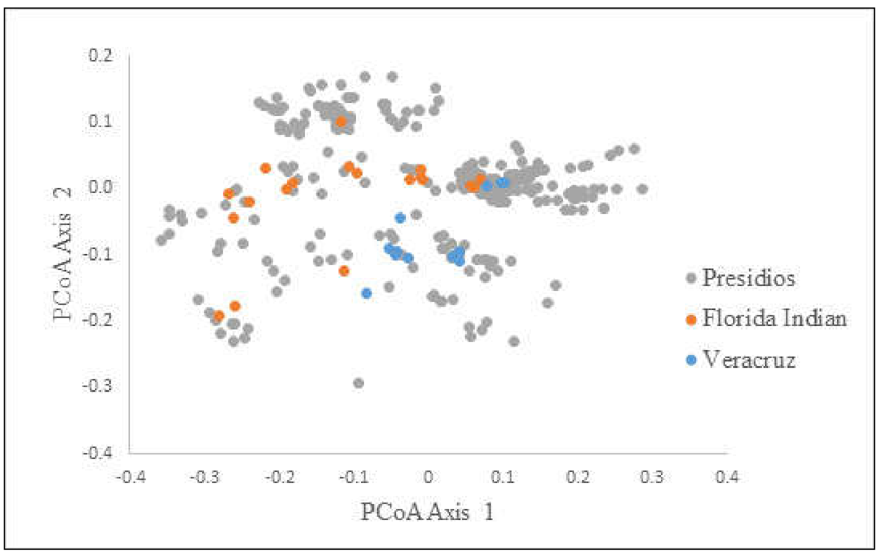

Figure 7.22. Principal Coordinates Plot Showing Cluster Assignments for Data Subset B

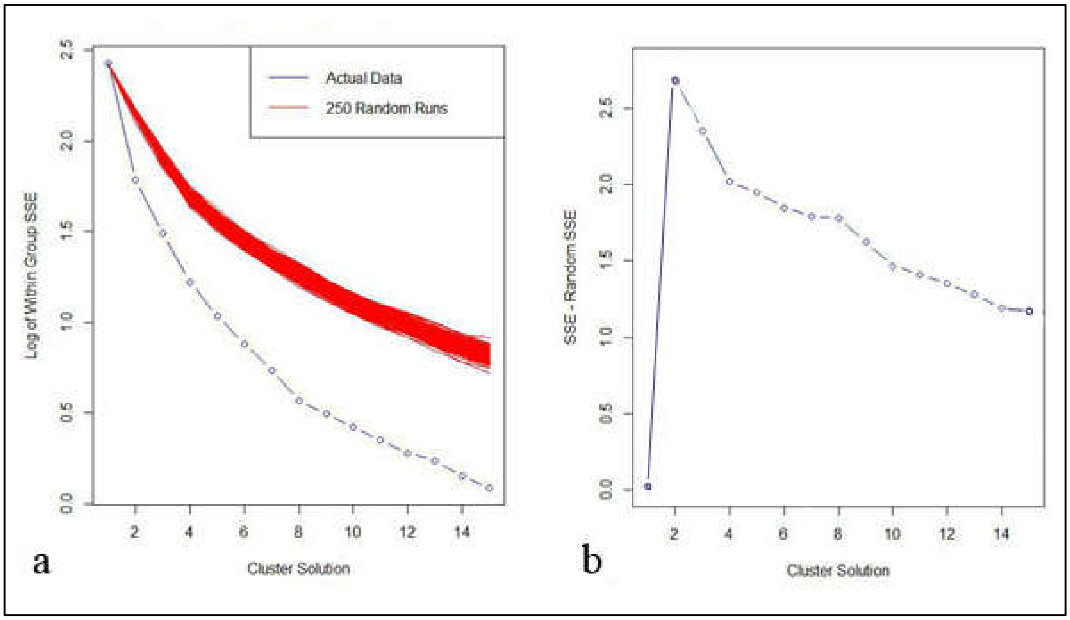

Figure 7.23. Plots of the Sum of Squared Error for Data Subset B for: a.) Actual and Randomized Data against the First 25 Cluster Solutions; b.) Difference in SSE between Actual and Randomized Data for the First 25 Cluster Solutions

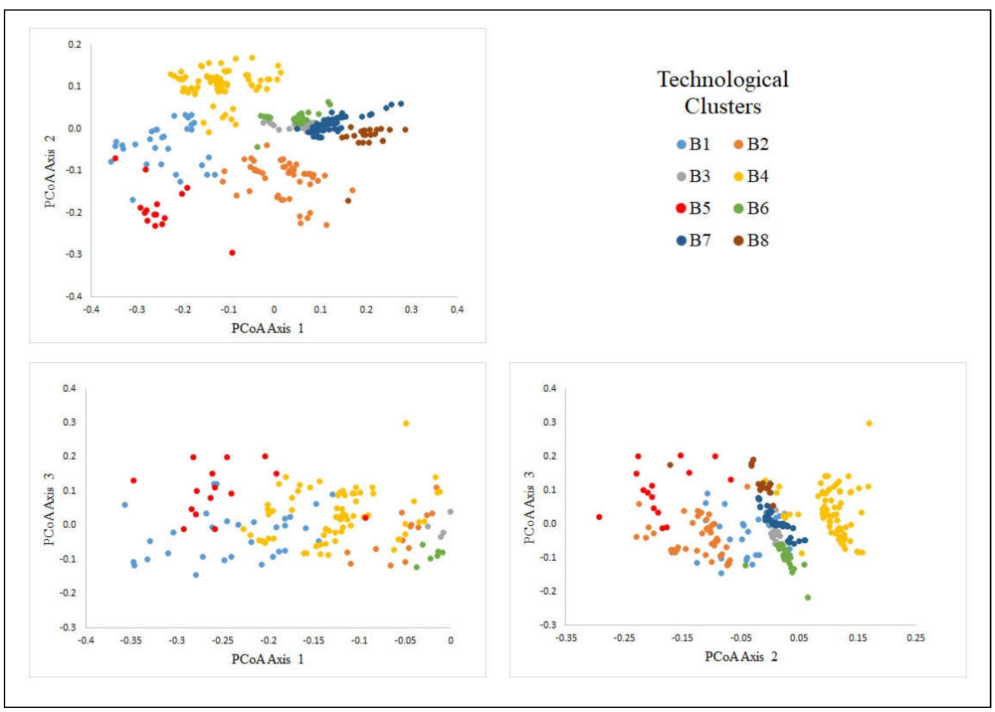

Figure 7.24. Principal Coordinates Plot Showing Cluster Assignments for Data Subset B

Stage 6: Evaluation of Analytical Groups

Throughout the rest of this study, I aggregate presidio sherds into four analytical groups based on broad patterns of technological similarity: casta/imports, likely casta/imports, Florida Indian, and unassigned. Attributes and technological cluster assignments for each pottery sample is provided in Appendix B. In sum, the resulting distribution of macroscopic attributes within the analytical groups is relatively consistent with patterns observed in the baseline data. For instance, wheel throwing technologies (as well as hand building techniques) are associated with presidio sherds that group with the Veracruz assemblage. Grog tempering and hand building technologies, in contrast, cluster with the Florida Indian pottery. Other stages in the production sequence demonstrate overlap between analytical groups that should be expected based on the baseline analysis. For example, most presidio pottery in the casta/imported group is oxidized and most pottery associated with Florida Indian pottery is fired in a reducing atmosphere, but there is also variation from this pattern.

Additional attributes that were not considered in the quantitative analysis are useful for validating the resulting analytical groups. For example, lead glazing was an imported technology that was not considered in the quantitative analysis, but overwhelmingly occurred with casta/imported and likely casta/imported pottery (there were only four exceptions to this pattern that I discuss below). Evidence of specific hand building techniques, such as the use of a mold or a slow wheel, were associated with casta/imported or likely casta/imported groups. Coiling methods, as would be expected, were strongly associated with presidio sherds that cluster with Florida Indian pottery.

I also examined the relationship between analytical groups and data from the XRD and petrographic analyses. Despite constraints previously discussed, XRD phase analysis of 80 presidio sherds and the occasional presence of shell inclusions provided data on the range of firing temperatures associated with each analytical group (Table 7.11). Casta/imported and likely casta/imported sherds varied in firing temperatures, but the small number of moderate or high fired sherds was associated with these analytical groups. All evidence suggests that pottery associated with the Florida Indian analytical group was low fired.

Table 7.11. Firing temperatures for presidio pottery based on the analysis of XRD data and aided by the occasional presence of calcareous inclusions (only shows cases with a spread ≤ 300°C)

Analytical Group	Spread	Min °C	Max °C	Count
Casta/Imported	150	1050	1200	1
Casta/Imported	300	500	800	4
Casta/Imported	200	600	800	1
Likely Casta/Imported	300	700	1000	1
Likely Casta/Imported	200	900	1100	1
Likely Casta/Imported	300	500	800	6
Florida Indian	300	500	800	68
Unassigned	300	500	800	14

Petrographic point counting analysis of 39 presidio sherds also provides additional independent assessment of the analytical groups. First, I examined inclusion type and size distribution in presidio sherds to distinguish between natural and intentionally added aplastics. The volumetric proportions of clay, silt, and natural sand varied for the presidio sample (Figure 7.25). Some sherds in the Florida Indian analytical group (n=21), however, appear to have a slightly higher percentage of silt, which could suggest a different clay source. Tempering practices represented within the Florida Indian analytical group also are relatively similar to decorated Florida Indian sherds (Figure 7.26). Size distribution of sand inclusions in casta/imported pottery (n=11), shows that nearly half of them contained only natural inclusions in the paste, with no addition of temper. This pattern is similar to pottery from Veracruz. When temper was added to the paste of casta/imported sherds, particle density was more variable. This variability also is apparent in the likely casta/imported group (n=5). Increased variability may be due to the small sample size or to adjustments made by casta potters to a new environment with different local resources.

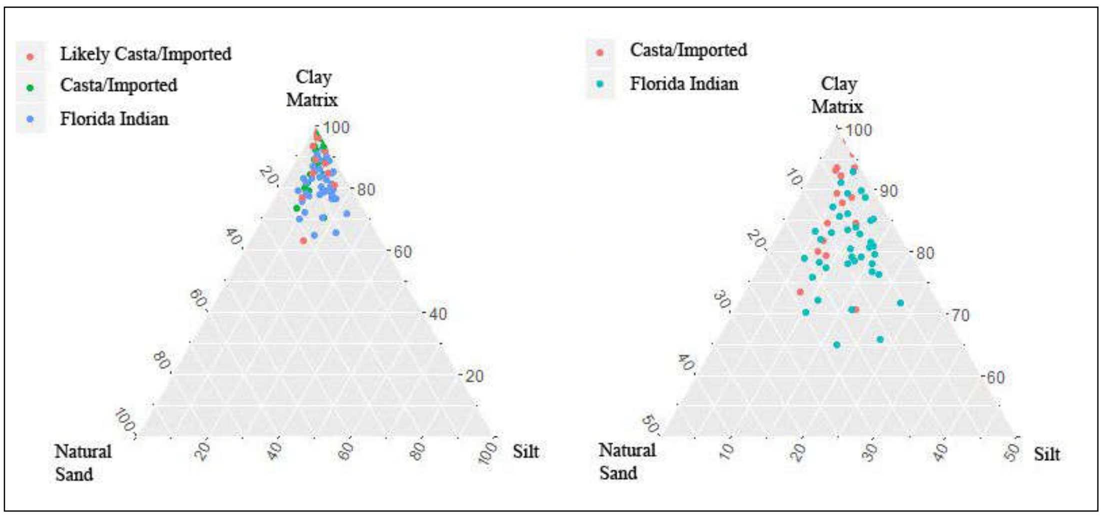

Figure 7.25. Ternary Diagrams of the Percent of Clay Matrix, Natural Sand, and Silt from Point Count Analysis of Ceramic Thin Sections from Mission Escambe and Pensacola Presidios

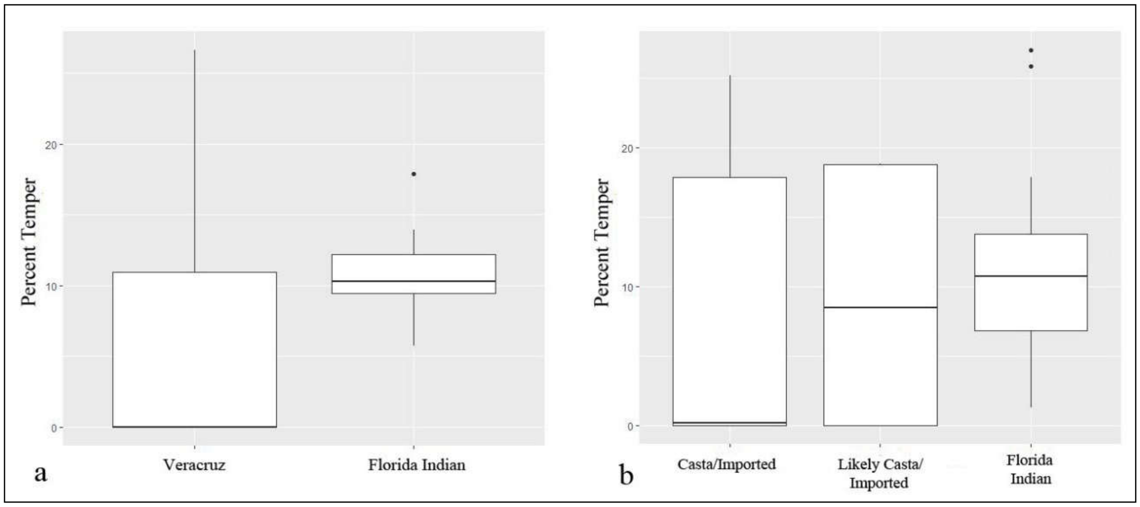

Figure 7.26. Box Plots Showing the Percent of Temper in Pottery Pastes Based on Point Counting of Thin Sections from: a.) Veracruz and Decorated Florida Native Pottery; b.) Analytical Groups

Given that the presidios were pluralistic communities that were occupied over multiple generations, I expected that if casta craftsmen were producing pottery in Pensacola, some changes in technological styles were likely. In addition to adjustments to local resources, interaction with Florida Indian craftsmen could lead to technological change. Technological transfer could occur in either direction, but these changes are not necessarily easy to recognize. As I have shown, there was some overlap in the technological traditions at every stage of production with few technological attributes that were exclusive to only one of the baseline assemblages. Exceptions included the use of the wheel and lead glazes, which were introduced to Pensacola through imports and possibly by casta potters. Grog temper, in contrast, was unique to Florida Indian pottery, at least in the baseline assemblage. Aside from vessel forms, these attributes offer the most obvious potential indication of hybrid practices.

As I noted above, four lead-glazed sherds from the presidios were associated with the Florida Indian analytical group. Two of these sherds were grog tempered and one was also wheel thrown. These sherds demonstrate obvious examples of technological mixture. Although these sherds clustered with the Florida Indian analytical group, I view this assignment with some skepticism. There is no indication that the wheel or glazes were ever adopted at Mission Escambe, and in fact, lead-glaze pottery and other imported artifacts are relatively scarce at the mission (Worth et al. 2011). Possibly glazes were adopted at the other mission locations or by Florida Indians at the presidios, but it seems doubtful that they adopted the wheel. As I have noted previously, primary forming techniques were most resistant to change and the wheel in particular would require learning entirely new motor skills. For these reasons, the wheel was rarely adopted by potters in Mesoamerica (Arnold et al. 2007). Even if the wheel were adopted by Florida Indian potters, this would suggest that they learned the technology from casta potters in Pensacola. Either way, these sherds suggest that castas were engaged in some local pottery production in Northwest Florida and that there was at least some blending of technological styles. In the next chapter, the study of pottery provenance will add further assessment of the validity of these analytical groups and differentiate between pottery that was imported and locally made by castas.

Summary

Analysis of the chaîne opératoire of Veracruz and Florida Indian pottery production indicates differences in technological styles at every stage of pottery manufacture. Generally, however, there also is enough overlap that a multivariate quantitative approach is needed to differentiate between presidio pottery that is similar to Veracruz versus Florida Indian technological traditions. Using a multi-stage analysis, I identified 24 technological clusters that I aggregated into four analytical groups: casta/imported, likely casta/imported, Florida Indian, and unassigned. These analytical groups are based on relative similarities in technological attributes that are shared with baseline pottery. Iterative analyses of subsets of the data and the systematic removal, lumping, and splitting of variables suggested that the analytical groups are relatively stable and robust. Further evaluation of the groups based on original variables included in the quantitative analysis, as well as independent attributes, lends further support for their analytical usefulness, although some hybridity in the sample is also indicated.

A degree of technological mixture is an important and somewhat expected development that likely occurred because of changes in natural resources available to casta potters in a new environment and through interaction among artisans. This hybridity suggests that casta potters were at work at the Northwest Florida presidios, a contention that is supported through chemical characterization in the following chapter. Technological style analyses also indicate that native potters produced some of the pottery represented by plain sherds found in presidio contexts. The provenance study in Chapter 8 provides a means to further test technological groupings and to distinguish between imports and pottery produced locally by castas at the presidios. Together, the technological style analysis and the provenance study provide the necessary information to assess labor relations and relational connections in Chapter 9.

[1]Pigott's (2015:66) analysis of plain rims and decorated sherds from Mission Escambe provides additional insights into the potential range of variation in vessel forms recovered from Mission Escambe. Her analysis identified 158 sherds with identifiable vessel forms, including 29 simple jars, 29 flaring rim jars, 79 simple bowls, and 21 carinated bowls. Pigott did not included any analysis on the form of vessel bases.

[2] The color-composition relationship is nearly, but not perfectly, logarithmic due to other factors that can impact redness. Specifically, in low iron samples, lightness values can shift based on the particle size of pigment "dilutants" (Hurst 1977:175). Because clay is the principal dilutant in all pottery samples, this effect is relatively standardized between samples.

[3] The number of plain sherds analyzed petrographicaly were bolstered by four additional samples that I selected from presidio assemblages, which had membership in PIXE core groups and were of possible Mexican or Veracruz origin (see Chapter 8).

[4] I am grateful to Ann Cordell and David Killick for helping me to identify these highly altered rock fragments from thin-sections.

[5] Pigott's (2015) study is based upon the analysis of decorated Indian sherds and plain rim sherds recovered from the 2009 to 2012 excavations at Mission Escambe. The distribution of inclusion types was reported as percent of weight only.

[6] Rye (1981:61) refers to these variables as "secondary" or "checking" attributes as they are not direct evidence of forming, but combined with other evidence may be informative.

[7] This process also included the splitting and lumping of variables. For instance, for the quantitative analysis, I ultimately lumped all hand-built pottery under a single category as more specific forming techniques were identifiable for less than 50 percent of sherds.

[8] Continuous data was transformed to categories using a number of hierarchical and non-hierarchical functions for creating univariate class intervals (see for example Armstrong et al. 2003).

CHAPTER 8

DETERMINING GEOGRAPHIC ZONES OF POTTERY PRODUCTION

I examine relational mechanisms of social change by testing previous assumptions about *both* the identity of pottery producers and the provenance of production. Given known population movements from colonial Mexico to Northwest Florida, these assumptions need to be assessed independently. That is, casta pottery may have been imported, demonstrating external interaction, or castas may have produced pottery locally. Local production by casta colonists has not been adequately considered for presidios in colonial La Florida and challenges traditional assumptions about labor relations in the Southeastern borderlands. In the previous chapter, I examined technological styles of pottery to discriminate between production by Florida Indians and casta/imports. In this chapter, I examine the provenance of pottery to determine where these vessels were produced. This analysis is particularly necessary for determining the strength of regional and external connections on the one hand, and local labor relations between native and casta populations on the other.

I use proton induced x-ray emission spectrometry (PIXE) as a principal tool for approximating the location of ceramic production. Supplementary data and analysis of a small sample using NAA is reported in Appendix F. In the following sections, I describe the sample and statistical methods used to analyze the PIXE compositional data. I then summarize the resulting core, non-core, and provisional compositional groups. Finally, I relate the provenance study to the technology based analytical groups that I presented in the previous chapter. Compositional analysis provides an additional check on the utility of technology-based analytical groups and tests traditional assumptions about labor relations and interaction in Northwest Florida. The latter I discuss in detail in Chapter 9.

The analyses presented in this chapter identify production zones in Central Veracruz, the Basin of Mexico, and Northwest Florida. The results suggest that the Port of Veracruz did depend on local and regional production, despite the port's central location along a major trade route. Similarly, the Pensacola presidios were supplied with pottery through local or regional production. Local production in Northwest Florida included the manufacture of some lead-glazed wares, a prospect that researchers have not previously considered. In addition, pottery from the Basin of Mexico was imported to both locations and some pottery manufactured in Veracruz also was shipped to the presidios.

Provenance Postulate and the Advantages of Multiple Analytical Techniques

The underlying principal involved in the "sourcing" of archaeological materials is the provenance postulate[1] (Weigand et al., 1977; see also Neff and Glowacki 2002). In brief, this postulate states that in order to approximate the geographical origin of artifacts or to group artifacts of unknown origin based on similar natural sources, between-source variability must exceed within-source variation. For ceramics, the extent of variation between and within compositional groups involves a combination of at least four different factors: 1) variation within the natural clay(s) procured to manufacture pottery; 2) alterations introduced by the potter (e.g., addition of tempers); 3) post-firing alterations, such as through daily use or post-depositional diagenesis; and 4) the chemical or mineralogical techniques used to detect compositional variation. The first three factors affecting chemical or mineralogical variability relate to the life history of the pot (Neff and Glowacki 2002:7-8). The final factor, the chosen analytical technique, can vary in sensitivity to each of the previous three sources of variation. Therefore, it is beneficial to incorporate multiple methods of analysis in provenance studies (Bishop 1980; Bishop et al. 1982; Stoner et al. 2008; Wallis 2011). In this study, I incorporate three methods of analytical analysis: PIXE, NAA, and thin-section petrography.

PIXE is the workhorse of my provenance study. Smaller samples were drawn from each PIXE compositional group and analyzed using NAA (pottery n=50; clay n=10) and petrography (n=75). These analyses are referenced in this chapter, but supplementary data and analysis is provided in Appendices C and F. I use PIXE as a bulk compositional method to define chemical groups of pottery and clay samples. Most of the groups formed by the analysis of PIXE data are associated with clays collected from either Veracruz or Pensacola. Comparison of samples from each PIXE group to MURR's comprehensive database of compositional data supports the general results of the PIXE analysis and suggests a provenance in the Basin of Mexico for two groups that were not associated with any of the clay samples. Because both PIXE and NAA are bulk chemical analyses, they sometimes provide limited resolution at intra-regional scales (e.g., Stark et al. 2007; Steponaitis et al. 1996). Thin-section petrography compliments bulk chemical analysis, improves resolution, and reveals the effects of temper on the chemical composition of ceramic vessels (see Appendix C for a description of petrographic data).

Samples and Procedures for Defining Compositional Groups Using PIXE

Neff and Glowacki (2002:6) identify two approaches for determining artifact provenance. The first approach involves identifying known reference groups, often from raw material samples, and characterizing them statistically. Unknown samples can then be statistically compared to the range of variation within known groups to determine artifact sources for the unknowns. This approach is common for natural sources that are localized and well-defined, such as obsidian outcrops. Because clays and other ceramic raw materials tend to be more broadly distributed, a second approach is common for pottery provenance. In this approach, unknown pottery samples are analyzed using quantitative methods to parse them into compositional groups. These pottery reference groups are compared to raw clay samples. I employed this second approach for the PIXE analysis.

PIXE Sample

All 26 clay samples (Pensacola n=12; Veracruz n=14) and approximately a third (n=535) of the larger pottery sample described in Chapter 6 were analyzed by PIXE, including 29 sherds from a prior pilot study (Table 8.1). A noted bias of sample selection was the overall size or weight of individual pottery sherds. Analysis by PIXE required the destruction of approximately 1-gram (about 1 cm x 1 cm) of each sherd. Further analyses by NAA or petrography meant additional destruction of individual sherds. To ensure that an archival sample was retained for all sherds and pursuant with agreements made with loaning agencies in the United States, sherds that weighed less than 5 grams were removed from consideration before implementing sampling procedures.[2]

Table 8.1. All Pottery Samples Analyzed by PIXE for this Study

Context	Plain	Lead-Glazed	Painted/Slipped	Decorated Indian	Total
Port of Veracruz					
17th Century	34	28	14	NA	76
Early 18th Century	33	37	13	NA	83
Late 18th Century	18	19	7	NA	44
Subtotal	*83*	*84*	*33*	*NA*	*203*
Pensacola - Presidio Santa Maria					
Convicts' Barracks	10	10	0	NA	20
Soldiers' Barracks	15	9	2	NA	26
Officers' Barracks	27	19	9	NA	55
Santa Maria Stamped	0	0	0	NA	2
Pilot Study Samples	12	0	0	1	13
Subtotal	*64*	*38*	*11*	*1*	*116*
Pensacola - Presidio Santa Rosa					
1722 Central West Area	9	13	2	NA	24
1722 East Area	13	11	1	NA	25
Post-1740 East Area	15	8	1	NA	24
Post-1740 Northwest Area	13	11	4	NA	28
Post-1740 "King's House"	6	9	4	NA	19
San Marcos Stamped Pottery	0	0	0	11	11
Pilot Study Samples	13	0	0	3	16
Subtotal	*67*	*52*	*12*	*15*	*147*
Pensacola - Presidio San Miguel					
Commanding Officer's Compound	8	12	4	NA	24
Mission San Joseph de Escambe		0	0	45	45
Grand Total	223	186	60	60	535

My goal was to select a stratified random sample for the PIXE analysis, choosing equally between each pottery category (plain, lead-glazed, painted/slipped, and decorated Florida Indian). This approach allows for better sampling of categories that occur in lesser amounts and reduces sampling error (Orton 2000:30). Because there were relatively few painted/slipped and decorated Florida Indian wares, I first selected *all* sherds of sufficient size from these categories for the PIXE analysis. Next, for plain and lead-glazed pottery, I attempted to sample equally from each context in Pensacola and the Port of Veracruz. Samples were randomly selected from each site context using lists of random numbers (see Chapter 6). As a final check, I compared the selected samples against a preliminary analysis of technological styles, which suggested that samples were representative of the diversity of technological styles present in the larger sample (see Chapter 7).

Analytical Methods

The objective of the PIXE analysis is to partition sherds into groups that can be statistically characterized by similar chemical composition and then to approximate the provenance of each of these groups. In this section, I describe the analytical procedures that I used to define and evaluate compositional groups for this study. The statistical analyses were conducted using a combination R/R Studio, Systat, and routines written by MURR researchers for GAUSS. The procedures were informed by previous studies using PIXE (e.g., Alawneh 2006) and NAA (e.g., Duff 2002; Neff 2002; Peeples 2011) and are outlined in Table 8.2.

Table 8.2. Analytical Procedures for Defining and Evaluating PIXE Compositional Groups

Stages of Analysis		Description of Procedures
1	Data Preparation	Data standardization/normalization, missing variable substitution, and rationalization for element inclusion
2	Initial Compositional Groups	Cluster analysis using Wards, average linkage (hierarchical), and k-means (non-hierarchical) methods
3	Core Compositional Groups	Mahalanobis distance and Hotelling's T^2 statistic based on log transformed elemental data
4	Non-Core Compositional Groups	Mahalanobis distances and Hotelling's T^2 statistic based on PCA scores
5	Provisional Regional Groups	Mahalanobis distances and Hotelling's T^2 statistic based on PCA scores with loosened thresholds for equivocal membership

Stage 1: Data Preparation. The first step is to prepare the raw elemental data measured by PIXE for quantitative analysis. Elements that were consistently below the level of detection were removed. The remaining seven elements (Mg, Al, Si, K, Ca, Ti, and Fe) were transformed to base 10 logarithms in order to standardize and roughly equalize the variance between elemental concentrations (Bishop and Neff 1989; Neff 2002). The procedure removes the effects of different magnitudes of elemental concentration so that more abundant elements do not dominate and define compositional groups. This transformation also has been shown to normalize elemental data, which is a prerequisite of the statistical methods that I apply (Neff 2002:16-17).

In a few cases, calcium was below the level of detection (pottery n=12; Florida clays n=4). Many of the sherds without detectable calcium were decorated Florida Indian wares and the absence of calcium is likely due to comparatively low calcium content in most Northwest Florida clays. Rather than remove the sherds and clays from the analysis, I temporarily substitute an elemental value that minimizes the multivariate distance to the centroid of the whole dataset using Mahalanobis distance (see discussion below). When evaluating compositional groups, missing values are recalculated so as to minimize the distance to the centroid of the group in which the sample is currently assigned.

It is worth noting that researchers engaged in compositional studies of pottery in the Southeastern United States often eliminate calcium and strontium and mathematically remove their effects on other elements prior to statistical procedures. This has been done to remove the effects of variable amounts of shell temper (Cogswell et al. 1998; Steponaitis et al. 1996) or to remove the diagenetic effects of burial in shell middens (Wallis 2011). I chose to keep calcium in the present study for several reasons. First, none of the pottery sherds were recovered from shell middens. In addition, while a small number of shell tempered sherds were included in the sample (n=34), in most cases the shell had completely dissolved leaving behind only platy voids. Petrographic analysis did not reveal evidence of secondary calcareous deposits in pottery pores that might suggest contamination by soluble calcium carbonate, which is sometimes an issue in wet environments (Quinn 2013:207; Wallis 2011:95-97). Finally, calcium typically is included in the study of provenance in most other regions. Calcium has been included in colonial provenance studies of Mexican and Spanish majolica (Iñañez et al. 2009; Rodríguez-Alegría 2002b). The element also has proven useful for discriminating bulk compositional groups for pottery in Veracruz (e.g., Eschbach 2019; Stoner 2008) and was similarly important for identifying groups in the present PIXE analysis.

Stage 2: Initial Compositional Groups. Neff (2002) argues that multiple statistical techniques should be used for pattern recognition and that resulting groups should be treated as hypotheses to be evaluated independently. This approach recognizes that each statistical method has its own weaknesses and that using alternate methods reduces the potential for erroneous results. Following Neff's recommendations, I applied both hierarchical (Wards method and average linkage) and non-hierarchical (k-means) cluster analyses on a Euclidean distance matrix of the log-transformed elemental concentrations and then compared the results (for discussion of these methods see Baxter 2003:90-104; Kaufman and Rousseeuw 1990; Kintigh and Ammerman 1982; Shennan 1997:234-258). I found that when using a 10-cluster solution each of these procedures produced comparable group membership for most of the samples. I also found that groups made sense based on contextual data. For example, decorated Indian pottery was never assigned to the same groups as samples from Veracruz and pottery categories tended to cluster together.

Stage 3: Core Compositional Groups. I further assess initial group assignments using statistical procedures to define "core groups" (sensu Duff 2002:103). Through this analysis, samples with low probability of group membership or possible membership in multiple groups are removed. Resulting "core groups" are analytically distinct and most likely to approximate geographical provenance of raw sources (Duff 2002:103). To do this, I used the Hotelling's T^2 statistic based on jackknifed Mahalanobis distances (Neff 2002). Mahalanobis measures the distance in multivariate space between a sample and the centroid of its assigned group. A conservative jackknifed method removes the sample under consideration from each group prior to comparing the sample to the group centroid. Hotelling's T^2 was then used to calculate the probability of a sample's membership in every group. An advantage of this approach is that it considers the probability of a sample belonging not only to its current group assignment, but also its probability of membership in every other group. Group membership probabilities are reported independently for each group, ranging from 0 to 100 percent probability for each individual group.

Because jackknifed probabilities are extremely conservative, relatively low probabilities are acceptable (Baxter 2003; Duff 2002:103; Neff 2002:33). There is no standard threshold for rejecting a sherd's membership in a group, although it is common to accept a 5 percent or greater probability of membership so long as there is less than 1 percent probability of membership in any other group (Baxter 2003; Duff 2002:103; Neff 2002). I determined my own thresholds through experimentation. Ultimately, I adopted thresholds that produced discrete groups that were consistent with independent contextual data. I set the probability of group membership at greater than 2 percent so long as probability of membership in the assigned group was at least five times greater than its probability of membership in any other group. At the same time, probability of group membership in any other group could not exceed 10 percent.[3] Samples that did not meet these thresholds for group assignment were removed and the procedure was repeated until all thresholds were met for all core samples. I then projected unassigned samples onto the core groups. Samples that met the threshold for group assignment were added back and the process was repeated until probabilities for membership stabilized, forming final core groups (see Duff 2002; Peeples 2011).

The strict thresholds for formation of core compositional groups required the removal of 40.1 percent (n=214) of pottery samples. This is not unusual for conservative methods (Neff 2002:33-34). This approach has the advantage that probabilities of group membership are high for 320 pottery sherds assigned to one of 10 core groups. The disadvantage is that sample sizes are drastically reduced. I increase sample sizes by identifying non-core members for each group.

Stage 4: Non-Core Compositional Groups. Many of the pottery samples that were removed by the high thresholds described above were still compositionally similar to samples in the core groups. Following procedures recommended by Duff (2002:103-105) and Peeples (2011:114-115), I loosened the thresholds for group membership to identify non-core members. In this way I can examine patterns of production, consumption, and exchange with statistically rigorous core groups, but also bolster sample sizes with slightly less rigorous non-core members.

To identify non-core members, I first used principal components analysis (PCA) to extract component scores for the core group samples. PCA is a method of ordination that reduces the dimensionality of a dataset, while retaining a substantial proportion of the variability contained within a small number of axes or components (Baxter 2003:73-82; Shennan 1997:269-287). I then projected unassigned samples against the core groups using the first five principal components, which accounted for 99.1 percent of the variation in the data. Hotelling's T^2 statistic based on jackknifed Mahalanobis distances was again used to estimate the probability of group membership, but this time based on component scores. The use of only component scores that account for most variation within the dataset increases the probabilities of group membership for some samples by removing differences in elemental composition that account for only a small amount of variation within the whole dataset (Neff 2002:31-33).

Because the use of a subset of data can increase the likelihood of misclassification (Neff 2002:31-33), I set a higher threshold for non-core group membership. For a sample to be considered a non-core group member its probability of group membership had to be at least 2 percent, but also had to be an order of magnitude higher for one group than for any other group. For example, if a sample had a 90 percent probability of membership in Group 1, but a 9.1 percent probability of membership in Group 10, the sample would be left unassigned. Unlike the process of identifying core groups, non-core group assignment was not iterative. That is, I did not add non-core group members back to the core groups for additional evaluation as this would have the effect of blurring the discrimination between all groups (Neff et al. 2006:62). The procedures set for non-core membership allow me to assign an additional 80 sherds (14.9 percent of the PIXE sample) to a compositional group, increasing sample size without sacrificing statistical rigor. However, by setting a high threshold for non-core group membership, 25.1 percent of the total sample remains unassigned. I, therefore, implemented one additional procedure to maximize sample size.

Stage 5: Provisional Regional Groups. Some of the remaining 134 unassigned samples had a low probability of membership in any group. This makes sense as pottery could have arrived in Pensacola and Veracruz from diverse production locations in Europe or the Americas, but did not necessarily form identifiable chemical groups.

However, many of the unassigned samples were excluded from core and non-core groups because they had equivocal membership in multiple groups. This was particularly an issue given the high threshold set for non-core group membership.

Although these samples cannot be confidently attributed to any one compositional group, many were only equivocal between groups that had a likely provenance in the same region. For example, pottery in Groups 1, 4, and 10 all were probable products of Northwest Florida. Returning to the example given above, a sample that had a 90 percent probability in Group 1 and a 9.1 percent probability of membership in Group 10 would be not meet the threshold for non-core membership in a specific group. While specific group membership was equivocal in this example, the sherd was still likely produced locally in Northwest Florida.[4] Equivocal membership within a region is not unusual as zones of variation often form a gradient, overlap, or can be confounded by the addition of temper. Schachner (2007:129), for instance, has shown that the use of grog can increase the likelihood of membership in multiple compositional groups that are associated with a single region.

Because understanding provenance, even at a larger regional scale, is useful for answering questions about labor relations and interaction, I use procedures to form additional provisional regional groups. To do this, I used the probabilities of group membership that were generated to assess non-core group assignments. In order to be included in the provisional groups, sherds first had to have at least a 2 percent probability in at least one group. Equivocal membership then was allowed so long as other possible membership was restricted to the same region. I defined equivocal membership as a probability of membership in one group being less than one order of magnitude than its probability of membership in another group.

A number of sherds (n=26) had very high, although equivocal, probability of membership in Florida pottery groups. These included 6 decorated Florida Indian pottery sherds from Mission Escambe. The only other cases of equivocal membership are seen between Groups 3 and 8 (n=23). These compositional groups are not associated with clays from Florida or Veracruz. Analysis of NAA data and comparison with MURR's database indicate that pottery in these groups were produced in the Basin of Mexico (Appendix F). In total, this procedure allowed for the assignment of an additional 49 sherds (9.2 percent of the total sample) to provisional regional groups associated with either Northwest Florida or the Basin of Mexico.

Summary Results of the Compositional Analysis

Following the above procedures, 320 sherds (59.9 percent of the sample) were assigned to 10 core compositional groups. Another 80 sherds (14.9 percent of the sample) were identified as non-core members of the same groups. Finally, 49 sherds (9.2 percent) can be provisionally placed in regional groups associated with either the Basin of Mexico or Northwest Florida. The remaining 85 samples (15.9 percent) could not be assigned to any specific compositional group or physiographic province. Figure 8.1 displays the relationships among core compositional groups defined by the first two principal components based on log transformed element data. The first component shows a strong positive loading on calcium (Ca). The second component is positively loaded on potassium (K) and magnesium (Mg).

Natural variations within geological formations makes it impractical to identify specific clay deposits used by potters, but compositional groups do broadly reflect the geographic context in which raw materials were procured. Ethnoarchaeological studies of modern potters indicate that craftsmen rarely traveled far to collect raw materials to produce their vessels and so areas of procurement can be linked to geographic zones of production. For example, in his survey of 111 ethnographic cases, Arnold (1980:149, 1985:39-49) found that while potters did not travel more than 50 km, most craftsmen (84 percent) traveled less than 7 km. Thus, chemical composition provides a way to associate pottery found in archaeological contexts in Veracruz and Pensacola with approximate locations of production.

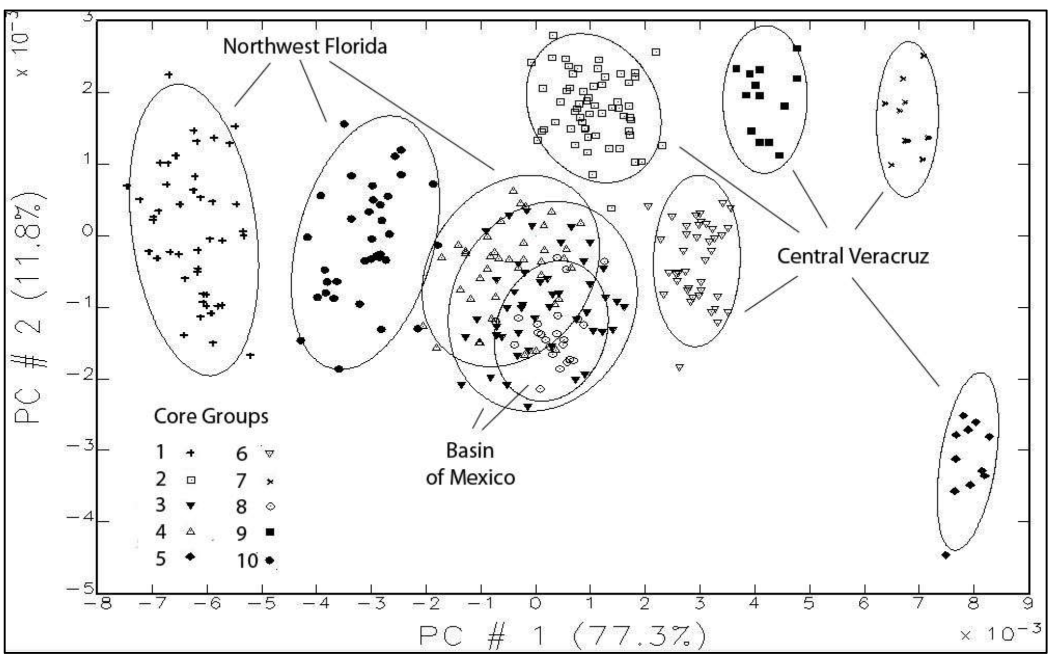

Figure 8.1. Bivariate Plot of the First Two Principal Components for Core Compositional Groups Based on PIXE Elemental Data.

Compositional Groups with Central Veracruz Provenance

Five of the compositional groups (2, 5, 6, 7, and 9) include ceramic vessels that are potential products of central Veracruz (Table 8.3). These groups together include 152 pottery sherds with most (92 percent) recovered from the Port of Veracruz (Table 8.4). These results suggest that the port did depend on the local and regional production of plain, lead-glazed, and some painted/slipped wares, despite access to trans-Atlantic and interregional trade through the port. In contrast, only a small number of pottery vessels from central Veracruz were identified from presidio contexts despite the port's role as a central gateway for the legal provisioning of Spanish Northwest Florida.

PIXE Group 2. Group 2 includes, as a core member, a clay sample collected near Tlacotalpan (Figure 8.2). Clay collected near Villa Rica also was included in this group as a non-core member. Both these clays were collected from the coastal plain of central Veracruz, but from within different drainage basins. Previous analysis of only the Veracruz assemblage revealed additional structure in the data, suggesting that there are in fact two sub-groups in Group 2 (Eschbach 2019). One of these groups is associated with clay collected near Tlacotalpan and the other with clay from Villa Rica. Most of the pottery sherds in this group are plainwares recovered from neighborhoods in the Port of Veracruz. Only two sherds are from Pensacola. A red painted sherd is from Presidio Santa Maria and a glazed sherd is from Presidio Santa Rosa.

Table 8.3. All Compositional Groups and Counts of Core and Non-Core Members by Pottery Category with Associated Clays and Probable Provenance

	Florida Indian		Plainware*		Lead-Glazed		Painted/Slipped		Pottery	Clays		
	Core	Non-Core	Core	Non-Core	Core	Non-Core	Core	Non-Core	Total	Core	Non-Core	Probable Provenance
Group 1	28	0	15	2	0	0	0	0	45	Escambe	Escambe	Northwest Florida
Group 2	0	0	45	3	6	0	7	0	61	Tlacotalpan	Villa Rica	Central Veracruz
Group 3	0	0	8	5	38	22	0	0	73			Basin of Mexico
Group 4	0	2	30	7	0	0	11	2	52			Northwest Florida
Group 5	0	0	1	0	0	0	10	0	11		Acazonica	Central Veracruz
Group 6	0	0	6	1	30	7	4	0	48		Jamapa/ Cotaxtla	Central Veracruz
Group 7	0	0	7	4	1	1	2	3	18		Tepetates	Central Veracruz
Group 8	0	0	0	0	24	4	0	0	28			Basin of Mexico
Group 9	0	0	4	1	2	1	6	0	14	Cempoala		Central Veracruz
Group 10	6	6	23	7	3	1	3	1	50		Gaberonne	Northwest Florida
Total	34	8	139	30	104	36	43	6	400			

*Plain colonoware sherds from a prior pilot study included in the plainware category

Table 8.4. Counts of Pottery Samples in Each Compositional Group (Core, Non-Core, and Provisional) by Archaeological Site

Provenance/ Group	**Port of Veracruz**	**Mission Escambe**	**Presidio Santa Maria**	**Presidio Santa Rosa**	**Presidio San Miguel**	**Total**
Central Veracruz						
2	59	0	1	1	0	61
5	11	0	0	0	0	11
6	45	0	2	1	0	48
7	18	0	0	0	0	18
9	7	0	3	2	2	14
Basin of Mexico						
3	24	0	24	17	8	73
8	2	0	6	19	1	28
Provisional	0	0	11	10	2	23
Northwest Florida						
1	0	24	0	21	0	45
10	0	9	8	32	1	50
4	0	0	42	9	1	52
Provisional	0	6	8	12	0	26
Total	166	39	105	124	15	449

PIXE Group 5. Pottery vessels in PIXE Group 5 were probably produced along the piedmont in central Veracruz. These sherds have the highest calcium concentration of any sherds in this study (~52 percent CaO). While most samples have calcareous inclusions, petrographic analysis of two of these sherds revealed that these particles are metamorphized limestone fragments that were probably natural inclusions. The clay itself also appears to be naturally calcareous. The high concentration of calcium likely originated from uplifted limestone eroding from higher elevations in the Sierra Madre (see Chapter 6). A single clay sample from Acazonica, located along the piedmont in central Veracruz, was included in the group as a non-core member. Except for one plainware sherd, all the pottery in this group is painted/slipped and recovered from excavations in the Port of Veracruz.

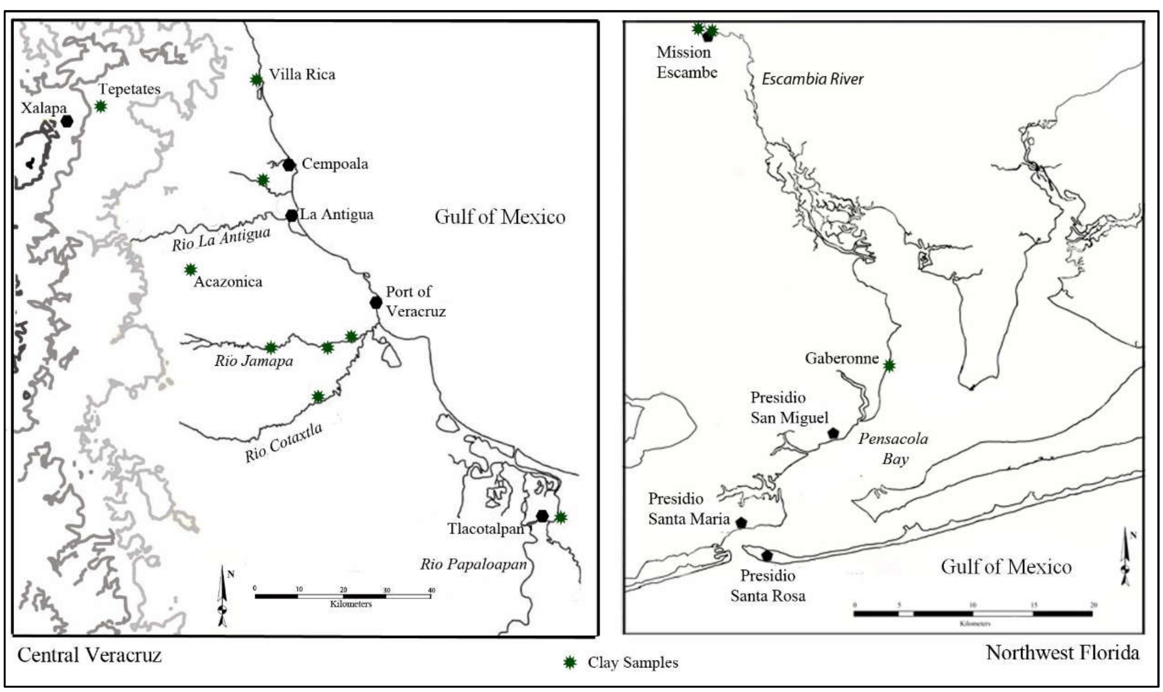

Figure 8.2. Maps of Central Veracruz and Northwest Florida Indicating the Location of Clays with Core and Non-Core Group Membership

PIXE Group 6. Vessels included in PIXE Group 6 were most likely the product of production along the Jamapa or Cotaxtla River drainages. All three clays collected along the Jamapa River and one clay collected along the neighboring Cotaxtla River were included as non-core members of Group 6. Most pottery vessels in this group were lead-glazed, although there were some plain and painted/slipped wares in this group as well. Given that today the mouth of the Jamapa River is located within 10 km of the colonial Port of Veracruz, it is not surprising that most of the pottery in this group were recovered from neighborhoods within the port. A few sherds, however, came from the Pensacola presidios, indicating that pottery manufacture near the port did supply some of the pottery to the presidios.

PIXE Group 7. A relatively small number of sherds are included in Group 7, all recovered from the Port of Veracruz. The pottery is mostly plain or slipped/painted. One clay sample is included as a non-core member. This clay was provided for the study by a potter at San Miguel Aguasuelos, a potting community located to the northwest of Xalapa. The clay was reportedly collected from Tepetates, approximately 4 km from the present-day community (see also Krotser 1974).

PIXE Group 9. Group 9 is the final compositional group with a likely provenance in central Veracruz. This also is a small group, containing only 14 core and non-core members. Half of these sherds are from Pensacola, with all presidios represented. The other half is from the Port of Veracruz. A clay collected near Cempoala suggests the pottery was manufactured in central Veracruz, to the north of the port. Pottery categories in this group are diverse, including plain, slipped/painted, and lead-glazed ware.

Compositional Groups with Basin of Mexico Provenance

By combining PIXE with the analysis of a small sub-sample using NAA, I identified two compositional groups with probable production in the Basin of Mexico. A total of 100 sherds made up these groups with 74 percent of these sherds recovered from presidio contexts, supporting historical documentation of interaction between central Mexico, the Veracruz port, and the Pensacola presidios. This pattern is further supported by the provisional inclusion of an additional 23 sherds that had equivocal membership between the two groups.

PIXE Groups 3 and 8. Two PIXE Groups (3 and 8) are not associated with any of the clays collected in Veracruz or Northwest Florida. Most of the pottery in this group was lead-glazed (n=88; 87.1 percent of samples in these groups). Sherds mostly were excavated from Florida contexts, with all presidios represented. Twenty-six sherds were from Veracruz, however, suggesting probable pottery production in Mexico or elsewhere. Six core-members from these groups were submitted to MURR for analysis by NAA. Comparison to MURR's extensive database of compositional data suggests that all these sherds were products of the Basin of Mexico. Based on these results, I argue that all the pottery associated with Groups 3 and 8 also were manufactured in the Basin of Mexico. This is not surprising as the royal roads connected the Port of Veracruz with Mexico City, and majolica from central Mexico also was found regularly in both Veracruz and Pensacola.

PIXE Provisional Regional Group. The 23 sherds with equivocal membership in either Groups 3 or 8 were all from presidio contexts in Pensacola. Pottery from all three presidios were represented. As with core and non-core members of these groups, most of these sherds were lead-glazed with only one plainware vessel included.

Compositional Groups with Northwest Florida Provenance

The remaining three compositional groups (1, 10, and 4) represent likely production in Northwest Florida (see Figure 8.1). These groups included 147 sherds, including samples recovered from Mission Escambe and all three presidios. There were no pottery samples collected from Veracruz contexts. Three Florida clays also were included as core and non-core members in two of these groups, adding further support for a Florida provenance (see Tables 8.3 and 8.4; also Figure 8.2). Calcium appears to be the major discriminant between each of these groups. Group 1 is depleted of calcium and Group 4 has the highest calcium of the Florida groups (see Figure 1). There is no evidence that difference in calcium content resulted from post-burial diagenesis. There is some correlation between pottery groups and archaeological sites (e.g., most pottery sherds in Group 4 are from Presidio Santa Maria), but this pattern could relate to cultural factors and shifts in the potting industry (see Chapter 9). The correlation is not absolute in any case and petrographic analysis does not reveal the presence of secondary calcium carbonate that might suggest post-depositional alteration.[5]

Another potential cause of variation between Florida chemical groups are natural aplastics and temper added to clay recipes. Florida pottery was more variable than Veracruz in terms of temper categories (sand, grog, and shell; see Chapter 7), which do not always relate to specific geographic locations (e.g., potters at Mission Escambe may have used several different tempering agents). Macroscopic and petrographic analysis did not, however, reveal any correlation between tempering practices and chemical groups. Grog and shell temper were found in all three compositional groups. In contrast to the variability seen in Veracruz, sand in northwest Florida was made up entirely of quartz. Comparisons of natural inclusions and quartz temper against log-10 concentrations of calcium do not suggest that quartz accounted for the variations in calcium between groups (see for example Figure 8.3; also Appendix C for petrographic data analysis). These results indicate that the three groups identified by PIXE were not directly related to tempering practices or natural variation in quartz sand found in Florida clays.

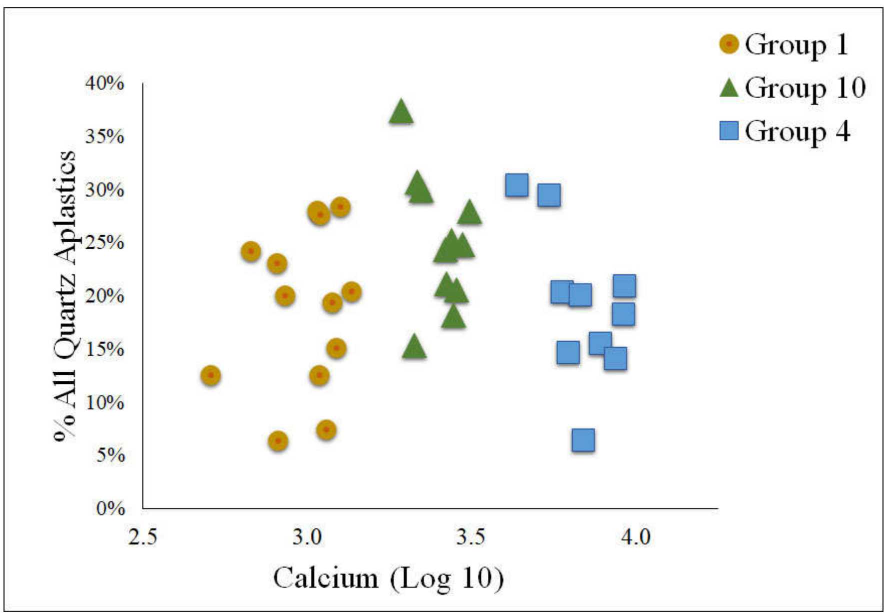

Figure 8.3. Scatterplot Showing the Relationship between Calcium and Quartz (Natural and Temper Aplastics) for PIXE Northwest Florida Groups 1, 10, and 4

PIXE Group 1. PIXE Group 1 includes decorated Florida Indian wares and some plainwares. The Indian pottery sherds associated with this group were collected primarily from the site of Mission Escambe. Two clays also are associated with this group, one as a core member and one as a non-core member. Both clays were collected adjacent to the Escambia River and near the site of Mission Escambe. It seems clear that the pottery vessels in this group were manufactured in Northwest Florida and possibly at or near the mission. All the pottery in this group was recovered from either Mission Escambe or Presidio Santa Rosa.

PIXE Group 10. Group 10 includes some decorated Florida Indian sherds, but no pottery from Veracruz. A single clay from Gaberonne, collected along the cliffs of Pensacola Bay, is a non-core member of the group, further supporting a Northwest Florida provenance. Most sherds in this group are plain, but there are also a few painted/slipped sherds and lead-glazed sherds. The presence of lead-glazed sherds in this group is important as it is evidence for production of glazed wares at or near the Spanish presidios. This was suggested in the previous chapter based on the presence of grog temper in some lead-glazed pottery. Two of the lead-glazed sherds in this group also are grog tempered. Pottery from all Northwest Florida sites are included in this group.

PIXE Group 4. Group 4 is the third and final compositional group of probable production in Northwest Florida. There are no associated clays, but all the pottery was collected from the Florida presidios and mission; there are no Veracruz sherds in this group. In addition, two non-core members are Florida Indian sherds. Core and non-core members of the group are mostly plainwares from Presidio Santa Maria, but there are also some painted/slipped sherds from both Presidio Santa Maria and Presidio Santa Rosa.

Relating Provenance to Technological Styles

In the previous chapter, I used technological styles to distinguish between pottery produced by Florida Indians and castas/imports. It has been traditionally assumed that all local pottery vessels in Spanish Florida were produced by natives of the Southeastern United States. By combining technological analyses with provenance studies, I test this assumption and better examine colonial relationships and the nature of changing interaction at the Port of Veracruz and Spanish Northwest Florida (see Chapter 9). In addition, identification of pottery provenance allows for another check of the analytical groups identified in the previous chapter (i.e., casta/imported, likely casta/imported, Florida Indian, and unassigned).

If these analytical groups are accurate, then all presidio sherds identified as Florida Indian based on technological traditions also should have a provenance in Northwest Florida. A total of 84 presidio sherd were identified as Florida Indian *and* were included in the provenance study with a core, non-core, or provisional group assignment (Table 8.5). All but seven of these sherds had membership in Florida groups. Among these seven, three pottery sherds had membership in Group 9 (Central Veracruz provenance) and four were members of Group 3 (Basin of Mexico provenance). Curiously, all seven of these sherds were shell tempered, and these were rare cases in which the shell had not completely dissolved. That is, abundant shell is still clearly

Table 8.5. Counts of Pottery Samples from the Northwest Florida Presidios That Were Assigned to Both a Technology Analytical Group *and* a Core, Non-Core, or Provisional Compositional Groups.

Provenance/Group	Casta	Likely Casta	Florida Native	Total
Central Veracruz				
2	2	0	0	2
6	2	1	0	3
9	2	2	3	7
Basin of Mexico				
3	26	17	4	47
8	21	5	0	26
Provisional	13	9	0	22
Northwest Florida				
1	4	1	10	15
4	9	4	32	45
10	5	3	24	32
Provisional	1	2	11	14
Total	85	44	84	213

visible in the pottery cross section (Figure 8.4). The presence of undissolved shell would substantially elevate calcium content within the bulk sample, potentially resulting in an inaccurate chemical group assignment. Two of these sherds also had grog temper, indicating a probable provenance in the Southeastern United States. Another three sherds were submitted for NAA analysis with the results indicating a Florida provenance as well. In sum, the provenance study suggests that pottery vessels identified as Florida Indian based on their technological styles did have a likely Northwest Florida provenance, lending support to the utility of methods used to discriminate between Florida Indian and casta/imported production in Chapter 7.

Figure 8.4. Cross Section of Shell Tempered Pottery Sherd with Undissolved Shell Visible

In total, there were 213 sherds from the presidios that had both an identifiable technological tradition and provenance assignment. Many of these pottery vessels were either produced locally by castas or imported into the presidios. The provenance analysis provides additional clarity and verification of casta contributions to pottery production at the presidios. Nearly a quarter of the samples falling into the casta/imported analytical group were, in fact, locally produced in Northwest Florida. This information challenges traditional views of labor relations and the nature of interaction in the Spanish borderlands of the Southeast. In the next chapter, I examine interactions diachronically to evaluate relational mechanisms of social change in Veracruz and Northwest Florida.

Summary

I have analyzed and evaluated PIXE data to identify core, non-core, and provisional compositional groups that can be related to geographical areas of production. My approach aims at identifying discrete compositional groups with strict statistical thresholds, while maximizing sample sizes. I define 10 compositional groups with 400 core and non-core members (74.9 percent of the original sample). Pottery vessels in these groups were produced in Northwest Florida, Central Veracruz, and the Basin of Mexico. Provisional groups included another 49 sherds (9.2 percent) that can be attributed to production in Northwest Florida or the Basin of Mexico.

These analyses have shown that both the port of Veracruz and the Northwest Florida presidios were supplied by the local and regional production of plain, lead-glazed, and painted/slipped vessels. The manufacture of lead-glazed wares in central Veracruz is not surprising, but the production of these wares in Spanish Florida has not been previously considered by archaeologists. In addition, this study demonstrates that local and regional production in both contexts was supplemented by imports from the Basin of Mexico. Pottery from Veracruz also reached the presidios. While the results of the provenance study are informative, a fuller understanding requires the integration of the compositional study with the technology-based analysis from Chapter 7. In Chapter 9, I integrate the results from both studies in a historically contextualized diachronic assessment of relational mechanisms and social change in Veracruz and Northwest Florida.

[1] Weigand et al. (1977) originally coined this principle the "provenience postulate." Neff and Glowacki (2002:14 note 2) later re-named this principle the "provenance postulate" in order to more appropriately distinguish between artifact source (provenance) and archaeological context (provenience).

[2] With permission from John Worth and the UWF Archaeology Institute this requirement was loosened for decorated Florida Indian sherds because, as previously noted, pottery sherds from Mission Escambe were typically very small. All Florida Indian sherds weighing more than 4.5 grams were analyzed by PIXE.

[3] My thresholds are somewhat similar to those accepted by Peeples (2011:113).

[4] Here, local refers generally to the physiographic province corresponding to the East Gulf Coastal Plain that includes northwest Florida (see Chapter 5).

[5] Calcium leaching is another possible post-depositional alteration, but these processes also are not consistently supported by contextual data and leaching would have impacted both archaeological contexts and nearby natural clay sources.

CHAPTER 9

MATERIAL MECHANISMS OF CHANGING RELATIONAL CONNECTIONS AND CATEGORICAL EXPRESSIONS

In this chapter, I examine relational mechanisms of social change from the archaeological perspective. Drawing on decades of research in Spanish colonial America and insights from social scientists, I have identified six mechanisms for evaluation. Two of these mechanisms relate to the active expression of categorical modes of identification: formal categorical activation and regional categorical activation. For these mechanisms, my analyses focus on highly visible tableware and serving vessels, many of which have been the focus of numerous previous studies. Three mechanisms relate more closely to relational modes of identification: strength of regional connections, labor mobility, and gendered brokerage. For these relational mechanisms, I examine mainly on low visibility pottery, particularly plain and lead-glazed utilitarian wares. A final mechanism, the brokering of external connections, somewhat straddles categorical and relational modes of identification. For this mechanism, I integrate both high visibility tableware and low visibility utilitarian categories.

Pottery from two neighborhoods at the Port of Veracruz and three presidios in Northwest Florida provide an opportunity to compare change in two distinct locations within the viceroyalty of New Spain. Assemblages from colonial Veracruz provide insights into the long-term trajectory of change over two centuries. Based on ceramic dates, assemblages are divided into three temporal components: seventeenth (1599-1700), early eighteenth (1700-1762), and late eighteenth century (1762-1800). In contrast, the

Pensacola presidios were occupied over a period of only 65 years, roughly corresponding to the second temporal period in Veracruz. Because the presidio was relocated several times and due to unique site formation processes at the second presidio, I was able to divide assemblages in Pensacola into three time slices: 1698-1719, 1722-1740, and 1740-1763. The presidios, thus, provide a finer grain view of social change over a much shorter period of time. For each context, I draw on electronically available data for categories of pottery that are already well-understood and integrate that data with the technological style analysis and the provenance study of plain, lead-glazed, and painted/slipped pottery that were presented in the previous chapters.

For this chapter, I have generally organized the analysis of relational mechanisms based on scale of interaction. I begin with the largest scale, specifically formal categorical activation and brokering of external connections. I then turn to regional connections, labor mobility, and gendered brokerage. Finally, I end with an analysis of potential regional expressions of categorical identities. After I examine these mechanisms separately for both regions, I briefly summarized the results through a comparison of the Port of Veracruz and the Northwest Florida presidios.

Formal Categorical Activation

Formal categories structured identities at very broad scales, spanning the viceroyalty of New Spain and extending throughout Spanish America. From the historical perspective, categorical identities are ascribed from the top down. Often, only indirect historical evidence provides glimpses of the bottom-up maintenance and manipulation of these categories. Yet, as is evident in Chapters 3 and 4, bottom-up relational mechanisms had emergent effects that contributed to the transformation of colonial hierarchies from an emphasis placed upon géneros de gentes to the development of the casta system and finally to the emergence of economic classes.

Archaeological data provide an independent line of evidence for examining categorical modes of identification. Social categories require symbols of group membership that are highly visible and recognizable at broad scales. In this study, I use the proportion of European and Asian-style serving vessels as a proxy for the broad communication of "Espanidad" (Spanishness). Tableware ceramics encompassed forms of individual and communal serving vessels introduced by colonists throughout Spanish America. The most recognizable of tableware ceramics in Spanish America were majolicas. First imported to the colonies from Spain and then manufactured in central Mexico, these distinctive tin-glazed wares were sold throughout the viceroyalty and widely associated with European forms of commensality.

In addition, Chinese porcelain arrived from Asia, first through Europe and then through the Manila trade after 1570. Transported across great distances, porcelain of comparable forms and vessel sizes were often more expensive than majolica (Gasco 1992b:85; Huster 2016:274-275; Voss 2012). The specialized technical knowledge and means of production, as well as the distance that majolica and porcelain were transported, raised their value – although market prices varied over time and by location (Gasco 1992:85; Lister and Lister 1982; Voss 2012). The technical knowledge required to produce majolica and porcelain limited its production so that it could not be easily replicated locally and become common. This kept majolica and porcelain from losing their value and, thus, their ability to signal high status categorical identities (see Bourdieu 1984). Categorical meaning attributed to majolica and porcelain was further highlighted by casta paintings that associated European and Asian-style tablewares with criollos and peninsulares at the apex of the colonial socio-racial hierarchy (Loren 1999:150).

Port of Veracruz

There is currently little historical information on any of the neighborhoods of the port until the eighteenth century. The general census of 1793 identifies 586 negros, mulatos, and indios living outside the town walls where the Barrio de las Californías was located. Inside the wall, the 1791 census describes more than half of the inhabitants of the western quarter, where the Barrio de Minas was located, as morenos or pardos, while only a third of the population were identified as españoles. The description of many of these individuals as castas, suggests biological and cultural mixing and diverse family histories.

Limited information on the inhabitants of the Barrio de Minas also is available through property appraisals that were included in a 1766 budget for the building of a military hospital that still stands in the neighborhood today. Twenty-two houses were demolished in the Barrio de Minas in order to build the hospital (Plano y Presupuesto 1766). Five structures were built of wood and masonry and were valued between 219 and 508 pesos. The rest of the structures were constructed mainly of wood and were valued at only between 6 and 69 pesos each. Thus, the appraisals reinforce that the Barrio de Minas was a relatively poor neighborhood.

Nevertheless, Majolica, Chinese porcelain, and other European-style tableware ceramics were recovered from all urban lots and all colonial temporal components excavated within the Barrio de Minas and the Barrio de las Californías (Table 9.1). Although most of these neighborhood inhabitants were poorer castas, the presence of porcelain and European -style tableware is unsurprising. Even idealized paintings from the eighteenth-century sometimes include images of chipped or broken majolica and porcelain tableware in association with lower status castas (Loren 1999:150-155). The port's location along a main axis of colonial exchange would have made these wares readily available.

There are currently no comparable excavated assemblages from high status neighborhoods in the central or northern quarters from which to gauge the extent of variability within the port. The Barrios de Minas was located inside the town wall and it is possible that there were differences between neighborhoods located on either side of the wall. However, comparisons of mean percentages of majolica, porcelain, and other tableware using two-tailed t-tests indicate that any difference between neighborhoods was not statistically significant for any time period ($p>0.10$). I, therefore, focus on diachronic variation.

While there is some overlapping variation between temporal periods, in general the proportion of Asian and European-style tableware grew over time (Figure 9.1). Most of these increases are explained by the consumption of majolica. Increases in tableware in general and majolica specifically were statistically significant across all time periods (Table 9.2). In contrast, there was only a statistically significant increase in porcelain and other tableware in the late eighteenth century. It is currently impossible to know how casta investment in Asian, Spanish, and European-style tableware compared with higher status residents in the central traza, but by the late eighteenth century these tablewares made up as much as 40 percent of pottery assemblages from some urban lots. These neighborhood assemblages provide a shifting baseline for lower urban castas. As discussed in Chapter 4, lower status castas from Veracruz were among those conscripted or recruited into service in Northwest Florida in the early eighteenth century.

Table 9.1. Tableware Sherds Recovered from the Port of Veracruz with Counts and Mean Percentages of All Pottery Sherds for Urban Lots from Each Barrio

Temporal Component	Barrio	Urban Lot	Majolica	Porcelain	Other Tableware[1]	Total Tableware[2]	Total Sherds
17th Century	Minas	2	3	0	1	6	66
		6	377	17	52	471	2743
		23	19	0	0	19	186
		49	8	0	0	8	225
	Californias	31	9	1	0	10	98
Mean Percent			8.2	0.3	0.7	10.0	
Early 18th Century	Minas	2	2062	56	16	2152	11395
		6	147	4	2	164	1363
		23	12	0	1	13	92
		49	13	0	0	13	56
	Californias	12	1	0	0	1	16
		18	157	10	7	176	809
		31/32	27	0	1	28	162
		38	6	1	0	7	39
Mean percent			15.4	0.6	0.4	16.4	
Late 18th Century	Minas	6	8	1	3	13	32
		26/49	441	17	13	476	1939
	Californias	12	236	18	18	273	659
		31/32	33	2	8	44	273
Mean percent			23.9	1.9	3.9	30.7	

[1] "Other tableware" includes non-Hispanic tableware from Europe, including delft, faience, stoneware, creamware, and pearlware. [2] "Total tableware" includes all tableware categories listed, plus indeterminate tin-glazed sherds.

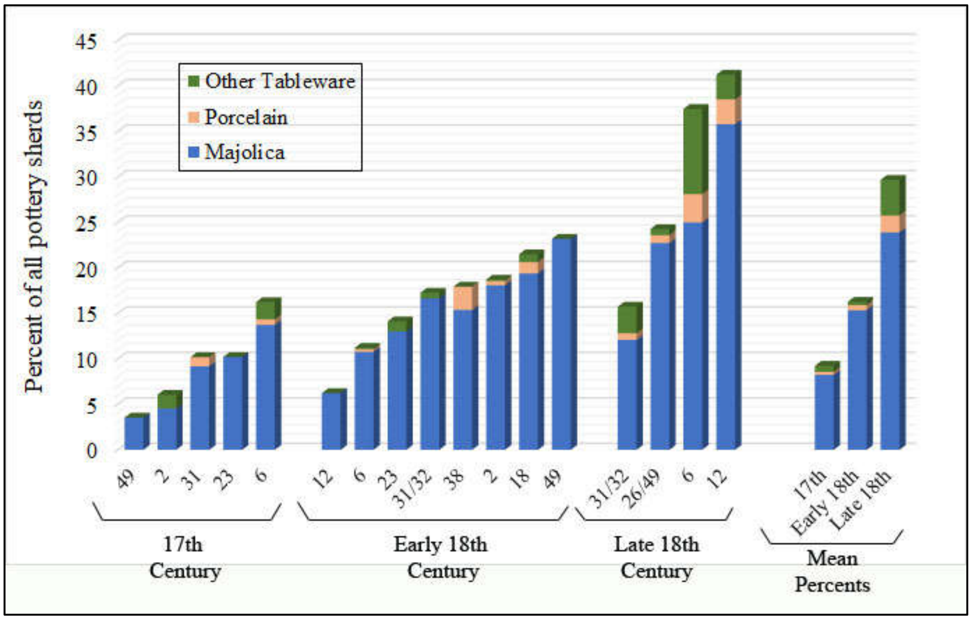

Figure 9.1. Asian and European-Style Tableware Ceramics Recovered from the Barrios de Minas and Californías at the Port of Veracruz by Urban Lot.

Table 9.2. Pairwise Two-Tailed T-Tests of Mean Percentages for Tableware by Temporal Components for both the Barrios de Minas and Californías.

Majolica			Porcelain		
17th			17th		
Early 18th	0.027		Early 18th	0.579	
Late 18th	0.013	0.072	Late 18th	0.035	0.069
Century	17th	Early 18th	Century	17th	Early 18th

Other Tableware			All Tableware		
17th			17th		
Early 18th	0.407		Early 18th	0.057	
Late 18th	0.103	0.020	Late 18th	0.011	0.018
Century	17th	Early 18th	Century	17th	Early 18th

Note: There were a few statistically non-significant (p>0.100) values, which I have highlighted.

Northwest Florida

At the Pensacola presidios, majolica and other imported tableware were consumed among all ranks, including convicts living in the barracks at Santa Maria (Table 9.3). Because in most cases there are only one or two residential contexts per temporal period and status group, two-tailed t-tests were not as useful for testing the statistical significance of differences. I instead performed pairwise chi-square probability tests for Pensacola contexts. Because values for porcelain and other tableware were often low or absent, I used a Monte Carlo simulation to determine probabilities rather than calculated chi-square distributions. Each table was randomized one million times and chi-square probabilities were then estimated as the proportion of randomized chi-square values greater than or equal to the actual chi-square value.

Differences between contexts were statistically significant ($p < 0.10$) in all but three cases (Table 9.4). Non-significant differences were between contexts in the same or adjacent temporal periods and within the same general status groups. Specifically, there were no statistically significant differences between the soldiers' barracks and the convicts' barracks at Santa Maria, between the soldiers' barracks and the slightly later Central West context at Santa Rosa, or between the later King's House and the Commanding Officers' Compound. These results only indicate that observed differences between these contexts are likely the result of random chance. However, chi-square significance is directly affected by both sample size and effect size (measured difference between samples) (Shennan 1997:114-115). Effect sizes between these cases were relatively small, contributing to the non-significant results. Differences between periods and status groups were statistically significant.

Table 9.3. Tableware Sherds Recovered from Pensacola with Counts and Mean Percentages for Urban Lots from Each Barrio

TPQ	Context	Majolica	Porcelain	Other Tableware[1]	Total Tableware[2]	Total Sherds
1698	Convicts' Barracks	22	0	0	22	212
1698	Soldiers ' Barracks	117	2	0	119	1008
	Mean percent	11.0	0.1	0.0	11.1	
1698	Officers' Barracks	390	79	62	531	3867
	Percent	10.1	2.0	1.6	13.7	
1722	Central West Area	29	1	5	84	248
1722	East Area	95	1	4	177	834
	Mean percent	11.5	0.3	1.2	27.5	
1740	East Area	92	1	2	98	308
1740	Northwest Area	84	0	8	100	355
	Mean percent	26.8	0.2	1.5	30.0	
1740	King's House	100	2	79	291	608
1756	San Miguel	97	2	55	156	390
	Mean percent	20.7	0.4	13.5	43.9	

Table 9.4. Chi-square Probabilities Based on Monte Carlo Simulations for Pairwise Comparisons between Florida Presidio Contexts for Tableware (Majolica, Porcelain, Other) and Non-Tableware Sherd Counts. Statistically non-significant (p>0.100) values are highlighted.

	Convicts 1698	Soldiers 1698	Officers 1698	CW 1722	East 1722	East 1740	NW 1740	King's 1740
1698 Convicts								
1698 Soldiers	0.752							
1698 Officers	0.045	0.000						
1722 CW	0.016	0.000	0.065					
1722 East	0.000	0.108	0.000	0.047				
1740 East	0.000	0.000	0.000	0.000	0.000			
1740 NW	0.000	0.000	0.000	0.020	0.000	0.058		
1740 King's	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
1756 San Miguel	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.373

As in Veracruz, there is a relative increase in the consumption of Asian and European-style tableware over time. Three identified "time slices" suggest there was little change in overall tableware consumption in contexts with a TPQ 1698 or TPQ 1722 (Figure 9.2). After 1740, tableware consumption more than doubled in relative proportion to all pottery. For contexts associated with convicts, soldiers, or settlers, majolica consumption accounted for most of this increase. For residential contexts associated with officers and royal administrators, tableware consumption increased in both majolica and other European-style tableware.

Comparisons between lower and higher ranked residences reveal surprisingly similar patterns in the consumption of majolica over time. Synchronic distinctions in tableware consumption is seen in the higher proportion of porcelain and other European tableware at the officers' barracks at Santa Maria. During later periods, the proportion of porcelain was similar between contexts, but tableware produced in Europe increased in proportion by an order of magnitude at the Kings' House and Commanding Officers' Compound.

Another comparison can be made with mission Escambe, where only 2 percent by count (1 percent by weight) of pottery has been reported as imported from Mexico or Europe (Worth et al. 2012). Thus, all colonists, regardless of enlistment status, rank, or recognized casta category consumed tableware ceramics that communicated a clear distinction from the occupants of at least one of the local native missions. Within the presidios, the expression of formal categorical difference was not as distinct. The general consistency in the use of majolica, between low rank and high-status contexts could suggest some communal ownership of tableware ceramics through governmental supply. If majolica was equally available, officers and presidio officials may have turned to porcelain and other European-style tableware to signal distinctions. These differences also may reflect variation in salaries and external connections.

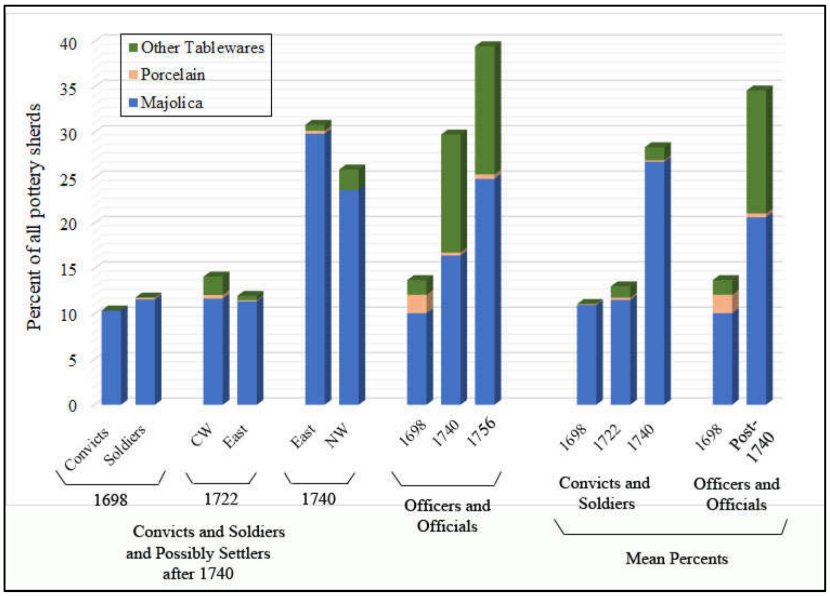

Figure 9.2. Asian and European-Style Tableware Ceramics Recovered from Residential Contexts at the Presidios of Northwest Florida. *Note:* Percentages are based on the mean of residential contexts

Brokering of External Connections

Asian and European-style tableware signaled more than categorical identities, they also indicate external connections and access to limited resources (see Neff 2014). There are two mechanisms involved in long-distance interaction that contribute to asymmetrical relations: brokering and opportunity hoarding. These forms of interaction are not necessarily mutually exclusive. In social network theory, “structural holes” are gaps that form between two or more internally connected social groups (Burt 1992, 2005). Weak ties between distant groups can create brokerage opportunities for individuals who are able to bridge the gap between them (Burt 2005:34; Granovetter 1973). According to social theorists such as Burt (1992, 2005), brokers gain social power as the gatekeepers of information and resources that flow between socially, politically, or geographically distinct populations.[1] In this section, I focus on brokers that facilitated interregional communication and exchange.

I examine brokerage directly through historical evidence and indirectly through archaeological evidence indicating the "hoarding" of limited imported resources. Tilly (1998:10) argues that opportunity hoarding can create and maintain durable inequalities as members of a categorical group "acquire access to a resource that is valuable, renewable, subject to monopoly, supportive of network activities, and enhanced by the network's modus operandi." In the case of external connections, opportunity hoarding may refer specifically to brokering positions. The social capital acquired through external connections only retains value so long as structural holes are only bridged by a limited number of individuals who straddle the gap (Burt 1992, 2005).

A well-known colonial example of brokerage and opportunity hoarding was the merchants' guild of Mexico City. Between 1592 and 1795, members of the guild held a monopoly over transatlantic trade, its members acting as the sole colonial brokers of legal exchange between New Spain and Europe. Ordinances ratified by Philip III mandated that all residents of New Spain who trafficked in commodities must be members of the guild. Guild members further hoarded opportunities by limiting membership to Spanish vecinos of Mexico City and forbidding small retailers, notaries and apprentices from joining (Booker 1984:2-3; Chance 1978:141-142; Smith 1944).

Opportunity hoarding may also relate to the resources acquired through external connections and empirically assessed not only through the unequal distribution of socially valuable imported tableware, but also non-local lead-glazed and plain earthenware pottery. Before examining external connections in Veracruz and Florida, I first briefly outline macroscale processes that structured transatlantic and interregional colonial exchange in the Spanish American Empire.

Transatlantic Exchange

Spanish imperial institutions were primarily concerned with transatlantic trade and the bullion that the empire came to depend upon to support their economy. Early colonial policies adhered to medieval mercantilist ideals and the so-called “bullionist theory” that was widely accepted in Europe at the time. The bullionist theory held that wealth and economic prosperity were measured in gold and silver. When gold and then silver was found in America, Spanish policies shifted to protect those sources of wealth from foreign and colonial encroachment. Mercantilist ideals suited the Crown’s ends as a “protectionist system” aimed at achieving a total monopoly over colonial trade (Haring 1975 [1947]:293). While this was the early aim of Spanish imperial expansion, economic policies evolved over the course of three centuries.

Charles V prohibited foreigners from trading directly with the colonies as early as 1523. A consistent exception throughout the colonial period was the importation of African slaves and then only with a special license. The emperor awarded a trade monopoly in all other commodities to the *consulado* (merchants guild) of Seville. Then in the 1560s, Philip II organized the flota system that, in theory, would limit all transatlantic exchange with New Spain to one fleet per year. Only Veracruz, Cartagena, and Nombre de Dios would serve as legal ports of entry to the American mainland (Haring 1975 [1947]:300-303; McAlister 1984:245,362-363; Walker 1979:4).

The Spanish ideal of a closed system reflected in imperial policies did not match in practice with economic reality. As Spain's dependence on America's bullion grew, investment in Iberian industries declined and inflation became a problem (Chaunu and Chaunu 1956; Vicen Vives 1969:427-455). Compounding these issues, was a general deterioration in the dependability of transatlantic shipments (Chaunu and Chaunu 1956; García Fuentes 1980; Haring 1964:207-215). The Crown dealt with seventeenth century drops in bullion remittance by increasing taxes on colonial imports. Taxation met the Crown's needs in the short term, but in the long term this strategy only encouraged colonial industry, inter- and intra-colonial trade, and fraud within the formal system of transatlantic exchange. It also stimulated an informal market in contraband (Bakewell 1971; Lynch 1969:193-195; 1992b:234-241).

It is impossible to quantitatively measure the extent of fraud and illicit trade, as by their very nature they were not formally documented. Yet clearly contraband was spurred by the rising cost of conducting trade through legal means.[2] Officials in Spain were complicit by registering declared value without verification of actual value and volume of merchandise. Naval commanders conspired to load unregistered warships responsible for escorting the flota, avoiding the avería (convoy tax) entirely. Fraud compounded the Crown's losses, spurring new tax increases and further incentivizing fraud and networks for contraband (Lynch 1992b:239; Vicen Vives 1969:405-406).

The vast majority of illicit trade happened in the colonies themselves with the support of colonists who reaped the benefits of lower cost goods and an improved bottom line. Along the Atlantic coast, foreign merchants found lucrative profits through direct colonial exchange in contraband goods (Haring 1975 [1947]:310; Vicen Vives 1969:405-406). The most overt form of foreign trade was through asiento contracts that legally allowed foreign vessels to dock in Spanish ports for the sale of black slaves. The asiento provided an excellent cover for contraband trade directly with Spanish ports, and illicit exchange flourished (Nettels 1931). By 1686, Vicen Vives (1969:406) roughly estimates that only a third of transatlantic commerce was legal and formally regulated.

The passing of the Spanish monarchy to the French Bourbons at the beginning of the eighteenth century created a shift in power and alliances in Europe that had a far-reaching impact on the colonies. For decades French commodities had dominated flota cargoes, but their share in transatlantic exchange was tempered by a smaller contribution to direct contraband exchanged in the colonies themselves (Walker 1979:20). New French influence in Spain and the award of a monopolistic asiento to the Royal French Guinea Company in 1702 had the potential to radically shift this economic balance. It was largely the prospect of this imbalance that led the British, Dutch, and later the Portuguese to declare war against the Spain and France in the War of Spanish Succession (Kuethe and Andrien 2014:1-2). During this period (1702-1713), the already deteriorating flota system declined further, again stimulating contraband. The English and Dutch took advantage by supplying the Spanish American colonies despite the ambivalence between their governments. At the same time, the French asiento and the Franco-Hispanic alliance facilitated direct trade at Spanish ports (Haring 1975 [1947]:314-315).

The end of the War of Spanish Succession in 1713 initiated another political and economic shift. Having already commercially benefited from the war, Britain profited even more from peace. The Treaty of Utrecht granted British South Sea Company a 30-year monopoly on the slave trade. Unlike previous asientos, however, from 1717 onward the South Sea Company was legally permitted to send a "permission ship" with 500 tons of duty-free merchandise directly to the port of Veracruz. Ironically, few slaves were actually sold at the port and the contract served more as mechanism for legal and illicit trade in manufactured goods (Aguirre Beltrán 1944:429; Kuethe and Andrien 2014:72; Walker 1979:72-73). The annual introduction of tons of legal tax-free merchandise in addition to the already flourishing contraband and Manila trades meant that the irregular flotas could not compete and had to sell their cargos in Mexico City or Veracruz at a loss or not at all (Walker 1979:75-132). Major reforms were stalled so long as the British held the asiento and annual permission ships (Walker 1979:195).

Despite significant Spanish losses by the Crown and consulados, the British asiento continued, raising tensions between the two states. Royal officials and Andalusian merchants established the *guardacostas,* a squadron of warships sent to patrol the Caribbean (Walker 1979:150; Wright 1971:84). During the 1720s and 1730s, guardacostas seized vessels suspected of smuggling, the crew individually profiting from their cargoes. The actions of the guardacostas only raised tensions further until war inevitably broke out. The War of Jenkins's Ear was named for a British captain whose ear literally fell victim to the guardacostas. The war ibegan in 1939 as a direct result of economic tensions between the two states, but then later merged with the War of Austrian Succession, lasting until 1948 (Walker 1979: 150,210; Wright 1971:87-100). The wars effectively ended Britain's asiento contract and annual permission ships.

In the second half of the eighteenth century, Bourbon reforms shifted economic policies toward free trade so that Spain could compete on a level playing field (Haring 1975 [1947]:318-319; Walker 1979:222-223). In 1765, trade with Spain's possessions in the Caribbean Islands was thrown open. Ships needed only to register their itineraries in one of nine ports in Spain and pay a minimal duty. The Free Trade Act of 1778 was extended to all remaining jurisdictions except New Spain. Protests mounted until free trade was finally extended to New Spain in 1789 (Haring 1975 [1947]:318-321; Walker 1979:223-225).

Interregional Colonial Exchange

The ideal transatlantic relationship according to mercantilist theory was one in which the colonies would remain dependent upon Spain for manufactured goods. In exchange the colonies would export high value raw materials and precious metals to Seville (Fisher 1997:37; Walker 1979:11). However, this pattern of dependency did not hold after the mid-sixteenth century. New Spain began to reach self-sufficiency in many European-style manufactured goods and agricultural products. This was particularly apparent after the 1570s when European imports shifted from necessities to luxury goods (McAlister 1984:371; Lockhart and Schwartz 1983:74). As legal trade with Spain declined and elites expanded their investments within the colonies themselves, inter- and intracolonial trade developed and expanded. The growth of European, criollo, and mixed populations spurred economic demands. Colonial elites increasingly profited from commerce and agricultural enterprises (Lynch 1992b:287-288). Urban landowners, such as shopkeepers and independent merchants who had not been granted encomiendas, invested in colonial manufacture and trade (McAlister 1963:366-367; Smith 1944).

Export of precious minerals, as well as major agricultural zones and administrative centers created the principal corridor of exchange along royal roads, connecting silver mines in Zacatecas to the administrative capital of Mexico City and then to New Spain's legal port of entry at Veracruz (Hassig 1985; Lockhart and Schwartz 1983:90; Rees 1975). Interregional exchange in New Spain dealt in complementary resources and specialized manufacture, such as wheat produced in the *tierra fria* (cool semi-arid regions) that was traded for tropical lowland products such as sugar, cotton, tobacco, and cacao (Bauer 1996; Gibson 1964:243-246; Lockhart 1992:192; McAlister 1984:233; Salvucci 1987). By the seventeenth century, interregional merchants were mainly Europeans and their American-born and sometimes mixed descendants. Native commerce was mostly restricted to regional "producer-vendors" who traded in marginal goods and sometimes owned pack animals introduced by Europeans (Lockhart 1992:194-197; Smith 1944). The overall longitudinal effect of these change was an increase in colonial commercial independence and integration, while economic connections with Spain weakened.

Port of Veracruz

While the colonial merchants' guild was centered in Mexico City, the Port of

Veracruz was a gateway for peninsular merchants, retail merchants, and brokers of illicit trade through the asiento (Aguirre Beltrán 1944:429; Booker 1984; Kuethe and Andrien 2014:72; Walker 1979:72-132). Merchants largely resided in the northern and central quarters of the city (Blázquez Domínguez 1996; Gil Maroño 1996; Hernández Aranda 2006c). Without comparable pottery assemblages from these higher status neighborhoods, I cannot yet archaeologically assess brokerage and opportunity hoarding at the port. Instead, I examine the trajectory of external connections more generally at the Barrio de Minas and the Barrio de las Californías, providing a shifting baseline for poor castas at the port.

This analysis includes the tableware assemblages that I considered in the previous section, but I have restructured the data to consider origin of manufacture (Table 9.5). Delft was produced in both Holland and England, while white salt glazed stoneware and creamware were manufactured in Britain (Nöel Hume 1969; Miller 2002). The only pottery recognizable as imports from Spain were olive jars and some majolica types. The inclusion of olive jars is somewhat problematic as equivalent British shipping containers were made of wood and thus not included in the analysis. I include olive jars here because diachronic trends for olive jar mirror the importation of Spanish majolica. Most of the majolica that was stylistically identifiable was manufactured in central Mexico. Finally, Tonalá Bruñida ware was manufactured in west Mexico.

The above pottery categories are visually recognizable types with known locations of manufacture. Yet, more than 70 percent of the pottery recovered from colonial contexts at the port were plain, lead-glazed, or slipped/painted – all with unknown provenance. The compositional study in Chapter 9 indicates that most imported pottery found at the port was from central Mexico.[3] In order to assess external connections beyond central Veracruz, I combined core, non-core, and provisional compositional groups to calculate the proportion of each pottery category produced in central Mexico by time period. I then used these proportions to weight the mean percentages for each category and temporal component. The results are presented in Table 9.5 and Figure 9.3.

Table 9.5. Mean Percentages of All Pottery Imported from Outside of Central Veracruz.

	17th Century	Early 18th Century	Late 18th Century	Count
Plain Earthenware[1]	0.0	0.0	5.3	7,025[2]
Lead-Glazed Earthenware[1]	0.7	15.6	10.3	6,685[2]
Subtotal	0.7	15.6	15.6	13,710[2]
Majolica (Mexico)	3.1	9.9	7.9	1646
Majolica (Spain)	2.8	0.3	1.1	261
Majolica (Unknown)	2.4	5.2	14.9	1652
Delft	0.4	0.3	1.2	32
Faience	0.3	0.0	0.1	49
Stoneware	0.0	0.1	0.2	13
Creamware	0.0	0.0	2.5	28
Porcelain	0.3	0.6	1.9	127
Subtotal	9.3	16.4	29.8	
Tonalá Ware	0.7	1.2	1.2	177
Olive Jar	12.9	9.5	4.1	1252
Total Imports Percentages	*23.6*	*42.7*	*50.7*	

[1]Percentages of plain and lead-glazed coarse earthenware are weighted based on mean proportions of the initial archaeological assemblages and the proportion of imports from central Mexico as determined by the provenance study.
[2] Count of plain and lead-glazed pottery in the total assemblage that was used to determine weighted percentages.

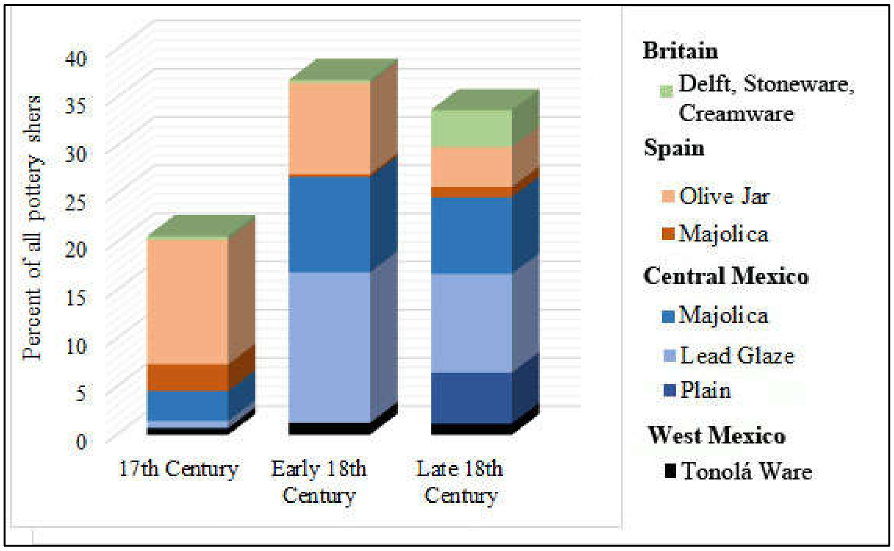

Figure 9.3. Changing External Connections at the Port of Veracruz

In order to consider the statistical significance of diachronic changes, I again used two-tailed t-tests to evaluate mean percentages for urban lot assemblages from each period. The test was applied only for wares with visually recognizable origins of manufacture. For plain, lead-glazed, and painted/slipped earthenware, I performed chi-square tests with Monte Carlo simulation on the counts of the provenance sample by temporal period. Chi-square allowed me to better evaluate the impact of smaller sample sizes on statistical significance (Table 9.6). Pairwise comparisons without statistically significant differences, and likely the result of chance, are highlighted. Generally, observed changes in consumption patterns were statistically significant. Non-significant p-values were returned for comparisons that showed little change between periods (i.e., small effect sizes).

Table 9.6. Pairwise Two-Tailed T-Tests of Mean Percentages and Chi-Square Probabilities based on Monte Carlo Simulations for Imported Pottery Categories in Veracruz

Britain		T-Test	Olive Jar		T-Test
17th			17th		
Early 18th	0.821		Early 18th	0.463	
Late 18th	0.081	0.021	Late 18th	0.065	0.240
Century	17th	Early 18th	Century	17th	Early 18th

Majolica (Spain)		T-Test	Majolica (Mexico)		T-Test
17th			17th		
Early 18th	0.013		Early 18th	0.020	
Late 18th	0.251	0.144	Late 18th	0.054	0.504
Century	17th	Early 18th	Century	17th	Early 18th

Lead-Glazed (Mexico)		X^2	Plain (Mexico)		X^2
17th			17th		
Early 18th	0.000		Early 18th	NA	
Late 18th	0.016	0.508	Late 18th	0.054	0.068
Century	17th	Early 18th	Century	17th	Early 18th

Despite the port's position as a central gateway linking Europe with New Spain, less than a quarter of the pottery recovered from seventeenth century contexts was imported. Olive jars from Spain dominated, while identifiable majolica types were nearly evenly split between wares from Spain and central Mexico. There were very few British tableware ceramics, Tonalá, or lead-glazed wares and none of the seventeenth-century plain pottery sherds were imported. If olive jars are removed from consideration, only a little more than 10 percent of all pottery was imported from outside the region. Consumption patterns shifted drastically by the early eighteenth century, when imports nearly doubled (or tripled if olive jars are removed from consideration). By the end of the century, imports represented between 45 and 50 percent of the pottery assemblage. Most of the new imports came from central Mexico, including an increase in majolica and lead-glazed imports. Spanish majolica nearly disappeared. Olive jars declined in frequency as well, but the reduction is not statistically significant until the late eighteenth century.

Reduction in wares from Spain is consistent with a general decline in imports for materials manufactured in New Spain. The eighteenth-century increase in pottery from central Mexico may be related to the establishment of a trade fair in Jalapa in 1718 (Booker 1984:23; Walker 1979:106-107, 168-169). Rather than requiring that peninsular merchants transport their merchandise all the way to Mexico City, merchants arriving with the annual flota met the Mexican guild merchants halfway. Jalapa, thus, became a brokering location that facilitated the importation of goods from central Mexico. This pattern continued into the late eighteenth century even after the flota system and the trade fairs effectively ended. Olive jars further declined, while the proportion of majolica and lead-glazed arriving from central Mexico continued, statistically unchanged. Some imported plainwares were now also arriving at the port. British wares were never abundant but increased in the final decades of the eighteenth century. The increase in British wares corresponds with the introduction of creamware in 1762 and the beginning of Bourbon reforms that opened the colonial market to free trade. Surprisingly, very little faience was recovered from any temporal component, despite the alliance between France and Spain at the beginning of the century. It is possible that foreign wares were more commonly consumed in higher status neighborhoods, but this will need to be explored in future studies.

Northwest Florida

Requisition and shipping lists for the situado specified how rations and supplies should be distributed. In practice, however, the maintenance of external connections and the distribution of goods was far more complicated. As early as 1713, the accountant Juan Mendo de Urbina reported that the presidio governor Salinas was engaged in contraband, selling illicit goods to presidio soldiers (Urbina 1713). In order to increase his business, he purposely caused shortages in alternate supply lines (Clune et al. 2003:66; Roberts 2009; Delangez 1937:150). A decade later, another governor Primo de Rivera was accused of engaging in contraband trade just prior to the presidio's relocation to Santa Rosa in 1722 (TePaske 1964:71). Military officers also engaged in smuggling even through the situado supply system itself. In 1713, an ensign arranged to replace some of the situado goods in Veracruz with merchandise that he then sold to other presidio soldiers and convicts (Childers and Cotter 1998:94). In addition, a decree by the viceroy in 1740 indicates that some captains at the presidio were controlling and limiting the supplies that soldiers received (Vizarron 1740). It is unclear if any among the lower ranks found means to step into the gap between the presidios and other trading groups, but officers and colonial administrators had more money and freedom of movement that allowed them to act as brokers between Pensacola, Mexico, and European traders.

The provenance study from the previous chapter allows for a more complete picture of imports that connected frontier settlements to New Spain and Europe. Imports accounted for a low of nearly 40 percent of pottery assemblages from convict and soldier barracks at Santa María to a high of nearly 80 percent for officer and governor contexts after 1740 (Table 9.7). Pottery from Spain was rare. Only five sherds of Spanish majolica were recovered from the officers' barracks at Santa María. Similarly, Spanish olive jars were only recovered in notable amounts from the earliest presidios. Throughout the presidio occupation, most imports were from colonial Mexico (Figure 9.4).

In the previous section, I noted that while majolica increased over time, there was little difference in consumption patterns between low ranked casta residents and high-status officers and local officials. A different pattern was apparent for foreign tableware and the combined weighted percentages for imported plain and lead-glazed wares (Table 9.7). Scarce amounts of British and French tableware were recovered from presidio contexts prior to 1740. After 1740 European tableware increased in similar proportions at both the King's house at Santa Rosa and the commanding officers' compound at San Miguel. In the case of lead-glazed and plain earthenware imports, there was little change over time, but there were distinct differences between low ranked castas and officers or colonial officials. This was due to differences in proportions of imported plain wares (X^2=8.568, p=0.005). Minor differences in the proportion of imported lead-glazed wares were not statistically significant (X^2=0.215, p=1.000). Differences in the distribution of imported plainware and European tableware may reflect the control that officers and local administers wielded over situado supplies and their ability to engage in illicit trade.

Table 9.7. Mean Percentages of Pottery Imported from Outside of Northwest Florida

	Convicts, Soldiers, and Settlers			Officers and Colonial Officials		
	1698	1722	1740	1698	Post-1740	Count
Plain[1]	6.0	2.5	4.3	10.5	12.3	3,453[2]
Lead-Glazed[1]	15.0	20.7	17.5	19.9	20.7	1,493[2]
Painted/Slipped[1]	0.0	0.8	0.0	0.2	0.0	157[2]
Subtotal	21.0	23.2	21.8	30.5	32.9	5,103[2]
Majolica (Mexico)	7.3	7.3	16.5	4.1	12.1	559
Majolica (Spain)	0.0	0.0	0.0	0.1	0.0	5
Majolica (Unknown)	3.7	4.2	10.3	5.9	8.5	462
Delft	0.0	1.0	1.0	0.2	9.1	115
Faience	0.0	0.3	0.4	1.4	3.0	89
Stoneware	0.0	0.0	0.0	0.0	1.4	11
Porcelain	0.1	0.3	0.2	2.0	0.4	88
Indeterminate	0.0	14.5	1.6	0.0	9.3	249
Subtotal	11.1	27.5	30.0	13.7	43.9	1578
Tonalá Ware	0.3	0.4	0.6	1.9	0.2	92
Other	0.0	0.2	0.9	0.2	1.6	32
Olive Jar	7.0	1.0	0.4	13.3	0.9	648
Imported Total	39.1	51.9	53.1	57.7	79.4	

[1]Mean percentages for plain, lead-glazed, and painted/slipped earthenware pottery are weighted based on mean proportions of the initial archaeological assemblages and the proportion of imports based on the compositional study.
[2] Count of plain, lead-glazed, and painted/slipped pottery in the initial archaeological assemblages that was used to determine weighted percentages.

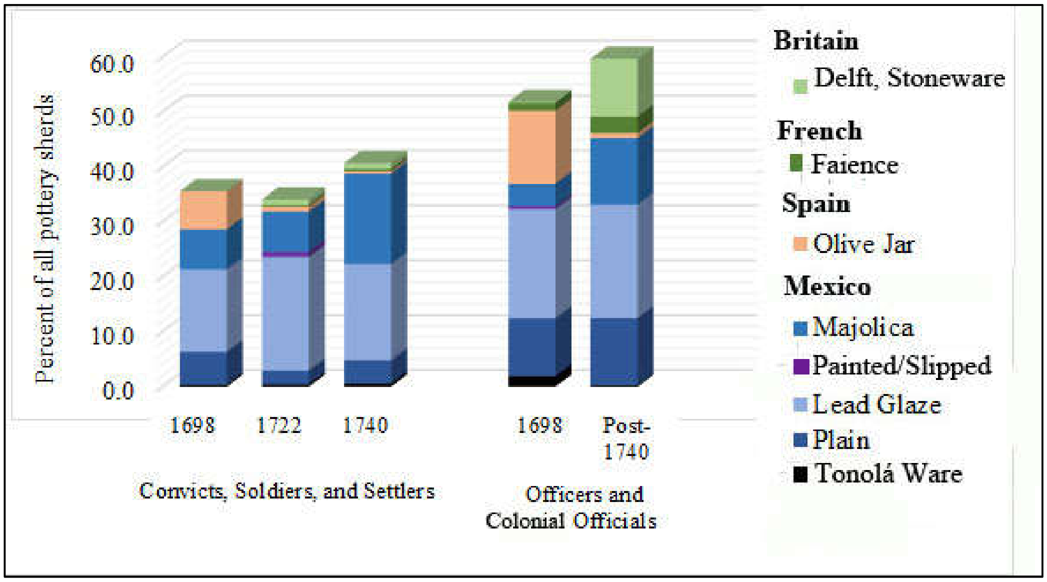

Figure 9.4 Changing External Connections at the Pensacola Presidios

Imported plain wares may have arrived at the presidios for use as utilitarian vessels or they may have contained other goods. While there was a statistically significant difference between the consumption of imported plainwares between contexts, lower ranked populations were not completely blocked from these resources. In contrast, British and French tableware ceramics were found overwhelmingly in high ranked contexts, possibly indicating hoarding. Foreign tableware could have arrived legally in New Spain through asiento trade ships, but the highest proportion of these wares were found in post-1740 contexts – after the War of Jenkin's Ear ended the British asiento. Alternatively, foreign tableware may have arrived through illicit trade with the French in Mobile or from trade with British colonists to the north through native intermediaries. Either way, presidio officers and local officials kept most of these wares for themselves (Eschbach 2007; Johnson 1999; Worth 2008).

In sum, analyses of pottery assemblages from Veracruz and Northwest Florida, indicate a strengthening of external connections with central Mexico. At the same time, relational connections with Spain appeared to weaken. This conclusion is based only on one category of artifact but is supported by historical data. In addition, analysis of data from presidio contexts indicate that higher status individuals had stronger external connections and some likely served as external brokers.

Strength of Regional Connections

Based on a growing number of studies, some archaeologists have emphasized colonial interaction through regional trade networks as a key mechanism that introduced diverse material culture into colonial households, thus transforming material traditions (e.g., Charlton and Fournier García 1993; Van Buren 1999; see also Voss 2008b:866). I approach regional exchange through a relational framework, arguing that patterns of pottery consumption can serve as a proxy for social interaction (see Peeples 2018). Relational modes of identification develop through repeated transactions that create durable social ties. In hierarchical societies, social categories can shape social roles from the top down, but in order to survive and pursue their own aims, individuals or groups may reproduce or transform relational connections from the bottom up (see Nexon 2009:25; Tilly 2005:6-7).

Historical sociologists who espouse a relational approach infer relational connections through historically recorded transactions. From an archaeological perspective, I infer relational connections based on transactions that involve a material transfer. The exchange of distinct categories of pottery may indicate different kinds of relations based on the value placed on those wares. Plain and lead-glazed pottery was most commonly used for utilitarian purposes. Because utilitarian vessels were frequently produced and exchanged at regional scales, they are appropriate for tracking the direction and strength of relational connections.

The provenance study presented in the previous chapter provides the necessary data for identifying plain and lead-glazed wares that were regionally produced in central Veracruz and Northwest Florida. In this study, I suggest that a high proportion of wares from different geographic zones within a region indicates regular interaction and strong relational connections between colonial settlements and hinterland communities. These connections shaped local identities, even cross-cutting broadly recognized social categories.

Central Veracruz

In early colonial Mexico, historians have found that small communities farmed for their own subsistence and their exchange was mainly with regional administrative centers. Large urban centers, in turn, were more connected to transatlantic exchange, providing a market for European imports and European-style colonial goods (Bauer 1996; Hassig 1985; McAlister 1984:151; see also Charlton and Fournier García 1993; Rodríguez Alegría et al. 2013). Colonial officials made few attempts to interfere with the day-to-day activities of native markets. Once colonists and their descendants actively participated in these markets, however, they brought with them increased interest in local colonial supervision – mainly at the interregional scale (Gibson 1964:352-353; Lockhart 1992:191). At the same time, European merchandise decreased in demand whenever it could be replaced with cheaper colonial equivalents (Garavaglia 1983:20,382-383; Lynch 1992b:346).

Local and intraregional trade was less regulated than larger-scale exchanges. Municipalities had the authority to regulate trade within their jurisdictions, but generally they were not very effective in this endeavor (Garner 1993:175). Urban markets were increasingly dependent on surrounding rural areas for food and other goods (García Ruiz et al. 2011:138–139; Garner 1993:72, 91-99,175-176; Hernández Aranda 2009). Low value, high bulk products were sold at the regional scale to restrict transportation costs (Garner 1993:84, 91-99). Outside the formal system there was also a large volume of exchange through informal barter that occurred in cities, towns, and throughout their hinterlands. Because informal transactions were not officially regulated, they are impossible to consistently track with documents alone (Garner 1993:176).

A limited number of provenance studies focused on lead-glazed or plain pottery, suggest that these wares mainly circulated at the regional scale (e.g., Fournier García and Blackman 2008; Rodríguez Alegría et al. 2013; Rodríguez Alegría and Stoner 2016). For Veracruz, the previous section demonstrated that some plain and lead-glazed wares were imported into the port from central Mexico, particularly during the eighteenth-century. Yet, the volume of imported plain and lead-glazed wares was less than 16 percent of the total pottery assemblage and even this amount was likely due to the port's function and location, as well as a result of shifting imperial policies in the eighteenth century. In contrast, plain and lead-glazed pottery produced within central Veracruz represented a high of 70.1 percent of all pottery recovered from seventeenth-century contexts and 45.1

percent from late-eighteenth century contexts (Table 9.8). Even at the end of the eighteenth-century, when regionally produced pottery decreased in relative frequency, most of the plain (82.4 percent) and lead-glazed (61.5 percent) pottery categories were manufactured in central Veracruz. The statistical significance of broad diachronic shifts in interregional versus intraregional exchange of plain and lead-glazed pottery based on sample counts from the provenance study are presented in Table 9.6.

Table 9.8. Combined Plain and Lead-Glazed Pottery Sample Counts and Weighted Assemblage Percentages for Core and Non-Core Compositional Groups with a Central Veracruz Provenance.

	Coastal Plain			Piedmont/Highlands		
	6	2	9	5	7	Total
17th Century	19	25	1	0	5	50
weighted percentage	16.4	44.6	0.7	0.0	8.4	70.1
Early 18th Century	15	17	0	0	6	38
weighted mean percentage	16.1	27.0	0.0	0.0	10.0	53.1
Late 18th Century	8	11	0	1	2	22
weighted mean percentage	19.9	19.7	0.0	1.9	3.6	45.1

Note: Percentages for each compositional group and temporal component were weighted based upon the mean percentages of plain and lead-glazed pottery found in the total assemblage from each component.

Within central Veracruz, exchange patterns appear fairly stable with most pottery associated with clays collected along the coastal plain (Groups 2 and 6). The current sample drawn for the provenance study revealed no statistically significant changes in sources of pottery over time (X^2=6.16, p=0.7016). The noticeable shift in weighted percentages for Group 2 are mainly due to an overall decline in the relative frequency of plainwares recovered from eighteenth-century contexts. Group 2 included a clay sample from Tlacotalpan as a core group member and a clay sample from Villa Rica as a non-core group member. A previous compositional analysis that included only pottery from central Veracruz, provided slightly refined results. By including only sherds from the port in that analysis, I reduced potential variability, which can highlight less obvious structure in the data (see Beardah et al. 2002:265). That analysis identified two sub-groups, one associated with Tlacotalpan and one associated with clay collected near Villa Rica (Eschbach 2019).

At least three colonial sources mention pottery manufacture at Tlacotalpan. According to the 1580 *relación* de Tlacotalpan (Paso y Troncoso 1905), native potters made jars and other earthenware of all types, which they sold to neighboring villages more than eight or 10 leagues away.[4] Later in the early seventeenth century, the Bishop Mota y Escobar (1987 [1609]) again mentions pottery production in Tlacotalpan, which the potters both used and sold.[5] A more detailed description of pottery production was written in a report by the alcalde mayor of the jurisdiction of Veracruz Vieja in 1604. According to him, "The Indians of Tlacotalpa are workers skilled in making pottery, large earthen jars, pots, jugs, and comales…on which they spend a lot, and they make a lot of money" (Cole 2003:192).[6] Notably, the pottery vessels that the alcalde mayor chooses to describe could all serve a utilitarian function, including comales (tortilla griddles) that were manufactured by native people in central Veracruz since at least the Middle Postclassic (AD 1200–1350) (Curet et al. 1994; Daneels 1997:244–245).

Pottery samples assigned to Group 6 were mainly lead-glazed and were associated with all three clays collected from the coastal plain along the Jamapa river (see the map in Figure 8.2).[7] Today, the mouth of the Jamapa is located only about 10 km south of the colonial port. It is possible that small communities located along the Jamapa river produced pottery for the city market, but similar clays also may have provided a source for potters within or outside the walls of the port itself. The pottery in Group 6 was consumed fairly consistently throughout the colonial period.

Communities farther inland and located along the piedmont or at higher elevations also provided some pottery throughout the colonial period but in lower relative frequency. Only a single plainware sherd from a late eighteenth-century context was assigned to Group 5 (associated with clay collected near Acazonica). Other pottery sherds included in this group were slipped or painted, which I discuss in a later section. It is possible that the single plainware sherd also was part of a painted vessel. Group 7 included mostly plainwares (n=11) and two lead-glazed sherds. This group was associated with clay provided by modern potters at San Miguel Aguasuelos. These potters collect their clay from Tepetates, located to the northeast of Jalapa (see Figure 8.2). At least one document describes the sale of pottery from Jalapa at the port. The 1750 estate papers of a shopkeeper Domingo Miro inventoried dozens of ceramics from Jalapa. These wares appeared to be a mix of serving and utilitarian vessels (Worth 2009).[8]

In Chapter 4, I described how Africans, Europeans, and their mixed descendants came to dominate the population along the coastal plain between Nueva Veracruz and La Antigua (see Figure 4.1). The padrón de Revillagigedo of 1791 indicates that this pattern continued into the late colonial period, at least within the walls of the port. Yet, the port was dependent on the surrounding hinterlands, jurisdictions that were dominated by native people. The consumption of large numbers of plainware vessels produced with clays similar to those I collected near Villa Rica, Tlacotalpan, Acazonica, and Tepetates suggests strong relational connections that brought traditional native pottery into diverse casta, particularly Afromestizo, households. At the same time, artisans producing vessels from clays collected near the Jamapa river, supplied households at the port with lead-glazed wares. Regionally produced plain and lead-glazed pottery dominated for most of two centuries, collectively only dipping below 50 percent of the total pottery assemblage in the late eighteenth century, during a period when Bourbon reforms had opened the door to free trade in the American colonies.

Northwest Florida

Regional exchange in frontier contexts are complex, but more historical and archaeological research already has been undertaken for colonial Northwest Florida compared to central Veracruz (e.g., Dadiego 2014; Pigott 2015; Harris 1999, 2003; Johnson 1999, 2003; Roberts 2009, 2012). During most of the occupation of Santa María, the native population was particularly scarce and relatively transitory. A small group of Apalachee established a community along the Perdido river in 1705 and there is some evidence to suggest that the presidios traded with the Movilas who allied with the French in Mobile (Childers and Cotter 1998:88-89; Harris 2003:268-269). The founding of Nuestra Señora de la Soledad y San Luís at the mouth of the Escambia river in 1718 provided at least one nearby source of regional exchange (Worth 2008; Worth et al. 2011). Potential for intraregional trade increased by 1740 with the arrival of Yamasee migrants and their founding of Punta Rasa by 1749 (Harris 2007; Dadiego 2014:58; Worth 2008). In addition, the relocation of the Apalachee mission up the Escambia river, facilitated trade with the Upper Creek – potentially bringing not only native material culture, but also British goods into the missions and presidios of Northwest Florida (Dadiego 2014).

In addition to interaction with native settlements, there is abundant historical evidence documenting legal and illicit trade between the Spanish presidios and the French in Mobile. Most legal exchange with the French – restricted mainly to munitions and foodstuff – was documented during the War of Spanish Succession (1701-1713) when Spain was allied with France (Clune et al. 2003:61-64; Johnson 2003; see Roberts 2010:68, Table 2).[9] Both the French and Spanish garrisons suffered from irregular formal supply and, as a result, they developed a system of mutual support that was consistent with the contemporary Bourbon policies of Philip V who allowed for Franco-Spanish exchange in aid during times of need (Clune et al. 2003:61-64; Johnson 2003). Later, as alliances shifted in Europe, official policies forbade exchange between the French and Spanish settlements along the Gulf Coast. Thereafter, trade between Mobile and Pensacola continued mainly through illicit interaction (Johnson 2003:324; Roberts 2010:70).

Regional exchange in the eastern borderlands has typically been tracked using a combination of historical data and visually recognizable ceramics – particularly decorated native, Asian, and European-style wares (e.g., Johnson 1999, 2003; Loren 2000; Roberts 2009, 2012). Decorated wares are often traded over longer distances, however, and are less valuable for evaluating the strength of regional connections. As in the Veracruz case, I used the results of the provenance study in Chapter 8 to track the consumption of regionally produced plain and lead-glazed wares at the presidios in order to evaluate the strength relational connections.

Utilitarian pottery, mainly plainwares, represented the bulk of locally produced pottery found in presidio contexts (Table 9.9). Noticeable declines in local wares was not due to statistically significant change in provenance (local vs imports), but to an overall decline in all plainwares – reminiscent of shifts observed for Veracruz. Despite these declines, more than 87 percent of plainwares from low status contexts were produced locally even after 1740. There also appears to be a difference in consumption patterns between low- and high-status contexts. The latter consumed more imports, including plainwares, a pattern that has already been noted. In fact, after 1740, only about half of all plainwares recovered from the residents of officers and local officials were produced locally. While officers and administrators had greater access to imports, lower status castas were more dependent on local relational connections – at least for ordinary plainware pottery that was used in their daily labor and potentially for local resources that these wares may have been used to transport. Over time, however, this pattern shifted as the proportion of plainwares in all contexts declined.

In the borderlands, scholars traditionally have assumed that most decorated native pottery vessels also served utilitarian functions (e.g., Deagan 1974, 1983; Ewen 1991, 2000; McEwan 1986). As I discussed in Chapters 5 and 7, some native wares cross-cut binary frameworks that place them in either utilitarian or serving categories. In addition, some “decorations,” such as roughening by brushing or cob-marking, actually served a utilitarian function. I discuss decorated native wares in a later section, but given their potential for similar use alongside some plain and lead-glazed wares, I include counts and overall proportions of decorated native wares in Table 9.9. Combining the percentages of decorated native wares with other locally made wares, there is still a decline in the use of local pottery at Santa Rosa – especially for high-status contexts. At the same time, a large increase in “decorated” native wares in low-status casta contexts mitigates the decline after 1740. Notably, most of those “decorated” wares were roughened (n=55; 84.6 percent). Roughening is often associated with Creek influence in eighteenth-century contexts. Many of the Apalachee natives that established the missions of Soledad y San Luís and then Escambe had lived among the Creeks for 14 years before arriving in Pensacola, likely adopting this highly visible tradition (Pigott 2015:110; Worth 2008; Worth et al. 2012). Some pottery also may have reached the presidios through direct or indirect exchange with the Upper Creek, although the current provenance study suggests most were produced in Northwest Florida. In any case, the increase in roughened pottery at the presidios likely replaced some of the plain utilitarian wares at Santa Rosa, suggesting exchange between the Apalachee missions (particularly Escambe) and the presidio.

Table 9.9. Combined Plain and Lead-Glazed Counts and Weighted Percentages for Core, Non-Core, Provisional, and Technological Groups Associated with Northwest Florida, Plus Counts and Percentages for Decorated Native Pottery in Total Assemblage

	Plain and Lead-Glazed Pottery						Decorated	Total
	1	4	10	Prov	Tech	Subtotal	Native	Percent
Convicts, Soldiers, and Settlers								
1698	0	15	2	1	1	19	18	
weighted mean percentage	0.0	44.9	6.0	2.9	3.1	56.9	1.1	58.0
1722	6	0	12	2	0	20	25	
weighted mean percentage	13.9	0.0	24.7	4.4	0.0	43.0	1.9	44.9
1740	5	1	13	3	3	25	65	
weighted mean percentage	6.1	1.2	17.2	3.7	4.3	32.5	9.6	42.1
Officers and Local Officials								
1698	0	14	1	3	1	19	178	
weighted mean percentage	0.0	24.5	1.8	5.3	1.8	33.3	4.6	37.9
Post-1740	1	0	2	1	3	7	25	
weighted mean percentage	2.5	0.0	2.6	2.5	7.4	14.8	2.5	17.3

Note: Percentages for each compositional group were weighted by the mean percentages of plain and lead-glazed pottery recovered from each context and temporal component.

The intraregional provenance of wares also shifted diachronically, a pattern that is statistically significant for plain and lead-glazed samples listed in Table 9.9 (X^2=57.618, p=0.000). The provenance study in Chapter 8 identified three compositional groups associated with either Florida clays or decorated native pottery samples. Pottery samples from Santa María were associated with Group 10 and Group 4 (see Table 9.9). Group 10 included a clay sample collected near Gaberonne, overlooking Pensacola Bay. Pottery manufactured using similar clays were found at all three of the presidios. Most of these wares were plain, but there also were some lead-glazed and decorated native pottery associated with this group. Group 4 did not include any of the clay samples collected for this project but did include two San Marcos Stamped sherds – a pottery type typically associated with Yamasee potters. Most of the pottery assigned to this group was recovered from Santa María. Only one plainware from Santa Rosa was associated with Group 4. In addition, some painted and slipped pottery samples from Santa Rosa also were included in this group, which I discuss in a later section.

Finally, Group 1 includes a clay sample collected along the Escambia River, adjacent to Mission Escambe. Unsurprisingly, none of the pottery recovered from Santa María – occupied prior to the founding of Mission Escambe – was assigned to this group. There was some plainware samples from Santa Rosa included in this group (n=12), but two-thirds of the group members were decorated native pottery samples recovered from Escambe (n=24), as well as some decorated native sherds from Santa Rosa (n=4). Most plainwares at Santa Rosa were assigned to Group 10, which also included four lead-glazed sherds from post-1740 contexts, as well as decorated native wares from Escambe and Santa Rosa, raising questions about who was using this clay to supply the presidios with locally produced ware. I address this question in the next section.

In sum, both the port and presidios remained dependent on regional connections despite simultaneous strengthening in external connections with central Mexico. In Northwest Florida, regional connections were not as strong as in Veracruz, particularly in higher status contexts. Nevertheless, regional connections remained important for supplementing external supply, particularly for lower status castas.

Labor Mobility

Labor mobility refers to shifts in labor relations that reflects a general change in how labor was organized – a mechanism that may include socioeconomic mobility. Labor relations were central to structuring the developing colonial hierarchy – a point that I have emphasized throughout this study. The organization of labor was embedded in the early structure of the géneros de gente and the later sistema de castas. Socioeconomic mobility was an important mechanism responsible for growing instability in the casta system and the development of an incipient economic class by the end of the eighteenth century. From the historical perspective, I have already examined socioeconomic mobility by mining census data concerning the connection between socio-racial categories and occupations in late colonial Veracruz and enlistment status and rank in early eighteenth-century Northwest Florida. In this section, I examine shift in labor relations through the lens of pottery manufacture in central Veracruz and Northwest Florida.

In her critique of the St. Augustine pattern, Voss (2008b:873) has argued that it was "labor relations with tribal communities, mission villages, and enslaved and conscripted populations and Africans that fostered the incorporation of these goods [locally produced wares] into colonial households." To this list of potential producers, I would add biologically and culturally mixed descendants who transformed colonial society through their unique familial and community connections. Labor relations varied between regions, producing, reproducing, and transforming relationships and the material culture that colonists used on a daily basis. In this section, I integrate the provenance study from Chapter 8 with the technological style analysis from Chapter 7 to address labor relations, mobility, and the introduction of diverse technology and traditions into colonial society.

Port of Veracruz

My analysis of technological styles of pottery recovered from the port facilitates the discriminating between casta and Florida native traditions in Northwest Florida. A similar discrimination between European, African, native, and casta traditions in central Veracruz is beyond the scope of this study as it would require (at a minimum) comparable analyses of colonial period native and African pottery. Further, the difficulty of identifying West and Central African pottery traditions in the American colonies is a problem with a deep history among Caribbean and North Atlantic archaeologists (e.g., Ferguson 1980; Hauser 2008, 2013; DeCorse 2001; Hauser and DeCorse 2003). Nevertheless, the historical context and provenance of different technological styles is suggestive (see also Eschbach 2019).

Thus far, I have only located a few colonial references to pottery production in Veracruz. As discussed in the previous section, native potters developed a thriving industry in Tlacotalpan in the late sixteenth and early seventeenth century. Estate papers for a shopkeeper in Veracruz also indicate that pottery manufactured near Jalapa entered the port's market. According to several historians, pottery produced around Jalapa reached such a degree of success that these wares were not only sold in Veracruz but also shipped to Havana and the West Indies (Blázquez Domínquez 2000b:105; Chávez Orozco and Florescano 1988:79).

In addition, historians focused on African descendants and the sugar industry in central Veracruz have shown that mills were dependent upon skilled laborers, including carpenters, blacksmiths, tanners, *and* potters (Cardoso 1983:28; Carroll 1991:62; García Ruiz et al. 2011:135). The owners of sugar haciendas heavily relied on African slaves and their mixed descendants for skilled labor. By learning a craft, slaves increased their value (Carroll 1991:66; see also Chapter 4). Potters also could earn some additional money for their owners or themselves by selling their wares in colonial markets (see Carroll 1991:66, 110; Landers 1997:88). The structure of labor regimes in central Veracruz resulted in relatively large numbers of Afromestizos who were skilled in European technologies, while fewer natives and mestizos entered traditional European trades as apprentices (Carroll 1991:74; Cole 2003:162).

It was within this historical context, that I examine the role of labor in introducing pottery traditions into the neighborhoods and households of the port. Because there were no significant changes in the intraregional provenance of plain and lead-glazed pottery over time and because sample sizes for painted and slipped wares were particularly small, I aggregate assigned samples from all time periods for this analysis.

Figure 9.5 reveals a clear relationship between broad categories of pottery and the geographical zones that provided these wares. Lead-glazed wares were overwhelmingly associated with clays collected along the Jamapa River, the most likely source of clays used by potters in or near the port itself. The relative frequency of these wares from other geographic zones decline significantly with distance from the port. Lead-glazing technology was introduced by European colonists (see Charlton et al. 2007; Lister and Lister 1987), and possibly some of these wares were made by peninsular or criollo artisans and lead-glazing technology was ultimately adopted by some native and mestizo potters in central Veracruz. In other regions, such as the Basin of Mexico, native potters were quick to incorporate lead-glazing, likely in order to cater to a growing number of peninsular and criollo consumers (Fournier García and Charlton 2019:47).

In central Veracruz, however, there are three reasons to suspect Afromestizo involvement in the production of lead-glazed wares that were found at the port. First, because of their role in the labor regimes of central Veracruz, Africans and their Afromestizo descendants were more frequently exposed to criollo and peninsular spheres of learning. Second, technological style analysis indicates that while some of these wares were made using a mold or hand formed, at least some were wheel-thrown as early as the seventeenth century. The wheel also was introduced by European artisans, but it was infrequently adopted by early native potters. In general, primary forming techniques are the most resistant to change, and wheel-throwing techniques require a whole new set of motor skills that are time consuming to learn (Arnold et al. 2007). In the early colonial Basin of Mexico, native potters typically added lead-glazes to pottery vessels that were otherwise formed using native molding techniques (Fournier García and Charlton 2019:46-47,49).[10]

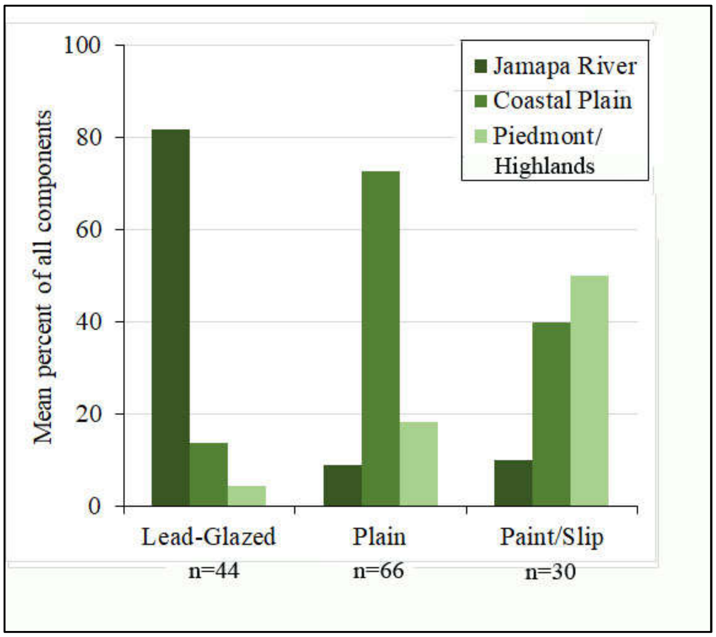

Figure 9.5. Relationship between Pottery Categories and Geographic Zones of Production. *Note:* Mean percentages are based on total samples assigned to Veracruz compositional groups.

In contrast, Africans and Afromestizos may have learned to use glazes and the wheel while working as slaves or wage earners at sugar haciendas or for urban craftsmen.[11] Third, the approximate provenance of most of the regionally produced lead-glazed wares is notable, located near or within a zone populated mostly by Afromestizos and criollos. In any case, lead-glazed wares were likely introduced to the market by potters living at or near the port and using at least some European technologies.

Away from the port, most plainwares were produced using clays similar to those that I collected along the coastal plain at Villa Rica and Tlacotalpan (Figure 9.5). For these wares, only non-European forming techniques were identifiable, such as molding, drawing, and coiling. I have yet to locate any historical reference to colonial potters north of the port, but Villa Rica was located about 65 km away, outside the jurisdiction of Nueva Veracruz where Afromestizo and criollo populations were concentrated. It appears that potters working in these geographic zones introduced indigenous plainware traditions into the port.

Turning to slipped and painted pottery, these wares were brought to the port from all three geographic zones. Yet, half were transported from the piedmont and higher elevations. Group 5 included the clay sample from Acazonia and all red slipped pottery (n=10). All of these vessels were formed by hand or with the use of a mold, indicating the use of non-European forming traditions. The use of red slips was common in Mesoamerica, Africa, and Spain (Charlton and Fournier García 2010; Curet et al. 1994; Hauser and DeCorse 2003; Smith 1990). At higher elevations, the few pottery samples assigned to Group 7 are mainly orange painted or slipped and either hand formed or wheel thrown. Located near Jalapa, peninsular or criollo potters probably introduced the wheel in this area. Closer to the port, most of the pottery produced along the coastal plain was white slipped and hand formed or molded. The three samples associated with the Jamapa River were all red slipped and included the only wheel thrown example from the coastal plain.

In sum, labor relations in central Veracruz introduced diverse pottery traditions into the port of Veracruz. European technology was introduced mainly by potters working at or near the port, possibly by Afromestizos who learned their crafts while working for criollo potters or serving as slaves or skilled wage laborers at the sugar haciendas. Learning a specialized craft and European technology offered a potential avenue for a modest income that was slightly more valued that unskilled labor. The use of European technology would have differentiated potters from others who did not. Meanwhile, intraregional connections brought native (and possibly African) traditions from communities located outside the main concentration of criollos and Afromestizos along the coastal plain surrounding the port.

Northwest Florida

The assumption that locally produced wares were all produced by potters indigenous to Southeastern North America, is likely due to well-known labor regimes in east Florida. St. Augustine was dependent on the mission chain and labor drafts as a primary source of labor during the sixteenth and seventeenth centuries (see Chapter 4). The first presidio in Northwest Florida was founded just prior to the collapse of that earlier system at the end of the seventeenth century and located in a largely depopulated region. Even after Apalachee and then Yamasee groups founded missions in the region, their free labor was never enough to fully support the presidios' needs. Colonial administrators thus turned first to convict laborers from colonial Mexico who they often enlisted or paid a wage in exchange for skilled work and then later turned to volunteer settlers.

There is scarce historical evidence describing pottery production in Northwest Florida. The earliest is from 1718 when a negro mason arrived at Santa María to inspect the local clays for brick making. The mason examined clays from multiple nearby sources but determined that the clays tended to crack when fired. He was then informed that native potters were successfully using local clays. From these accounts, the mason concluded that native potters must be "mixing some old fragments with new material" (González de Barcia 1951:375). This account hints that the colonists were aware of the local use of grog. Later reports indicate that there was a kiln for firing bricks in Pensacola by at least 1741 (Uruena 1753). Finally, a 1756 map by Agustín Lòpez de la Camara Alta suggests a location along Pensacola Bay that had clays appropriate for making "*loza y ladrillos*" (ceramic and bricks) (Figure 9.6).

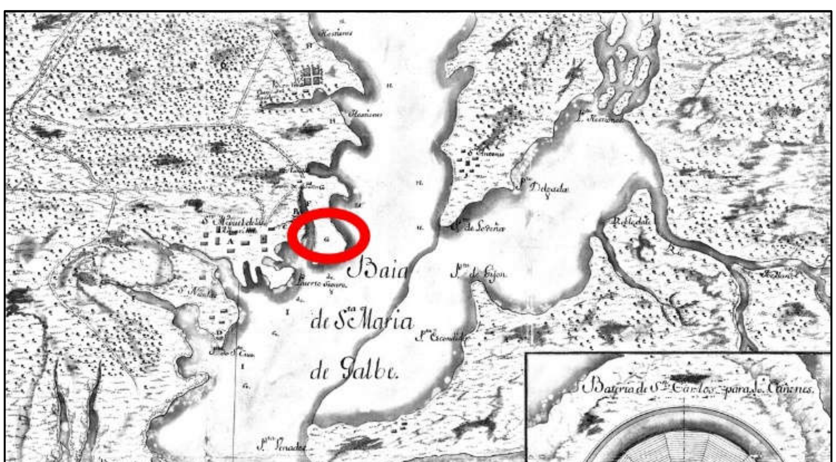

Figure 9.6. Map of Pensacola Adapted from Agustín Lòpez de la Camara Alta's 1756 Map Detailing Plans for Fort Santa Barbara at Presidio San Miguel de Panzacola. Map's Legend Indicates a Potential Source for Clay to Make "Loza y Ladrillos" (Ceramic and Bricks). *Note:* Red circle added to indicate location of potential clay source.

The few historical references to pottery production support abundant archaeological evidence that native people were producing wares in the region. These descriptions also indicate that colonial administrators were interested in the local clays for making brick and possibly pottery and also were aware of native methods for adapting to local resources. In Chapter 7, I laid the foundation for examining local pottery production and labor relations from an archaeological perspective. Using pottery from Veracruz and mission Escambe, I conducted a multistage quantitative analysis to discriminate between wares made by diverse colonists and native potters. In this section, I combine the results of that analysis with the provenance study to assess the labor relations that introduced local native and casta pottery traditions into colonial households.

Most locally produced plainwares were manufactured by native potters as archaeologists frequently assume. However, approximately 20 percent of plainware samples collected from low status contexts were manufactured by casta potters in Pensacola. This was true across all three temporal periods (Figure 9.7). In contrast, only 5 percent of the samples drawn from the officers' barracks at Santa María were made by castas. Most were produced by native potters or imported. Samples drawn from post-1740 high status contexts were either imported or made by native potters. Unfortunately, only a few of the plainware samples drawn from these latter contexts were assigned to both a compositional and technological style group. Because of the small sample size, the results for these contexts are dubious. Otherwise, a X^2 test suggests that differences in plainwares between contexts are statistically significant (X^2=16.932, p-value=0.0289).

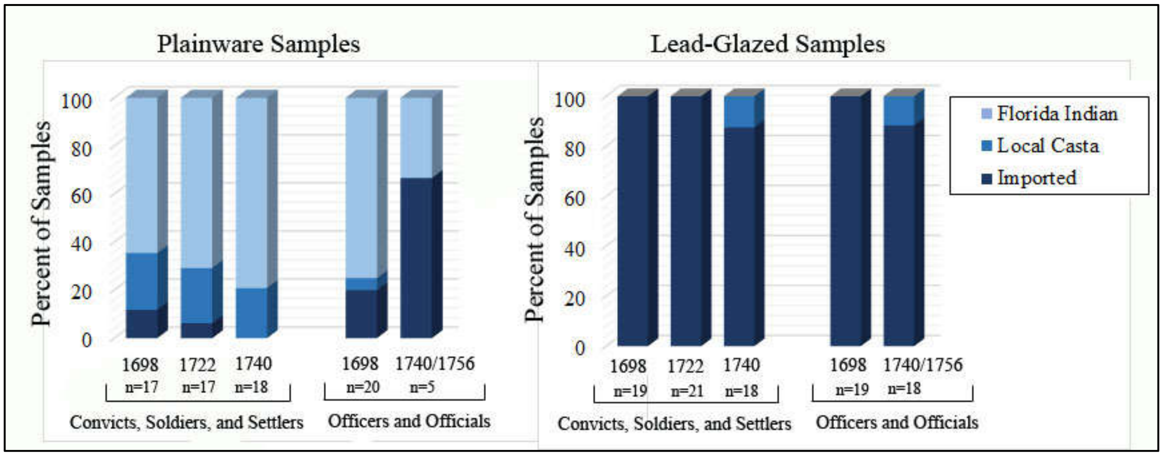

Figure 9.7. Plain and Lead-Glazed Samples from the Pensacola Presidios Assigned to Both Compositional and Technological Style Groups.

Based on the current sample, all lead-glazed wares were imported to the presidios prior to 1740. After this date, however, more than 10 percent of lead-glazed pottery – both from low rank and high-status contexts – were made locally in Northwest Florida. Again, although sample sizes are relatively small, this shift is statistically significant (X^2=6.843, p-value=0.073), and consistent between for all samples drawn from pre-1740 (n=59) and post-1740 (n=36) contexts. As noted in Chapter 7, two of these sherds were grog tempered, a technological choice that was not present in the Veracruz sample. The brick mason's 1718 assessment of local clays suggests that colonists were aware of the benefits of this tempering technique. Casta potters may have adopted grog tempering to improve the firing of their pots. Two other local lead-glazed samples assigned to the casta technological group were sand tempered, indicating that even if some casta potters adopted grog temper, it was not universal.

Finally, painted and slipped pottery was rare in all contexts, representing less than 3 percent of pottery assemblages in all but post-1740 high-status contexts where they averaged 6.1 percent of assemblages. I attempted to examine additional sherds where possible, but ultimately only 18 samples were assigned to both technological and compositional groups. Two of these samples were imported. Most were locally made by casta potters (n=10) using red slips or paints and in eight cases there is a clear indication that a wheel was used to make these vessels. The remaining six were red slipped or painted wares, hand formed by native potters with some evidence of coiling.

While the compositional groups associated with Northwest Florida production shifted over time, there is no statistically significant difference in clay choices between casta and native potters (X^2=0.451, p-value=0.886). I suggest three possible explanations for this. Like the brick mason from 1718, some casta potters were probably interested in the clay recipes used by native craftsmen to make their pottery and may have followed their lead in using similar clay sources. In a few cases, casta-made wares recovered from Santa Rosa were assigned to Group 1, associated with a clay sample collected from near mission Escambe. It seems unlikely that casta potters were traveling such a distance to gather clay, but perhaps native people brought clays to the presidios for bartering with casta potters. Another likely possibility is that Group 1 represents a range of possible sources in Northwest Florida. The number of clay samples collected in the region is relatively small and cannot fully represent the compositional variation present in regional clays. More work is needed to better understand how well geological and physiographic zones can be chemically differentiated.

That said, it is interesting to note that many of the casta-made samples, including the lead-glazed wares, were assigned to Group 10, which includes a clay sample collected near Gaberonne. This clay is located in the same area indicated on Lòpez de la Camara's 1756 map as a potential source for making ceramics (see Figure 9.6). The rest were associated with Group 4, which is not associated with any clay samples. All but one of the plainware samples were from Santa María contexts. However, many of the red painted and slipped samples from later contexts were assigned to this group.

Returning to the question of labor mobility, the current sample suggests that castas were making plain utilitarian wares mainly for their own consumption or for barter to other low status castas. This pattern is clearest as Santa María. A larger sample is needed, particularly from post-1740 high-status contexts, to test if this trend continued. Pottery production, particularly for plain hand-formed utilitarian vessels, was not an endeavor that brought social distinct. If these potters were selling their wares, it would have brought little money and would not have differentiated them from native potters who provided most of the plain utilitarian wares to the port. However, it would have introduced casta manufacturing traditions and possibly differences in forms more familiar to casta colonists.

In contrast, the later local production of lead-glazed wares, particularly those that were wheel-thrown, would create some distinction as these wares required specialized knowledge and resulted in ware types that were not otherwise available locally. Notably, these local wares were found equally in both low-ranked and high-status contexts. Red painted and slipped vessels, however, were at least twice as common in high-status contexts. Sample sizes are too small to identify a pattern between producers and consumers, but, given that a higher proportion of slipped and painted wares were found in high-status contexts and that most of the wares in the overall sample were made by castas, it seems likely that casta potters were producing red slipped and painted wares for high-status officials alongside some native potters. Casta-made slipped and painted wares were present at all three presidios and some of these wares were produced using a wheel, again indicating some distinction between native and casta potters from the earliest years of the presidios.

In sum, labor relations in both Northwest Florida and central Veracruz introduced pottery both from surrounding native communities and from casta artisans living at or near the port and presidios. Production of lead-glazed pottery by Afromestizos in Veracruz and castas in Florida indicated closer connections between these groups and criollo or peninsulare craftsmen, while marking a distinction between their labor and the native production of plain or roughened utilitarian pottery.

Gendered Brokerage

In this section, I assess an underlying assertion concerning the St. Augustine pattern at the Port of Veracruz and the presidios of Northwest Florida. Deagan (1974, 1983), argued that encounters between Spanish colonists and diverse colonized people were structured by ethnic-gendered relations at household scales. According to her original framework, because most European colonists were male, indigenous women acted as cultural brokers mainly through cohabitation, introducing native material culture into private domestic contexts. European material culture was preserved through male activities in highly visible contexts. Later this framework was broadened to incorporate African women and syncretic material culture (Deagan 1990, 1991), as well as the role of non-European women as domestic servants and slaves (Deagan 2001, 2003). Gendered brokerage as a potential driver of material culture change aligns with the historically documented mechanism of biological mixing discussed in Chapters 3 and 4.

Recent research, however, has challenged gendered brokerage as the central driver of material culture change and has raised questions about the application of dualistic artifact categories (see critique in Voss 2008b). My assessment of relational mechanisms of change from the historical perspective indicates the importance of biological mixing between Europeans, Africans, and indigenous as a relational mechanism of colonial transformation from the bottom up. Historical and archaeological evidence demonstrates that change was more complex and involved multiple relational mechanisms beyond gendered brokerage at a single scale. Nevertheless, the St. Augustine pattern – what I am henceforth referring to as gendered brokerage – was one of several possible mechanisms of change.

Deagan (1974, 1983) first tested her hypothesis of social change through the investigation of four eighteenth-century households in which she sorted artifacts based upon their social visibility and ethnic affiliation (defined broadly as Hispanic or indigenous and later European vs non-European). Within this framework, local non-European material culture entered colonial households in low visibility contexts. For pottery, low visibility wares were exclusively utilitarian (Deagan 1974, 1983, Ewen 1991).

Port of Veracruz

While it is certain that the composition of households shifted over time, in 1791 more than half of the females in western quarter where the Barrios de Minas was located were described as morenas or pardas. About a quarter of the female residents were españolas and a little more than 15 percent were mestizas or indias. More than half of the españolas also held the title of doña and may have lived outside the Barrio de Minas, in a wealthier neighborhood adjacent to the central quarter (Blázquez Domínguez 1996; Gil Maroño 1996; Hernández Aranda 2006). Thus, most women serving as potential cultural brokers in the study area were morenas or pardas, that is, Afromestizas.

As discussed in the previous sections, plainwares were all made in central Veracruz until the late eighteenth century and then only a small number were imported from central Mexico. In addition, unlike St. Augustine, many of the lead-glazed wares also were made in the region and possibly at the port itself. Deagan (1983; see also Ewen 1991) sorted lead-glazed wares into the Hispanic or European category, yet these wares were locally produced, possibly by Afromestizos who dominated the labor force close to the port. Plainwares were largely produced by potters along the coastal plain outside the area that was dominated by criollos and Afromestizos (see Figure 9.5). These wares were more likely produced by native potters. The information available on the composition of the port in general and the two neighborhoods specifically do not suggest that there were many native women living at the port. Although plainwares did decline over time, these vessels dominated ceramic assemblages for most of the colonial period. Even in the late eighteenth century, on average plainwares were about equal with lead-glazed wares (Figure 9.8).

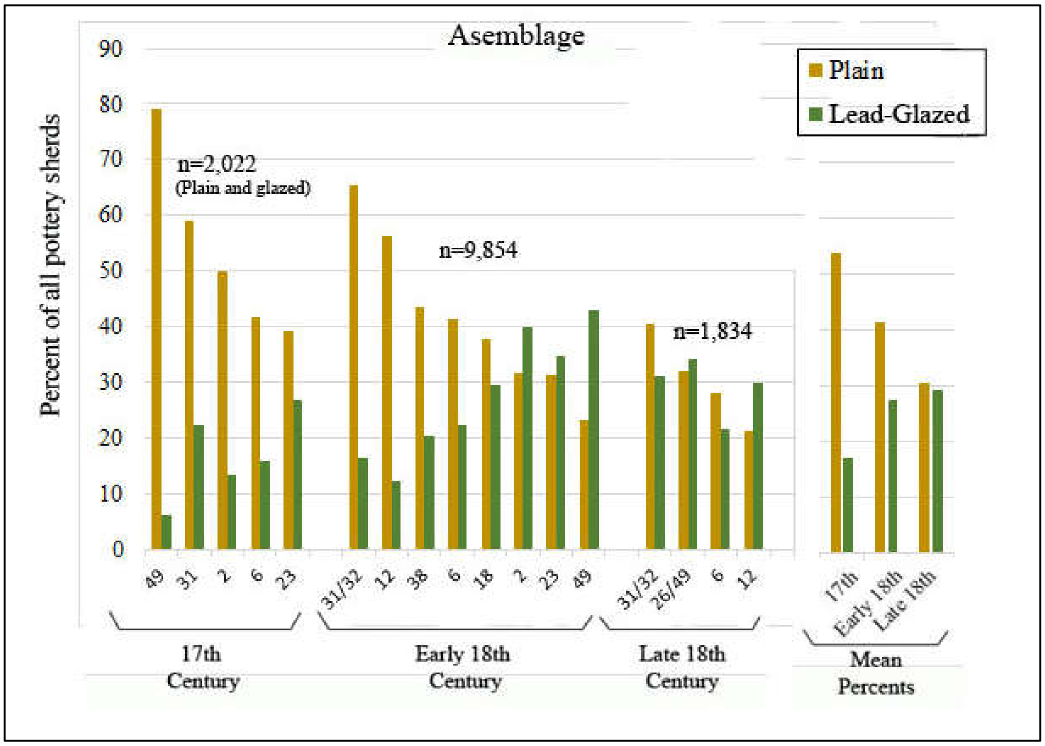

Figure 9.8. Percentage of Plain and Lead-Glazed Wares in the Assemblage of Each Urban Lot Excavated at the Port of Veracruz.

Given their potential role in food preparation, it is worth going beyond broad pottery categories to note available evidence concerning utilitarian vessel forms. For this assessment, I include only the 607 samples examined for the technological style analysis. Of these samples, vessel forms were identifiable for 81 sherds, including 55 utilitarian wares (Table 9.10). In addition to plain and lead-glazed vessels, some white or red slipped wares were also made into utilitarian forms. Glazed wares were mainly bowls, but also cazuelas, cooking pots that could have been used for traditional Spanish braising, frying, or simmering. Glazed cazuelas also could have been adapted for African, native, or new colonial cuisines (see Chapter 5). Interestingly, archaeologists have noted a positive correlation between African descendent communities and stewed food appropriate for cooking in a cazuela (Ferguson 1980, 1992; Franklin 2001; see also Voss 2005:466). Based on the compositional study, these glazed cooking pots were made near the port, while some red slipped cazuelas were imported from the piedmont.

At the same time, plain and white slipped comales were present in the sample from five different urban lots. Ceramic griddles indicate that women in both neighborhoods also had adopted native technology for cooking tortillas. One of the plain comales may have been manufactured at or near the port itself. Four of the white slipped comales were assigned to Group 9, associated with clay collected near Cempoala. Thus, comales were likely all produced within the coastal plain of Veracruz.

Table 9.10. Utilitarian Vessel Forms Identified during Macroscopic Analysis of the Veracruz Sample.

	Bowl	Cazuela	Comal	Jar	Total
Plain	1	1	6	9	17
Glazed	25	3	0	1	29
Slipped	0	2	6	1	9
Total	26	6	12	11	55

The presence of plain and slipped comales, lead-glazed and red slipped cazuelas, as well as plain, glazed, and slipped jars demonstrates that diverse regionally-produced utilitarian wares were available and consumed at the port. While castas could have adapted jars and cazuelas to different cuisines, comales were used mainly for cooking tortillas. The possible introduction of comales into Afromestiza households suggests direct interaction with native women. While many of the women living in the Barrio de Minas were described as pardas and morenas, suggesting an African heritage, these women also were castas and likely had diverse familial connections with criollos, peninsulares, and even native people who may or may not have lived in the port. In addition, the use of African slaves and their descendants as domestics would have introduced pardas and morenas to varied techniques for preparing maize that also was a town staple.

The main thrust of Deagan's (1983) original hypothesis was that native women would act as cultural brokers, introducing element of their *own* indigenous culture into low visibility contexts within colonial households. My analysis suggests more complexity as women of diverse backgrounds introduced an array of locally available wares into the domestic sphere. In this regard, I would argue that it is useful to look at gendered brokerage, labor relations, and regional connections as concatenating mechanisms of change.

Northwest Florida

For Northwest Florida, the historical data presented in Chapter 4 indicate that there were few women, either casta or native, living at the first presidio. Native women were relatively transitory during these early years, although a few may have remained as the wives of soldiers. There also were women from colonial Mexico who had joined their husbands in Pensacola. The number of women (and families) only notably increased after 1740. Indications of intermarriage with Apalachee, Yamasee, or other native women are mentioned only anecdotally in official reports. The post-1740 increase in women at the presidio was due mainly to renewed recruiting efforts in Mexico. In addition, based on the previous discussion of labor relations, it is now evident that not only native people but also castas were producing pottery locally, adding to the range of wares from which colonists could choose.

As previously discussed, the plainware assemblage decreased in relative frequency over time in both low and high-status contexts, while lead-glazed wares were relatively stable (Figure 9.9). As with Veracruz, most plainwares were locally produced, but until 1740 colonists in Pensacola were dependent on external connections for all lead-glazed wares. An influx of women and families from Mexico may have simultaneously increased demand for lead-glazed utilitarian pots, leading to the introduction of glazing technology in Northwest Florida. The identifiable vessel forms present in the presidio sample were dominated by bowls and jars (Table 9.11). Noticeably absent from these vessel forms were cooking pots. Only a single cazuela was identified by form and only one of the bowls had soot residue, suggesting that it may have been used for cooking. Based on Deagan's (1974, 1983) work, archaeologists working in Florida typically include "decorated" native pottery in the utilitarian category when they are found in colonial contexts. I, thus, consider the potential use of these native wares in the colonial kitchen.

Most native-produced wares were represented by plain sherds, but it likely that many of these fragments were broken from decorated vessels (Table 9.12). Incised pottery was most commonly of the Lamaroid tradition associated with the Apalachee and Creek. These vessels were typically incised on the upper shoulder of carinated bowls, leaving the rest of the pot unaltered except for some burnishing (Pigott 2015:111-112). Carinated bowls were used in the Southeastern North America for frying and making semi-liquid foods, similar to glazed cazuelas, and could have been adapted to cuisines brought from Mexico. Carinated bowls were most common among utilitarian wares at Santa María, during a period when lead-glazed vessels were found in lower frequencies in all contexts. The use of carinated bowls was particularly notable in the officers' barracks. Observed differences in the frequency of glazed and carinated wares were statistically significant between contexts (X^2=101.59, p=0.000).

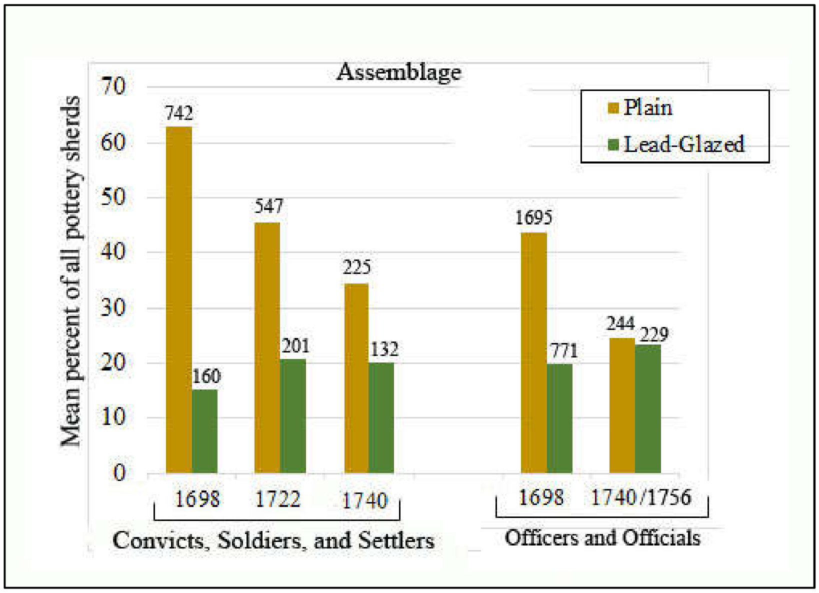

Figure 9.9. Mean Percentage of Plain and Lead-Glazed Wares by Context and Temporal Component at the Pensacola presidios.

Table 9.11. Utilitarian Vessel Forms Identified during Macroscopic Analysis of Pensacola Presidio Samples

	Basin	Bowl	Cazuela	Comal	Jar	*Total*
Plain	0	1	0	3	15	19
Glazed	1	18	1	0	4	24
Painted	0	0	0	0	1	1
Total	1	19	1	3	20	44

Table 9.12. Plain, Lead-Glazed, and Decorated Native Vessels as Percentages of Utilitarian Wares from the Pensacola Presidios

	"Decorated" Florida Native			Native	Total
	Roughened	Carinated	Other	Plain[1]	Native
Convicts, Soldiers, and Settlers					
1698	0.0	0.6	0.8	51.5	52.9
1722	2.3	0.2	0.2	46.8	49.6
1740	12.9	0.2	2.1	42.3	57.6
Officers and Local Officials					
1698	0.0	5.6	1.1	48.1	54.8
1740	1.4	0.0	3.6	16.3	21.3

	Imported/ Casta Plain[2]	Lead-Glazed[3]	Total[3]		Total Utilitarian
Convicts, Soldiers, and Settlers					*n*=
1698	28.2	18.8	47.1		920
1722	19.3	31.1	50.4		773
1740	11.1	31.3	42.4		403
Officers and Local Officials					
1698	16.0	29.2	45.2		2644
1740	32.5	46.2	78.7		488

[1] The mean percentage of plain utilitarian wares in the excavated assemblage weighted by the percent of wares assigned to the native technological style group in the study sample.
[2] The mean percentage of plain utilitarian wares in the excavated assemblage weighted by the percent of wares assigned to the casta or likely casta technological style groups in the study sample. Includes both local and imported wares.
[3] Includes both local and imported wares.

Roughened vessels in the Lamar tradition were typically brushed or cob marked only on the lower portion of cooking pots (Hally 1986:280; Knight 1985:188; Pigott 2015:110). Roughening was commonly associated with the Creek, and so it unsurprising that these wares are not present in study contexts from Santa María, but were recovered from Santa Rosa assemblages after some Apalachee descended from Creek territory and settled in Northwest Florida. It appears that these wares replaced other cooking equipment mainly in low-status casta contexts. Post-1740, officers and local officials relied overwhelmingly on imports and some casta-produced wares for food production and other utilitarian functions. As with carinated bowls, differences in the frequency of glazed and roughened native pottery was statistically significant between contexts (X^2=323.15, p-value=0.000).

Despite the post-1740 increase in the number of women recruited from colonial Mexico, the relatively frequency of native pottery actually increased slightly in low status contexts during this period. There is not sufficient historical data to track fluctuations in the relative proportion of native versus Mexican women among their small numbers at Santa María, but certainly after 1740 casta women dominated the female population at the presidio. If women were acting as cultural brokers with control over the tools used for food production, they were adapting to local resources and introducing foreign pottery styles. This introduction could indicate direct or indirect interaction between casta and native women as colonists adapted to local resources for their cooking pots and other domestic tools.

The main distinction in the use of utilitarian wares was based on rank and economic advantage. Officers and local administrators had greater access to glazed imports, and at Santa María they supplemented glazed wares with burnished carinated bowls. In addition to lead-glazed wares, I also identified three plain comales among the samples selected for the technological style analysis (see Table 9.11). These fragments were recovered from three different contexts: the soldiers' barracks and officers' barracks at Santa María and the East Area of Santa Rosa (TPQ 1722). While the number of comales were small in the sample, their presence indicate that colonists were utilizing Mexican vessel forms to prepare dishes. In addition, the one comal that was included in the provenance study was locally produced by a casta potter. As in Veracruz, the role of women as cultural brokers was more complex than was inferred by the original configuration of the St. Augustine pattern. Women likely did play an important role in introducing native and Mexican traditions into colonial households, but through diverse forms of interaction and adaptation to a new environment. This was the case at both the presidios and the port.

Regional Categorical Activation

The historical perspective emphasizes broad categories of identification from the top down. The géneros de gente and then the casta system homogenized colonial populations and obscured local attachments and regional categories of identification. Regional categorical identities were subsumed under broad labels such as indios, which included diverse identities with roots in pre-conquest periods that were later transformed through colonial interaction. In colonial Mexico, historians have begun to explore regional and community identities through native language documents, which rarely mention the “indio” label. Instead, Nahuatl and Maya language documents emphasize communities of origin and shared histories (Chance 2008:138-141; Lockhart 1992:115; Restall 1997:13). In the southeastern borderlands, native societies were divided into diverse political and linguistic groups that are more frequently mentioned in Spanish language documents in order to track their shifting political alliances with Spanish, French, and British settlements located along the frontier of the Spanish empire. Meanwhile, criollos, African descendants, and castas developed local or regional identities through social interaction and adaptation (e.g., Restall 2009:232-233; Voss 2005).

Categorical expressions of regional identity are often overlooked, not only from the historical perspective, but also in the conceptualization of archaeological frameworks – at least within the context of colonial households. Deagan (1983), for instance, hypothesized that while gendered brokerage would introduce a combination of native and European-style wares into low visibility spheres, serving vessels would include exclusively Chinese or European-style tablewares, particularly majolicas. Recent research, however, has shown that this pattern does not hold true, and diverse regionally produced serving vessels have been found even in peninsular or criollo households outside the circum-Caribbean (see review in Chapter 2). In this section, I assess pottery assemblages from the Port of Veracruz and the presidios of Northwest Florida for locally produced serving vessels that may have activated regional and potentially new categories of identification in highly visible spaces.

Port of Veracruz

Regional stylistic changes in serving vessels after colonial contact are poorly understood in central Veracruz. Because the port was not established in its present location until the end of the sixteenth century, it is not possible to track the earliest evolution of pottery styles with the present case study. In the Basin of Mexico, where post-conquest pottery has been better studied, traditional Orange and Red Ware serving vessels continued well into the colonial period, with some elaboration and alteration in forms (Charlton and Fournier García 2010; Fournier García and Charlton 2019). In central Veracruz, highland styles, such as the Guinda complex and Cholutecoid polychromes – consisting of red slips, polishes and paints – were characteristic of the Late Postclassic (Curet et al. 1994; Smith 1990). Other types include late Aztec III black on orange variants. Serving vessels included molded deep plates, bowls (with or without tripod supports), and pedestaled cups (Brüggemann et al. 1991; Curet et al. 1994; Daneels 1997:244-245; Medellin Zenil 1960:124-137).

Information on regionally produced serving vessels recovered from colonial contexts is scant, and so my analysis represents only an early first step. At the port, red and orange slips were often accompanied by burnishing or polishing, but rarely do they have black or white paint applied over the slips. In some cases, black, brown, or orange paints were applied to an otherwise plain fine textured pottery, appearing somewhat similar to wares that are still produced today near San Miguel de Aguazualos (Figure 9.10; Table 9.13). The two sherds that were included in the provenance study were both assigned to Group 7, which included a clay sample from modern potters at Aguazuelos.

Few vessel forms have been identified for orange slipped or for orange or brown painted pottery, but the highly visible painted designs (usually dots, lines, and circles) and their transportation over the greatest distance within the region, suggest possible added value and potential use in highly visible contexts.

Only six of the red slipped sherds included in the technological style analysis had identifiable vessel forms. Half were utilitarian (cazuelas and a large jar) and half were serving vessels (bowls and a plate). Based on this analysis, I roughly estimated that half of the red slipped wares were serving vessels in order to approximate the mean percentage of serving vessels in Table 9.13. These percentages have limited value but give some indication of the possible role of regionally produced red ware serving vessels until a larger sample can be analyzed in the future. Red slipped samples were assigned only to Veracruz compositional groups from the coastal plain and piedmont

Figure 9.10. Photo of Red Slipped and Burnished Plate Rim (left); Orange painted vessel (right)

I also include imported hand painted Tonalá Bruñida (also called Guadalajara Polychrome) from West Mexico as a distinctive regional style. Deagan (1983:113) groups Tonalá with Hispanic utilitarian wares, but while these wares were widely traded and even shipped to Spain, they developed from regional traditions in Mesoamerica and included vessel forms appropriate for the Spanish table. In this study, I view these wares as a regional expression of categorical identity that were incorporated into colonial households at a much broader scale.

Table 9.13. Frequency of Regional Style Serving Vessels Recovered from the Port of Veracruz with Mean Percentages of Regional Serving Vessels and Tableware Ceramics

	17th Century		Early 18th Century		Late 18th Century	
	Count	Percent	Count	Percent	Count	Percent
Orange or Brown Painted/Slipped	22	0.5	124	1.2	5	0.6
Red Slipped[1]	150	12.1	627	7.5	104	5.5
Black Painted	0	0.0	8	0.2	0	0.0
Plain Fine Buff	359	19.6	352	10.3	139	9.0
Tonalá Bruñida	15	4.4	148	4.3	14	2.8
Regional Style Serving Vessels	471	47.8	945	27.0	210	20.7
Porcelain and European-Style Tableware Ceramics	514	52.2	2554	73.0	806	79.3
Lead-Glazed[2]		2.0		8.6		11.1

[1]Mean percentages for red slipped/painted wares were weighted based on the original assemblage and the identification of serving vessels in the sample included in the macroscopic analysis. I approximate that roughly 50 percent of red slipped/painted wares were used as serving vessels.

[2]Mean percentages for lead-glazed wares are weighted based on the original assemblage proportions and the mean percentages of lead-glazed serving vessels by temporal component identified in the technological style analysis. Lead-glazed wares were not included in the totals for serving vessels or tableware ceramics.

Not all of the regionally made serving vessels consumed at the port were decorated with highly visible attributes. Plain fine buff wares appear similar to the Bizcocho wares that were imported from Spain during the sixteenth century, but the three samples assigned to compositional groups were all produced in central Veracruz. Although these wares were not painted, slipped, or burnished, they were used in highly visible contexts as serving vessels and their off-white pastes were brightly distinctive. In addition, while most lead-glazed wares served utilitarian functions, the technological style analysis in Chapter 7 indicates that about 16 percent of the glazed sample was used in serving. I include their weighted percentages in Table 9.13 for consideration, but I did not add them to the regional-style totals as lead-glazed tableware was ubiquitous in Spanish America and not necessarily distinctive for signaling a regional identity.

Based on my analysis, as much as 47.8 percent of serving vessels incorporated into casta households were regional styles and all but the Tonalá Bruñida wares were produced in central Veracruz in the seventeenth-century (see Table 9.13). The relative frequency of these wares declined over time, but in all periods, local serving vessels were dominated by plain fine buff and red slipped wares. While these wares were regionally produced, their use in highly visible contexts might express categorical identities at broader scales. As I already mentioned, plain fine buff vessels are similar to those that came from Spain and, thus, fit within the broader repertoire of European commensality. In contrast, polished red slipped serving vessels were a widespread precolonial tradition that is characteristic of late Postclassic central Veracruz and the central highlands – often associated with the Aztecs just prior to the Spanish conquest (Curet et al. 1994; Smith

1990). Charlton and Fournier García (2010:135) suggest that red wares appealed to early peninsulares because they were similar to some bright red ceramics found in southern Spain. Red slipped wares were similarly found in some regions of West Africa (Hauser and DeCorse 2003). Red wares, thus, could cross-cut géneros de gente to create a broadly unifying expression of colonial identity in highly visible contexts (see Charlton and Fournier García 2010 for a similar argument).

A less wide-spread expression of regional identification was tied to orange or brown painted pottery. These wares were less common in colonial contexts, but they persisted through the colonial period. Somewhat similar wares are still manufactured in San Miguel Aguasuelos today. The trends presented in Table 9.13 suggest a decline in regionally produced serving vessels and an increase in imported European-style tableware over time. I do not attempt to evaluate the statistical significance of these trends because the weighted percentage of red slipped serving vessels versus utilitarian wares is only a rough estimate based on a very small sample. In addition, a form/functional analysis of a larger sample of orange slipped, and orange or brown painted wares is needed. Further discussion on the role of regionally produced wares in expressing alternate categorical identities will need to await additional work, but I view this study as an important first step.

Northwest Florida

Following the collapse of the mission chain, previously distant indigenous communities relocated to the outskirts of the St. Augustine and Pensacola presidios. In Pensacola, the Apalachee and Yamasee missions remained spatially segregated, not only from the presidios but from each other, maintaining regionally distinct categorical identities, subsumed under the broader social category of *indio.* Only after these missions were abandoned in 1761, did the two populations merge into a single community, closer to the presidio and under a Yamasee chief (Worth 2009c). The bulk of the ceramic assemblage from mission Escambe consists of "Lamaroid" ceramic types that developed along the Gulf Coastal plain and reflected the main styles of the Apalachee and Creek (Pigott 2015). Although I do not currently have assemblage data for the second mission at Punta Rasa, Yamasee refugees had adopted San Marcos ceramic traditions from the Atlantic style zone in the mid-seventeenth century (Worth 2009a:199-200).[12]

Despite the arrival of Yamasee migrants by the 1740s, the percentage of San Marcos Stamped pottery at Santa Rosa was relatively small, and only four sherds were recovered from contexts included in this study, all from the King's House. Far more abundant were Lamaroid wares associated with the Apalachee migrations. While forms associated with these types could have utilitarian functions, incised carinated bowls could have been used for mixing, heating, *and* as communal serving vessels (see Chapter 5). In her analysis of the native pottery assemblage at Santa María, Harris (1999:114) similarly suggests that incised cazuelas could have been used for food service.

In the previous section, I included decorated carinated bowls relative to other utilitarian wares. In this section, I reconceptualize these wares as vessels that have high visibility designs and potentially were used as a regionally distinct communal serving vessel (Table 9.14). Considered as a proportion of all tableware and serving vessels, decorated carinated bowls were most common at Santa María, particularly at the officers' barracks. In fact, the assemblage of the officers' barracks is the most diverse. Only 65.5 percent of serving vessels were European-style ceramics or porcelain. The largest percentage of Tonalá and a relatively large percentage of red slipped/painted wares were also recovered from the officers' barracks. Differences in types of tableware and serving vessels between all contexts based on original assemblage counts is statistically significant (X^2=333.66, p=0.000).

Table 9.14. Mean Percentages of Serving Vessels and Tableware Ceramics by Temporal Component for the Pensacola Presidios

	Florida Native Carinated	Plain "Colono ware"	Red Slipped/ Painted	Tonalá	Euro/Asian Style Tableware	Total Serving	Serving/ Tableware
Convicts, Soldiers, and Settlers							n=
1698	3.4	2.0	2.4	2.8	89.4	10.6	156
1722	0.8	0.5	4.0	1.8	93.0	7.0	285
1740	0.4	0.9	8.7	1.6	88.4	11.6	226
Officers and Local Officials							
1698	18.4	0.2	6.7	9.2	65.5	34.5	811
1740	0.0	0.7	5.5	0.5	93.3	6.7	476

Red slipped or painted wares were recovered from all contexts. In low status contexts, the relative frequency of red slipped/painted serving vessels increased over time. Red slips and paints were not used by coastal potters at contact and thus archaeologists generally consider it a technology encouraged through colonial interaction (Melcher 2011:22-23; Saunders 2000:99-100). Red slipping is so often applied to modified tableware forms that they are usually placed in the colono ware category even when vessel forms cannot be determined (Melcher 2011; Vernon and Cordell 1993). While it is generally assumed that colono wares were locally produced by native potters, another broad type "Mexican Red Painted" is an assumed import. Deagan (1987:43-44;

FLMNH 2019) describes this type as molded or wheel-thrown and slipped or painted and then burnished.

For this study, I selected red slipped and painted pottery samples without a consideration of their original typology in order to reassess traditional assumptions. Unlike the Veracruz sample, all of the vessel forms identified in the technological style analysis of red slipped and painted sherds were serving vessels (n=20) and all but two were locally produced (n=13; 86.7 percent). Locally produced wares included most of those sherds that were previously classified as imported Mexican Red Painted. In addition, most of the locally produced red slipped or painted samples were made by casta potters (9 of 16 assigned samples). As the Veracruz case study suggests, red slipped and painted wares were a common serving vessel that cross-cut native, African, and Spanish traditions in Mexico. Casta potters brought red slipping and painting traditions to Florida from Mexico, while Apalachee potters brought a similar technology, which they had adopted at Mission San Luis (near Tallahassee) prior to the collapse of the mission chain (Vernon and Cordell 1993; see also Cordell 2001).

A final category of serving vessels is subsumed under the broad category of plain colono wares. Because pottery traditions in the eastern borderlands did not generally have vessel forms that were easily adaptive as individual place settings, native potters sometimes adopted European forms. In the circum-Caribbean region, these wares are generally placed in a broad colono ware category. As part of an earlier pilot study, I analyzed a small sample of 24 plain sherds, plus one that was classified as Walnut Roughened. Because these sherds are distinct based on their forms, I only selected samples that were large enough that a partial destruction for chemical and petrographic analysis would leave an archival sample with its form still recognizable. As a result, these samples were not selected from the study contexts. Still, this analysis was informative. The compositional study confirmed that all assigned samples (n=19) had a Northwest Florida provenance. In addition, the technological style analysis supports previous assumptions that most plain colono wares were made by native potters (n=17; plus one roughened sherd). However, in three cases, there were plain "colono wares" that were made by casta colonists in Florida.

In this section, I reexamined the range of serving vessels used in highly visible contexts. While European-style tableware ceramics express broad association with the apex of the socio-racial hierarchy, locally manufactured wares convey regional distinctions. As in Veracruz, red slipped or painted pottery potentially expressed identification with a broad colonial American identity that cross-cuts socio-racial categories at the presidio. It is unclear what, if any role plain colono ware played in expressing a distinct categorical identity given that they do not have highly visible decorations. These wares were relatively rare and may have simply been an alternate option for vessels appropriate for the Spanish table, during times of limited supplies. The most distinctive regionally specific style wares were the incised carinated vessels that could have been used for communal serving. Interestingly, decorated carinated vessels were most common at the earliest presidio and particularly in high ranked contexts, largely prior to the establishment of the Apalachee missions.[13] It is possible that high ranked officials stopped using them once they were more commonly available and regionally associated with the Apalachee mission. Instead, in later years, officers and local officials consumed a higher relative frequency of foreign European wares.

Before turning to a comparison between the Pensacola presidios and the Port of Veracruz. It is worth mentioning one additional category of pottery that was only recovered from the first presidio. Santa María Stamped was a previously unknown ceramic type that usually consisted of small jars and was distinguished by a highly visible stamp design that was unknown in the eastern borderlands (Figure 9.11; see Bense and Wilson 2003:181,387). Similar vessels have been recovered from excavations in Mexico City, however (Sodi Miranda 1995:70-71). It has been assumed that these wares were imports, but out of curiosity I included three samples in the compositional study unrelated to the rest of my sample. All three wares were locally produced in Northwest Florida and technological style analysis indicates that they were all made by castas. While some of these wares were lead-glazed, I only tested unglazed samples. There is no indication from this investigation that potters were using glazes in Pensacola before 1740 and so these wares likely represent a mix of imports and local products. What is interesting about these wares is the potential expression of a regional social identity from Mexico through their local production and use.

Figure 9.11. Santa Maria Stamped Pottery Recovered from Soldiers' Barracks at Presidio Santa María de Galve

Material Comparisons of Two Regions

In this section, I briefly compare mechanisms of changing relational connections and categorical expressions as seen at the two neighborhoods in Nueva Veracruz and the three presidios of Northwest Florida.

Formal Categorical Activation

The material expression of formal categories is viewed through the lens of European-style tableware and porcelain and the expression of Espanidad. It was during the seventeenth century that géneros de gente transformed into the sistema de casta. Most seventeenth century pottery assemblages come from the Barrio de Minas, located inside the wall. Here majolica and other tableware consisted of only 10 percent of all pottery. Investment in tableware ceramics, particularly majolicas, increased in the eighteenth century, during a period when the casta system became unstable, due at least in part to historically documented socioeconomic mobility.

Similar trends were observed at the borderland presidios. In Figure 9.12, I estimate the trend lines for the consumption of European-style tableware and porcelain at the port and presidios.[14] Prior to 1740, tableware consumption fit between the levels observed in seventeenth and early eighteenth-century Veracruz. After 1740, tableware consumption in low status contexts were higher than at the port. Officers and presidio officials consumed an even greater proportion of tableware, mainly due to the presence of other European ceramics. Socioeconomic mobility may have played a role in this change as convicts were enlisted and earned a soldier's salary or garnered additional wages from skilled labor, but socio-demographics also changed during this period with an increase in women and families at Santa Rosa that could have inspired a greater investment in categorical expressions of Espanidad. As discussed in Chapter 4, the Reales Listas of 1741, indicates that many of the new settlers claimed the socio-racial status of españoles, despite the obvious skepticism of the official doing the recording.

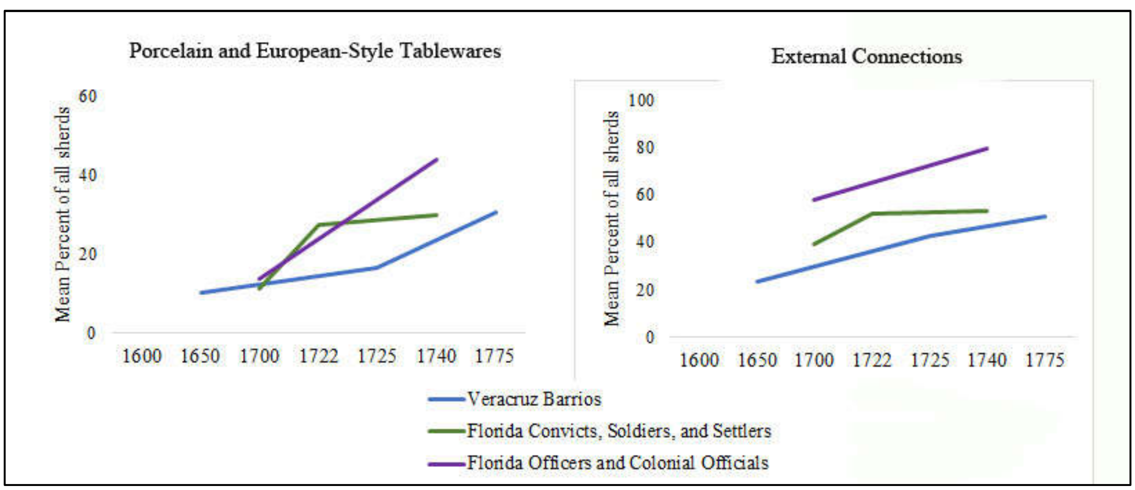

Figure 9.12. Comparison of Trends in European-Style Tableware Ceramics and External Connection between the Port of Veracruz and the Northwest Florida Presidios

Brokering of External Connections

In New Spain, members of the Mexico City merchants' guild were the legal brokers of transatlantic and intercolonial exchange. Merchants residing in Veracruz also played a role in brokering these external connections. I do not currently have assemblages from elite households to assess the role of opportunity hoarding in those contexts but an increase in pottery from central Mexico apparent in the eighteenth century may reflect changes in imperial policy that created the trade fairs and made Jalapa an important brokerage location between Veracruz and Mexico City. Despite the role of Veracruz as a major legal port, most of the pottery vessels consumed in the poor barrios were produced in central Veracruz, particularly in the seventeenth century. In the early eighteenth-century, imports from central Mexico increased while imports from Spain decreased, possibly due to brokerage at the Jalapa trade fair. Either way, even in the late eighteenth century, imports were barely more than 50 percent in the poorer households of the port.

In contrast to the port, the presidio inhabitants were more dependent on external connections for survival (see Figure 9.12). Imports were mostly from colonial Mexico, which is consistent with the historically documented formal supply system. While all inhabitants had access to imported pottery, military officers and local officials had a consistently higher proportion of wares from outside the region. At all three presidios, high ranked individuals consumed more imported plainwares. In addition, after 1740, there was a notable increase in foreign tableware ceramics (mainly British), which were found overwhelmingly in contexts associated with officers and local officials. Official reports and correspondence confirm that military officers and local administrators had greater control over the formal supply line, as well as greater freedom to engage in illicit exchange. Their role as brokers of external connections is reflected in the unequal distribution of plainware and foreign tableware ceramics. In the case of British and French tableware, these vessels were consumed almost exclusively at the King's house and commanding officers' compound at San Miguel, possibly indicating hoarding.

Strength of Regional Connections

The strength of regional connections shows the inverse of external connections for the Port of Veracruz and the Pensacola presidios. Regionally produced plain and lead-glazed wares dominated pottery assemblages at the port until the late eighteenth-century. The geographic zones of production that supplied the poorer neighborhoods remained relatively consistent through time. Most pottery came from the coastal plain, which included sources located near the port where criollo and Afromestizo populations dominated and from far to the north and south, where native population remained the majority. Some pottery sources were further inland, particularly near Jalapa, which remained connected to the port through transactions that brought their pottery into the port. These exchange networks indicate strong intraregional ties between the poor barrios of the port and the surrounding hinterland.

At the presidios, regional connections were not as strong as in Veracruz. Nevertheless, lower status castas remained dependent on local sources for more than 40 percent of their pottery. Some of the difference between Florida and Veracruz was because the presidios remained dependent on external sources for most lead-glazed wares throughout their occupation. Meanwhile, more than 87 percent of plainwares found in low-status context were produced locally. After 1740, low status castas also were increasingly dependent on roughened utilitarian wares, indicating interaction with native potters – most likely from the Apalachee mission of Escambe. In contrast, because of their external connections, after 1740 only about half of the plainwares recovered from the residents of officers and local officials were produced in Northwest Florida, indicating weaker ties to local producers.

Labor Mobility

Pottery production in both Veracruz and Northwest Florida was linked to much broader labor regimes within their respective regions. In central Veracruz, demands for permanent skilled laborers, particularly at sugar haciendas, led to a relatively large labor pool of Afromestizos who were skilled in European technologies. Production of lead-glazed and wheel thrown pottery at or near the port, where Afromestizos dominated the available labor pool, suggests that Afromestizos likely played a role in the production of wares that incorporated European technologies. Production of lead-glazed wares would have provided some distinction from native artisans, as Afromestizo potters supplied at least the poorer neighborhoods with the bulk of lead-glazed pottery. At a greater distance from the port, available data suggests that it was mainly native potters who supplied plain and possibly slipped and painted pottery to the port.

At the presidios, the provenance study and technological style analysis revealed that both native and casta potters supplied local demands for utilitarian wares. Castas consistently produced plainware pottery mainly for their own needs or for barter to other convicts, soldiers, or settlers. Officers relied mainly on native pottery and imports to supply their need for plainwares, although a larger sample is needed from the King's House and San Miguel to better assess any changes in this trend. After 1740, castas began to produce lead-glazed pottery at the presidios. As in Veracruz, the use of lead-glazes and wheel-throwing technology would have distinguished castas from native potters. Being the only local producers of lead-glazed vessels would have added some value to their skills and, unlike the plainwares that castas produced, locally-made lead-glazed wares were consumed equally by low status castas and higher rank officers and local administrators.

Gendered Brokerage

Given the important role that biological mixing played in the transformation of colonial society, there is little doubt that gendered brokerage played an important role in determining the kinds of materials that entered colonial households, particularly within domestic contexts. However, I argue that gendered brokerage concatenated with other mechanisms related to labor relations that brought material traditions into the local market and with regional connections that brought women into direct contact with alternate methods of food production. In Veracruz, castas who were mainly Afromestizas incorporated a mix of traditions into the domestic sphere, including glazed bowls and cazuelas, as well as plain and slipped comales and jars.

At the presidios, there were few women or families during the first half of their occupation and there is currently only anecdotal information on cohabitation and intermarriage between natives and colonists. After 1740, there was a definite increase in the number of women at the presidio, mainly due to successful recruiting efforts in colonial Mexico. If women were acting as cultural brokers, they were introducing diverse material into domestic contexts. At the officers' barracks at Santa María, women (and likely men as well) supplemented plain and a few lead-glazed imports with native carinated bowls used as cazuelas. In later years, the occupants of the King's House at Santa Rosa and the Commanding Officers' Compound at San Miguel relied very little on native pottery, while low status castas supplemented plain and lead-glazed cooking vessels with roughened cooking pots that were likely made by Apalachee potters. Given the increase in casta women after 1740, through social interaction and adaption to local resources, these women incorporated a range of resources into their food preparation activities.

Regional Categorical Activation

In colonial households of the circum-Caribbean, studies of highly visible expressions of categorical identity have been mainly focused on the sistema de castas and the association between Espanidad and European-style tableware, particularly majolica. However, a growing number of studies outside of the eastern borderlands and the Caribbean have demonstrated a greater variation in the use of regional styles of serving vessels adapted for the colonial table. In Veracruz and Northwest Florida, I reexamined potential regional styles of serving vessels found in colonial households.

Notably, in both regions locally produced red slipped and burnished serving vessels can be traced to the Postclassic period in central Veracruz and the central highlands. These wares may have reminded Europeans of red wares produced in southern Spain and likewise could have been familiar to slaves arriving from West Africa. The familiarity of these wares cross-cut the boundaries of the géneros de gente and the sistema de casta, potentially signaling a broader colonial identity. Similarly, Tonála included tableware forms and, while it was broadly traded, it was only produced in West Mexico and was a distinct regional style with roots that extended into the precolonial past.

In addition to widespread colonial styles, more restricted regional designs developed separately in central Veracruz and Northwest Florida. Pottery with brown and orange painted designs produced near Jalapa was consumed in relatively small amounts in the poorer barrios of the port. Their appearance in colonial contexts was consistent across two centuries and similar wares are made with similar clays even today, demonstrating persistence. In Northwest Florida, most native pottery vessels served utilitarian functions, but some, like incised carinated bowls also functioned as communal serving vessels. These wares only made up a notable proportion of serving vessels at the officers' barracks at Santa María. Once a more permanent Apalachee mission was established in the region and these vessels potentially became more available, colonists stopped using them. Possibly this change was due to shifts in the availability of more preferable tableware ceramics. For example, British tableware ceramics were more common in officer and official residences after 1740. At the same time, the fact that carinated vessels were suddenly more common at the missions may have reduced their value for creating social distinctions.

[1] Brokerage is not necessarily advantageous in all contexts. Some scholars have noted that brokerage may be viewed negatively in societies where the needs of the group are more valued than the individual, resulting in long-term disadvantages for brokers (Coleman 1988; see also discussion in Peeples and Haas 2013).

[2] Even before seventeenth century declines in silver exports, the consulado in Seville was forced to raise the rate of export taxes (*avería*) to pay for rising costs of flota defense. Between 1602 and 1631, the avería increased from 6 percent to 35 percent. Commercial losses were further compounded by duties levied on colonial production, such as the royal fifth on all bullion and mercury profits, and extraordinary taxes throughout the century to increase royal revenues and pay for colonial administration (Haring 1975 [1947]:305-306; Lynch 1992b:235-237).

[3] Unassigned pottery samples (n=37; 18.2 percent of sample) may have originated from central Veracruz, central Mexico, or from other locations.

[4] "*Hacen ollas y loza de todas maneras que venden a los pueblos comarcanos, de mas de ocho o diez leguas a la redonda*" (Paso y Troncoso 1905:3)

[5] "*…hacer loza de la bastarda, que ellos usan y gastan*." (Mota y Escobar 1987 [1609]:51)

[6] Cole (2003:192) only provides the English translation. I have not yet had the opportunity to track down the original that is currently archived at AGN Tierras v. 70, expediente 1, foja 20r.

[7] The current provenance study also included a clay from the Cotaxtla river. However, in a previous analysis that included only the Veracruz samples and identified only core-groups, the Cotaxtla clay sample was excluded (Eschbach 2019). Group 6 included only the three clays collected along the Jamapa river.

[8] "fifteen and a half dozen of ceramics from Jalapa at one peso per dozen, amounting to fifteen pesos and four reales…sixteen large service pieces at three reales each, amounting to six pesos…thirty-one dozen of middling ceramics from Puebla at four reales each dozen, amounting to fifteen pesos, four reales…five dozen jugs (*bucaros*) at a peso each dozen, amounting to five pesos" (Worth 2009b:43).

[9] Roberts (2009, 2010, 2012) refers to these exchanges as "open contraband." I disagreed with this characterization of what were, in fact, legal transactions sanctioned by the viceroy or royal accountant in New Spain, paid out of the royal coffers, and formally recorded in official documents. Robert's contention that this was contraband appears to be based mainly on sixteenth century legal precedents that forbade colonial exchange with foreign agents. This remained Spain's general policy until the Bourbon reforms of the late eighteen century, but casuist judgements created legal flexibility that both the Crown and their colonial representatives exercised throughout the colonial period. For instance, individual licenses and *asiento* contracts for the importation of slaves (and sometime other goods) were alternately granted to the Portuguese, French, British, and others throughout the colonial period. Legally sanctioned trade certainly was used as a cover for the illicit exchange of contraband, but formally documented transactions approved by royal officials in New Spain for the survival of the presidios (typically

only for foodstuff and munitions) was lawful. The fact that most of these transactions occurred while Spain and France were allied also is telling

[10] Wheel-thrown pottery was probably produced mainly by peninsulares and criollos, although by the late eighteenth-century mestizos and natives were using molds or the wheel (Fournier García and Charlton 2019:46-47,49).

[11] Handler and Wallman (2014:459) have shown that African slaves used the wheel to produce pottery for sugar production and possibly for domestic use in Barbados and Martinique. In some parts of the Caribbean, such as in Jamaica, people of African descent adopted lead glazing technology (Hauser 2008:140-142; 2013:59-60; Hauser and DeCorse 2003:76–77, 88).

[12] The meaning of overt decorative styles attached to the Atlantic and Gulf style zones is debated. Worth (2009a, 2009c) argues that they reflected interaction networks along the two branches of the Spanish missions and with adjacent non-mission groups in the interior, rather than active communication of categorical identity. Based on available evidence, highly visible styles certainly did not convey distinct ethnic, linguistic, or political categorical identity. Yet, in northwest Florida, the presence of distinct Atlantic and Gulf styles used by two distinct groups in separate communities could have developed into a categorical expression of identity that may not have existed previously. From the perspective of casta colonists, these wares would have communicated at least broad categorical distinction as indio, if not a recognized regional distinction.

[13] Analysis of pottery at Mission Escambe, found that approximated 20 percent of decorated vessels were incised and about 13-14 percent of identifiable vessel forms were carinated bowls (Pigott 2015:65-66), so these vessels were produced at the missions but rarely consumed at the later presidios.

[14] I base trend lines for Figure 9.12 based on the proportion of tableware ceramics and the TPQ of assemblages. Because the Veracruz time slices cover a larger period, I placed data points in the middle of each period. For the seventeenth century, I placed the data point at 1650. For the early eighteenth century, I used 1725 and for the late eighteenth century, I used 1775.

CHAPTER 10

EMPIRICAL AND CONCEPTUAL CONTRIBUTIONS TO PROCESSES OF SOCIAL TRANSFORMATION IN COLONIAL NEW SPAIN

The arrival of Hernan Cortes in central Veracruz brought about encounters between diverse groups of people who had never previously interacted – resulting in long-term interactions and centuries of change. By the time presidios were established in Northwest Florida, the Spanish empire had expanded across wide swaths of two continents and the colonial social structure in New Spain had transformed at least twice. Most of the colonists that founded the borderland garrisons and villages at Santa María, Santa Rosa, and San Miguel were not from medieval Iberia, but from pluralistic communities in New Spain. In this study, the Port of Veracruz provided a case study for the long-term trajectory of social transformations in colonial Mexico, as well as a shifting baseline for contextualizing a finer grain study of three frontier presidios in Northwest Florida. For both contexts, I asked two principal questions: (1) How did castas maintain or transform social relations and categories of identification at the Port of Veracruz and Northwest Florida? (2) What reciprocal adjustments did officials make to local and imperial policies in order to maintain control over their colonial subjects? In other words, I examine the bottom-up and top-down mechanisms that drove social transformations.

This project contributes both empirically and conceptually to the study of Spanish colonialism and, more broadly, to academic research on the longevity, change, and collapse of empires. In this chapter, I describe the results and contributions of my work. In the first part of this study, I synthesized decades of historical research, defining three social transformations in social structure of New Spain. For the two case studies, I conducted archival research at the Archivo General de la Nación in Mexico City, the Archivo Municipal de Veracruz, and the University of West Florida. Through this research, I identified and analyzed eighteenth-century documents, providing new historical data and analyses for the port and presidios. This work empirically contributes to the ongoing historical scholarship of two regions. In the second half of this dissertation, I developed a method for quantitatively discriminating between technological traditions of indigenous and colonial potters. Combined with a provenance study, this work contributes to archaeological research on plain, lead-glazed, and slipped/painted pottery production, colonial labor relations, and exchange networks.

These efforts were undertaken to assemble evidence related to the central conceptual contribution of this research – the construction of an interpretive framework that moves beyond simplified dichotomies, harnesses historical and archaeological data, and facilitates comparative research. This framework incorporates a mechanism-based approach – drawing on the work of sociologists, political scientists, historians, and archaeologists – to consider both bottom-up and top-down causes of social change. I examined the role of these causal mechanisms of change in Veracruz and Northwest Florida. In this chapter, I combine these analyses and assess how relational mechanisms concatenated into processes of social change with both bottom-up and top-down dynamics.

Anthropologists, historians, and archaeologists have adopted a long list of conceptual frameworks for addressing social transformations in colonial America, including syncretism, transculturation, creolization, mestizaje, ethnogenesis, and hybridity (see Chapter 2). Many of these frameworks developed in response to perceived weaknesses in the acculturation paradigm, particularly unidirectional culture change, a monolithic conceptualization of colonized and colonizer populations, and inattention to agency, power relations, and persistence. Different frameworks often have been coopted in the development of ad hoc interpretations for specific contexts, and at times they have been used interchangeably, disconnected from their original meaning. More importantly, these general frameworks typically only describe general outcomes. Middle-range theories or the elucidation of causal mechanisms are needed to explain the processes that led to distinct community or regional trajectories (see discussion in Smith 2015). I have drawn on the work of political scientists and historical sociologists to reframe ideas presented by historians and archaeologists, resulting in the construction of an interpretive framework that is detached from the acculturation paradigm.

Social scientists have advanced a theoretical approach to social transformations tied to two modes of social identification. Relational identification is based on regular interpersonal transactions that form durable social networks. Within these networks, individuals are identified based on their position in relation to others. In contrast, categorical identification is based upon ascribed or self-ascribed membership within groups that share similar attributes and symbols. Importantly, categorical identities exist outside of direct interaction and can exist at a very large scale. Within this study, I reframed social transformation as a process that includes both modes of identification. Social transformations, thus, involve local changes in the structure of relational connections that can lead to large scale shifts in categorical identification and, by extension, the underlying societal structure.

Historians already have identified at least three large-scale shifts in the social structure of New Spain, from the initial formation of the géneros de gente, to the sistema de castas, and, finally, the development of an incipient economic class. Schwaller (2016) has recently argued that early colonial society was structured by géneros de gente (types of people) that stressed socioeconomic, ethno-geographic, and ethno-religious distinctions borrowed from medieval Iberia. The shift toward a racialized hierarchy and the more well-studied sistema de casta did not develop until the seventeenth century. Yet, within the next century, there were growing signs of instability within the sistema and the eventual development of an incipient economic class. Within this context of macroscale social transformations, I approach the two central questions of this study through an examination of the bottom-up and top-down mechanisms of change at the Port of Veracruz and the presidios of Northwest Florida.

In this concluding chapter, I bring together the results of historical and archaeological analyses to highlight the empirical and conceptual contributions of my research. In the next section, I briefly discuss the empirical results of my historical synthesis, archival research, pottery analyses, and incorporation of comparative case studies. I then turn my focus to the conceptual contributions of this research, integrating my empirical finding (and those of other scholars) to highlight broader implications of this study. From the historical perspective, I identify four processes that incorporate unique sequences of bottom-up and top-down mechanisms of change. I label these processes: contact, convergence, mobilization, and site transfer. Next, I discuss the six relational mechanisms that I examined with archaeological data. Some mechanisms, such as formal categorical activation not only cause change, they also constitute social boundaries. I briefly assess the archaeological evidence for changing categories, as well as the evolving relationship between relational and categorical modes of identification. I then combine historical and archaeological analyses, demonstrating the unique contributions of each line of evidence. Finally, I contend that my research contributes to much larger academic discussions on the persistence, contraction, and collapse of empires. I end the chapter with a brief consideration of future research directions.

Empirical Contributions to the History and Archaeology of the Spanish American Empire

My main objective throughout this study was the identification of mechanisms and processes that caused social change in the viceroyalty of New Spain. In order to address my research questions, I have synthesized extensive historical scholarship (Chapter 3), analyzed archival documents (Chapter 4), and completed laboratory analyses of pottery categories that have received little attention in the past (Chapters 6-8). This foundational research resulted in important empirical contributions to the investigation of the Spanish colonialism. The two case studies that I selected represent two sides of an artificial academic divide between historical archaeologists working in the Spanish borderlands and circum-Caribbean regions versus those scholars investigating core regions of New Spain and other locations within Spanish America (discussed Chapter 2).

Comparisons across this professional boundary also have resulted in significant findings that I briefly describe in this section.

Historical Contributions

An important synthesis of historical research in Chapter 3 delineated three social transformations that frames this study. Historians have long recognized these shifts in the colonial social structure (e.g., Chance and Taylor 1977; Cope 1994; Seed 1982). Schwaller's (2016) recent historical work on the géneros de gente has been particularly instrumental in defining the early colonial structure apart from the later casta system. However, the limited geographical extent and temporal scope of most scholarship, as well as a disproportionate focus on the casta system and colonizer/colonized dichotomies has tended to mask the breadth and long-term trajectory of these changes. Understanding broad transformations is important for contextualizing local changes in both core and borderland regions. I hope that my synthesis will bring these large-scale colonial transformations to the forefront of archaeological research, particularly among historical archaeologists working in the borderlands and circum-Caribbean regions – outside core areas where most of this scholarship has been conducted.

Beyond the historical synthesis, my research has incorporated new archival research. For Veracruz, my most notable contribution was the study of the 1791 census for the Port of Veracruz (Revillagigedo of 1791). I am not the first to examine this important document (see Blázquez Domínguez 1996; Gil Maroño 1996), but I add to previous work the quantitative analysis of matrimonial and occupational patterns, comparable to investigations of similar census data from Guanajuato (Brading 1971), Oaxaca (Chance and Taylor 1977, 1979), Mexico City (Seed 1982), and Orizaba (Castleman 2001). My analysis reveals similar patterns in the alteration of the colonial social structure during the late eighteenth century. Specifically, there was a divergence in the relationship between socio-racial categories and division of labor, resulting in what Brading (1971:258) referred to as an "ambiguous middle layer."

For the Northwest Florida presidios, my analysis included a larger number of documents, drawing upon the work of historians and archaeologists who have collected and, in some cases, transcribed documents from the Archivo General de Indias (AGI) and the Archivo General de la Nación (AGN). I accessed these documents at the John C. Pace Library's Special Collections and the Division of Anthropology and Archaeology at the University West Florida. In addition, my investigations at the AGN contributed to current in Northwest Florida. Most notably is my transcription and analysis of the Reales Listas of 1741. This document lists detailed information on presidio occupants, including names, ages, socio-racial identification, place of birth, and enlistment status. This is a unique document. No comparable records of presidio residents have previously been located for the Northwest Florida presidios. The initial date of this document and later appended notations (dating to at least 1746) is an important timeframe, during which there were striking alterations in presidio demographics. Specifically, after 1740, there was an increase in the number of settler families. Six of those families are described in this document. In addition, my analysis of the Reales Listas confirmed that fluctuations in the number of convict laborers at the presidios was due, at least in part, to the enlistment of some of these laborers into the ranks as soldiers.

In sum, the first part of my study contributes to historical research on the Spanish colonialism at multiple scales. A synthesis of prior scholarly work puts needed focus on three large-scale transformations with which archaeologists have yet to fully or explicitly engage. Archival research on colonial Veracruz sheds light on the main port of entry into New Spain, including quantitative analysis of the 1791 census that is comparable to work in other regions. For Northwest Florida, I add fresh analysis of documents previously identified by archaeologists and historians and I add to these collections a transcription and analysis of the Reales Listas of 1741.

Archaeological Contributions

In the second part of this dissertation, I describe the methods and results of a technological style analysis and a provenance study of pottery categories that, to date, have received little analytical attention in colonial period contexts. Using pottery from the Port of Veracruz and a Northwest Florida mission as baselines, I developed a multivariate method for discriminating between technological styles used by castas and Florida natives at the presidios. This method may be used in other colonial contexts for investigating labor relations in general and regional pottery production in particular. My approach involved a macroscopic attribute analysis, a petrographic analysis, and a mineral phase analysis of plain, lead-glazed, and slipped/painted pottery – providing extensive data for future comparison.

For the provenance study, I conducted a chemical compositional analysis of clay samples and pottery from both regions using PIXE. In addition to PIXE, I also submitted a small sample to MURR for compositional analysis using NAA. This work is important beyond the current study as provenance research has been very limited in central Veracruz and Northwest Florida. My quantitative examination of chemical data identified 10 compositional groups, including two groups with a central Mexican provenance, five production zones in central Veracruz, and three in Florida. These compositional groups will usefully serve as initial references for future research.

The provenance study of Veracruz pottery provides information on labor relations and regional exchange patterns that are rarely documented historically. The historical contextualization of production zones provides evidence that both native and Afromestizo potters were provisioning the port, defining regional traditions that characterized households within poorer barrios. At the same, these data support historical research, indicating increasing intra- and interregional exchange – in this case, between Veracruz and Mexico City – and a reduced reliance on exchange with Spain (see Chapter 9).

The combination of the technological style analysis and the provenance study allowed for the testing of traditional assumptions regarding pottery production in Northwest Florida. It has long been assumed that all wheel-thrown pottery vessels found at the presidios were imported from outside the region and that all hand-formed wares were produced by native communities using traditions associated with the Southeastern borderlands. In fact, my analysis found that castas from Mexico were making both wheel-thrown and hand-formed pottery in Northwest Florida throughout the occupation of the presidios. This pottery included Santa María Stamped vessels that are decorated similar to wares that have been found in excavations in Mexico City (Sodi Miranda 1995:70-71). Before 1740, casta-produced wares were mainly plain and slipped or painted. After 1740, casta, and possibly criollo, potters from Mexico also were making lead-glazed wares at the port. This analysis will require the reassessment of pottery typologies, labor relations, and exchange in Northwest Florida.

Contributions of Comparative Research

Throughout this project, I have found considerable value in the comparative approach, particularly between distinct regional contexts. While it was extraordinarily challenging to wrangle two datasets (historical and archaeological) for two different regions, insights from this aspect of my investigation was rewarding. The idea to test assumptions regarding the manufacture of pottery in Florida was conceptualized while I was directing excavations in Veracruz, shortly after completing a master's thesis based on the Presidio Isla de Santa Rosa in Northwest Florida. That early step across an artificial academic boundary, exposed me to a growing body of research conducted in core regions to the south of the borderlands. That was the beginning of a journey toward examining the borderlands (and Veracruz) within a much larger scholarly context that was the Spanish American empire. In this section, I briefly discuss two empirical contributions of that comparative aspect of my research.

The first contribution is to interregional debates over the use of non-European serving vessels in colonial contexts (see review in Voss 2008b). Deagan (1974, 1983) hypothesized, based upon disparate power relations between European colonist and indigenous people, that European-style material culture (including tablewares) would dominate highly visible or "public" contexts. Deagan and her students successfully tested this theory in St. Augustine (1974, 1983) and later in the Caribbean (e.g., Ewen 1991).

Deagan’s work has been widely influential, but as historical archaeology has developed within core regions outside of the United States and the Caribbean, archaeologists have documented greater variability. Indigenous serving vessels have been found in colonial households in central Mexico (e.g., Rodríguez Alegría 2005a, 2005b;), southern Peru (Rice and Smith 1989; Smith 1997), and Bolivia (Van Buren 1999). Proposed explanations for this variability have included the use of serving vessels as tools of negotiation through feasting with native elites (Rodríguez Alegría 2005a, 2005b), expression of a developing colonial identity (Charlton and Fournier García 2010:146-147; see also my discussion of regional categorical identities below), as well as more mundane explanations related to market demand and availability.

In the latter case, Charlton and Fournier García (2010:144-145) suggest that native potters adapted precolonial Red Ware vessels to suit Spanish demands for tableware forms. A similar argument has been made to explain colono ware in the Southeastern borderlands. Colono ware is an ambiguous pottery category used primarily in the circum-Caribbean and the Southeastern United States. It encompasses diverse pottery that was hand-built, copying European forms. Because of their method of production, scholars typically attribute their production to native or African potters (Deagan 1987; Melcher 2011; Vernon and Cordell 1993). There is a key difference, however, that has not been explicitly discussed. That is, native potters in Mexico copied plate and dish forms from precolonial Black-on-Orange traditions (Charlton and Fournier García 2010:144), whereas native potters in the Southeastern borderlands did not have comparable forms among their pottery traditions that were appropriate for the Spanish tableware (Hally 1986; see also discussion in Chapter 5). As a result, colono ware copied European forms and were relatively rare at the Spanish presidios (Deagan 1987; Melcher 2011). In addition, my technological analyses and provenance study have shown that some pottery that was previously sorted as colono ware was actually produced by colonists from Mexico.

In sum, regional variability in the consumption of locally-produced serving vessels was likely due, at least in part, to the regional production and availability of traditional native forms that were adaptable to European-style commensality. However, even in the Southeastern United States where native potters did not traditionally produce individualized serving vessels, I have argued for the reevaluation of some native pottery types, such as decorated carinated bowls that were used for both cooking *and* as communal serving vessels. Increased availability does not discount other explanations, such as the signaling of a developing colonial identity, but accessibility was likely a contributing factor. In addition, casta production of wares previously categorized as colono ware calls for reexamination of ceramic typologies and their interpretation.

My second empirical contribution, based on interregional comparisons, deals with the use of majolica tableware as a symbol of status or "Espanidad." Voss (2012:43-44) has argued that the correlation between majolica and status varied based upon geographical location and temporal period. My research in Northwest Florida and Veracruz agrees with this assessment. At both the port and presidios, investment in majolica tableware increased over time – even in poorer lower status residences. While location within interregional exchange networks certainly contributed to variability across the viceroyalty, I contend that the value and social meaning of majolica also was changing alongside large-scale shifts in the colonial social structure. This is an assertion that I discuss in more detail in the later section on Formal Categorical Activation. I now turn to addressing the main research questions posed by this dissertation and my contribution of a conceptual framework for the analysis of social change in colonial settings.

Historical Perspective on Relational Mechanisms and Processes of Social Change

In the first part of this study, I presented the historical perspective on relational mechanisms of colonial social transformations. In order to identify potential mechanisms for assessment in Florida and Veracruz, I reviewed decades of scholarship by historians who have uncovered a number of causal mechanisms of social change in colonial New Spain (Chapter 3). Further insights were elucidated from the work of historical sociologists, particularly Charles Tilly (2005) and his examination of social boundary mechanisms. Based on this combined research, I identified four bottom-up and four top-down mechanisms of social change that are accessible with historical data:

<u>Bottom-up</u>	<u>Top-down</u>
• Encounter/Borrowing	• Formal Imposition
• Biological and Cultural Mixing	• Formal Inscription/Erasure
• Collective Action	• Formal Individual or Collective Transfer
• Socioeconomic Mobility	• Formal Incentive Shift

Historical analyses demonstrate a dialectic relationship between bottom-up and top-down mechanisms. It was not only imperial administrators and institutions driving change, but also subjugated and colonial people at every level of the colonial hierarchy. An ultimate goal of mechanism-based approaches is to identify those mechanisms that concatenate into processes. In the social sciences, processes are repeated "combinations and sequences of mechanisms that produce some specified outcome at a larger scale than any single mechanism" (Tilly 2008:9). Based on the synthesis of historical sources presented in Chapter 3 and the analyses of Veracruz and Northwest Florida case studies in Chapter 4, I identify four causal processes involved in the transformation of Spanish colonial society (Figure 10.1).

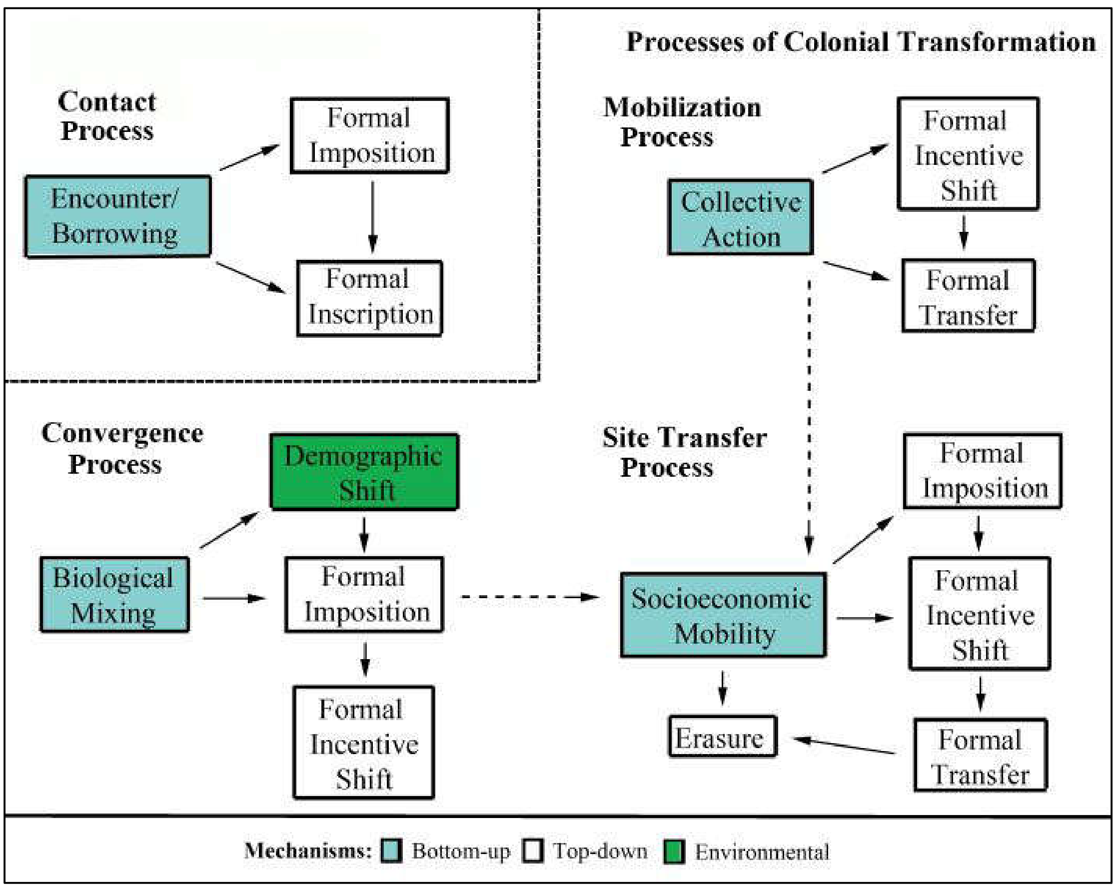

Figure 10.1. Causal Processes of Social Transformation in Colonial New Spain. *Note:* Schematic details four relational processes (contact, convergence, mobilization and site transfer) and the relationship between these processes (dashed lines with arrows).

Contact Process

Tilly (2005: 138-140) identifies encounter and borrowing as separate mechanisms, but I consider them together as they typically co-occur when two groups that have not previously interacted come into direct contact, such as through migration and colonization. Distinctions form along points of contact, and social categories are borrowed and adapted from homeland societies. During the decades that followed initial contacts in New Spain, colonial institutions modified and formally imposed social categories – along with their associated rights and responsibility. Social distinctions between categorical groups were further emphasized through formal inscription, seen through spatial segregation. Most native communities were spatially removed from colonial towns. Within pluralistic colonial centers, neighborhoods and districts also were segregated based on borrowed social categories. For instance, imperial policies formalized in the 1573 ordinances, directed the assignment of colonial town lots to founding vecinos, creating a social organization in which Spanish elites were located closest to the plaza. Encounter, borrowing, formal imposition, and formal inscription, thus worked dialectically to create an initial colonial social structure.

The cases presented in Chapter 4 demonstrate that while contact processes were at work in both regions, initial conditions and historical contingencies (e.g., timing, colonial demographics, settlement function, etc.) led to unique trajectories. In central Veracruz, early conquistadores and colonists borrowed categorical distinctions from medieval Iberia, leading to the local development of géneros de gente. Across the Gulf of Mexico, the first of the Northwest Florida presidios was founded two centuries after initial encounters in Veracruz, and social categories were borrowed from colonial Mexico rather than Spain. The function of the presidios as garrison towns meant that emphasis was placed on military rank and enlistment status, while casta categories that had developed in seventeenth century New Spain were of secondary importance, yet still intermittently imposed in official documents.

In sixteenth-century La Antigua, Veracruz, official descriptions indicate that negros esclavos were living upriver and along the periphery of the town. Later, at Nueva Veracruz, formal inscription was more evident. First the Tenoya river and then the town wall was used to segregate the population by géneros and later by casta. Inscription also was apparent through segregation practices between cofradías and hospitals. At the presidios, inscription occurred at the regional and community scale. Initially, there were few natives living in the vicinity until the Apalachee and Yamasee migrated into the area. The missions that were eventually established remained spatially segregated from the presidios, inscribing difference mainly between Florida native groups and colonists from Mexico. Within the presidios themselves, inscription emphasized categories based upon enlistment status and rank, at least somewhat erasing the local importance of casta categories.

Colonial Convergence Process

Following initial encounters, society continued to transform through several colonial processes – the first of which I characterize as convergence. Many of the general social theories adopted by archaeologists to explain social change in colonial contexts, such as creolization, hybridity, and transculturation, fall under this broad characterization (see Liebmann 2013; Chapter 2). In this study, I define the convergence process through a series of bottom-up and top-down mechanisms (see Figure 10.1). Biological and cultural mixing was an early driver of colonial change, spurring the creation of new social categories and challenging colonial people and imperial institutions to determine the placement of American-born individuals who did not fit within the categories that were adapted from Spain. Biological mixing combined with shifting immigration patterns and devastating declines in native populations during the sixteenth century, ultimately leading to a macroscale change in colonial socio-demographics. As the mixed population grew in number, imperial institutions imposed new categories of identification. Simultaneously the penalties and awards associated with those groups also were adjusted from the top down.

This process was evident at the Port of Veracruz where biological mixing was mainly between European and African descendants with little evidence of a native presence along the coastal plain. Along the frontier of Northwest Florida, biological mixing does not appear to be as significant a process for driving change. The presidios were established nearly two centuries after Europeans first arrived in Veracruz, during a period when the casta system was fully developed in New Spain. Intermarriage and sexual unions between Florida natives and colonists were only anecdotally described for the presidios. After 1740, there were more women at the presidios, but it seems these were mainly castas and some criollas from New Spain. The role of biological mixing and reciprocal top down mechanisms, thus, varied between regions and communities, leading to unique historical trajectories in the convergence process.

Colonial Mobilization Process

Another mechanism that drove change from the bottom up was collective action, which prompted reoccurring top-down mechanisms that combined into a mobilization process.[1] For instance, slave rebellions and escapes in central Veracruz had macroscale impacts on the shaping of imperial policies throughout the Spanish colonies. The Crown and viceroy created new penalties and rewards that altered formal incentives, further emphasizing the boundaries between people of African descent and other colonial people. An important aspect of this dynamic was the coercive labor regimes of the sixteenth and seventeenth centuries that propelled rebellions. By the eighteenth century, coercive forms of labor were in decline and being replaced with free wage labor. It was within this context that convict laborers and conscripted soldiers were sent to the presidios. Coerced colonizers employed similar tactics as those used by black slaves in Veracruz, including acts of rebellion and coordinated efforts to escape.

By this point, imperial responses were informed by two previous centuries of colonial experimentation. Local administrators enacted penalties for those who attempted escape, but also created positive incentives that provided avenues for socioeconomic mobility. Individual transfer in the form of enlistment became a reward for good behavior, allowing pardoned convicts to collect a wage. At the same time, soldiers and officers were sometimes penalized through demotion and transfer to the ranks of the forzados. Formal incentive shifts and individual transfers both emphasized boundaries based on enlistment and rank, while also creating permeability between formal boundaries. Interestingly, it was during this period in New Spain that obraje owners were increasingly rejecting penal servitude in favor of wage labor. Presidio officials were effectively doing the same through formal transfer and by creating wage-based incentives.

Notably, not all collective action involved acts of violence. In some cases, cooperative behavior was adopted for mutual support and collective bargaining. In Veracruz, Afromestizos created cofradías as a means to pool their resources and work together to improve their circumstances. During the seventeenth century, the cofradías also became a means of limited socioeconomic mobility, based first on place of birth and then later emphasizing distinctions based on physical appearance. The evolution of the cofradías in Veracruz reflected and contributed to the seventeenth century development of the sistema de castas in New Spain.

Colonial Site Transfer Process

The final process that I identify is driven by the bottom-up mechanism of socioeconomic mobility and related top-down responses. I refer to this process as site transfer, a concept used by Tilly (2004) to refer to the transfer of social sites (including persons or networks of individuals) across existing social boundaries. In Tilly's framework, site transfer is a single mechanism that encompasses racial passing, religious transfer, and explicitly top-down transfers. In this study, I parsed Tilly's concept of site transfer to distinguish between bottom-up and top-down mechanisms. However, these mechanisms concatenated with others into a process that in some cases lead to the local erasure of social boundaries (see Figure 10.1).

In New Spain, socioeconomic mobility was present from contact, but this mechanism became increasingly relevant for driving change during the middle and late colonial periods (Chapter 3). During the first half of the seventeenth century, indications of socioeconomic mobility among castas and Europeans – both up and down the colonial hierarchy – led to unease among elites and imperial administrators. Colonial officials responded with a strategy of divide and rule, imposing a growing number of ranked categories, reinforced with adjustments to associated privileges and responsibilities that represented an incentive shift. These top-down strategies appeared to have had some initial success, contributing to the formation of the sistema de castas.

By the eighteenth century, socioeconomic mobility again threatened the colonial social structure. While the number of socio-racial categories had proliferated, only a limited number were regularly employed in a given community, providing the opportunity for slippage and passing between categories. At the same time, increasing dependence on wage labor during the eighteenth century provided a means of socioeconomic mobility in New Spain. By the second half of the eighteenth century, imperial institutions allowed individuals to petition for and, later, purchase a higher ranked socio-racial category.

At the Port of Veracruz and in Northwest Florida demands for skilled labor similarly created some opportunities for economic advancement. Yet, socioeconomic mobility worked in both directions. By the end of the century in Veracruz, peninsulares and criollos dominated elite positions, but also occupied roles as unskilled laborers and servants, eroding the relevance of the casta system in the structuring of colonial society.

Simultaneously, socioeconomic mobility and demands for labor in both Florida and Veracruz resulted in at least some spatial erasure based upon social-racial distinctions. While census data indicate that inhabitants living outside the town wall in Veracruz were still mainly Afromestizos in the late eighteenth century, black slaves, servants, apprentices, and journeymen worked and resided within the town walls and in pluralistic households.

In Northwest Florida, erasure was particularly acute. Convicts and soldiers were conscripted regardless of their socio-racial identities and compelled to reside in the same barracks, emphasizing enlistment status and rank and minimizing distinctions based upon socio-racial status. Yet, casta categories were not completely forgotten in Florida. Some official reports, particularly the Reales Listas of 1741, indicates efforts to assign colonists to appropriate socio-racial categories, as well as contradictions between those categories and subjective physical descriptions. Distance from their homeland communities enabled individuals to "pass" as españoles in Pensacola and it seems likely that some did just that.

Discussion: Interaction between Contact and Colonial Processes

Contact, convergence, mobilization, and site transfer processes are notably centered on four bottom-up mechanisms that concatenated with specific top-down responses. However, bottom-up mechanisms often also represented reactions to environmental and cognitive mechanisms. Macroscale environment mechanisms (e.g., socio-demographics changes) and cognitive mechanisms (e.g., Enlightenment philosophies) resulted in some interregional similarities in the trajectory of change. I recognize the importance of these mechanisms (discussed in Chapter 3), but my main focus is on relational mechanisms. Top-down relational mechanisms, such as formal policy shifts enacted by local administrators and imperial institutions, also led to bottom-up reactions. For instance, collective action involving revolts and escape efforts among black slaves in Veracruz and convict laborers in Northwest Florida were responses to coercive labor regimes imposed from the top down. Socioeconomic mobility in the eighteenth century was enabled by changes in imperial policies that collectively transferred native people across a socio-religious boundary, from cristianos nuevos to cristianos viejos. During the same period, changes in church policies toward extramarital unions led to reductions in illegitimacy among castas, further blurring boundaries between castas and españoles.

More broadly, change also was caused by a concatenation of processes and mechanisms. For example, local mobilization led to the process of site transfer, as local elites attempted to halt costly revolts against their authority – causing change in both Veracruz and Florida. Biological mixing in Veracruz produced a growing number of free Afromestizos who advanced economically through their work as artisans. As part of a larger process of social change, Afromestizos altered their cofradías to emulate Spanish brotherhoods and collectively emphasized distinctions within their groups based upon place of birth and then physical appearance. In Northwest Florida, collective action at Santa María during the early years of the presidios occupation led to policy changes that created formal incentive shifts and individual transfers that provided avenues to socioeconomic mobility.

While relational mechanisms and social processes interacted in complex ways, there were notable trends in my two case studies, as well as in other regions described in Chapter 3. Contact process occurred during first encounters between groups and, therefore, it was the initial cause of change that shaped early colonial societies. This process was most stark in the sixteenth century when groups that had never previously interacted came into direct contact – a historically rare event (see discussion in Tilly 2004:218). Later encounters at presidio Santa María had less of an effect on the overall social structure. Casta categories that were borrowed from New Spain, as well as the Spanish military structure were already familiar to the Apalachee, Yamasee, and other native groups that the colonists encountered. The contact process in this later case heightened already familiar boundaries between colonists and native groups.

Other social processes were relevant throughout the colonial period but varied in their impact over time. Biological mixing was a significant early mechanism that prompted the imposition of new social categories. The resulting convergence process remained important throughout the colonial period, altering colonial socio-demographics as the number of castas grew and came to play an important role in the developing labor structure. The outcome of convergence varied regionally as seen in Veracruz and Northwest Florida.

Collective action in the form of revolts was most pronounced relatively early in New Spain and shortly after colonists arrived in Northwest Florida. In both cases, many rebellious acts by blacks in Veracruz and convict laborers in Florida occurred during earlier periods of colonial occupation and in response to coercive labor regimes. In contrast, socioeconomic mobility and the site transfer process became increasingly significant in the latter half of the colonial period – eventually leading to new social movements (see discussion in the section on Colonial Transformations and Persistence of Empires).

From the historical perspective, long-term changes in Veracruz both mirrored and contributed to macroscale shifts in colonial social structure. The Crown, administrators, and colonial elites used formal categories to organize colonial society, particularly as it relates to the distribution of resources and labor. Relational mechanisms drove change from the bottom up through both coordinated and uncoordinated actions, prompting responses from the top down within the multi-layered colonial hierarchy. At the local level, this was particularly apparent in Northwest Florida where official reports, correspondence, and census data document strategies used by local officials to maintain control over a frontier garrisoned community. Decisions by these mid-level administrators effected change both from the top down and bottom up. Historical research in colonial Mexico and particularly at the Port of Veracruz provides a broader context for understanding the construction of relational and categorical identities in Northwest Florida. At Santa María, social categories were initially borrowed from New Spain during the height of the casta system at the end of the seventeenth century. Distance from their homeland communities and the military function of the presidios likely increased the rapidity of social transformations along the frontier.

Archaeological Perspective on Relational Mechanisms and Social Transformations

Archaeology offers an alternate line of evidence for assessing change in the colonial social structure and the relational mechanisms that drove those changes. Because Spanish language documents were mainly written from a top-down perspective, social relations were typically framed by formalized categories. As a result, it is often difficult to move beyond colonial frameworks to assess other forms of relational connections and categories of identification.

I identified six relational mechanisms of social change that are amendable to study with archaeological data. All of these mechanisms affect relational connections, but two also constitute categorical expressions:

Relational Connections

- Brokering of External Connections
- Strength of Regional Connections
- Labor Mobility
- Gendered Brokerage

Categorical Expressions

- Formal Categorical Activation
- Regional Categorical Activation

The conceptualization of these mechanisms is based upon previous research by colonial archaeologists and insights drawn from the work of sociologists on social boundaries, social inequality, and social capital. Broadly speaking, these mechanisms deal with relational connections and the active expression of categorical modes of identification. Transformation of the colonial social structure developed through direct interpersonal interactions at multiple scales, including the manipulation of broadly recognizable social categories. Local changes to the structure of relations could contribute to widespread transformations in the colonial social structure.

I examined mechanisms that caused change in relational modes of identification through the investigation of ubiquitous utilitarian wares, mainly plain and lead-glazed pottery. These wares often were exchanged through direct interaction at regional and community scales, providing data on the strength of relational connections, labor relations, and gendered brokerage. To assess mechanisms that reflect the active expression of categorical modes of identification, I examined the distribution of distinctive serving vessels. Because social categories exist at broad scales and apart from direct interpersonal interaction, they require symbolization to express group membership. The regular depiction of widely exchanged and recognizable tableware in eighteenth-century casta paintings suggests that these vessels are appropriate for assessing formal categories of identification. In addition, regionally diverse serving vessels were produced and often exchanged at smaller scales, potentially reflecting the continued expression or development of regionally-based categorical identities that are rarely mentioned in Spanish language documents.

Trade networks do not figure prominently into historical discourse on the changing colonial social structure, but exchange at multiple scales reflects the strengthening or weakening of relational connections, while simultaneously introducing diverse materials into colonial households. For this reason, archaeologists have tended to emphasize the role of exchange in social transformation more than historians. In this study, I examined external connections with regions outside of central Veracruz and Northwest Florida, as well as the strength of intraregional connections.

Brokering of External Connections

The distribution of pottery recovered from the Port of Veracruz revealed a weakening in external connections with Spain, while connections with central Mexico strengthened over the course of two centuries. Although the presidios of Northwest Florida were occupied over a much shorter period, a similar pattern was documented. External connections were not directly accessible to everyone at the port or presidios, however. Instead, brokers facilitated these exchanges, gaining social capital for their role in bridging the gap between their local communities and distant resources. In central Veracruz, I could not directly assess the role of merchants as brokers, but increased imports from central Mexico in the eighteenth century may reflect the establishment of the Jalapa trade fair as a brokerage location in 1718. Despite the strengthening connection between central Mexico and the port, imports barely exceeded half of ceramic assemblages by the late eighteenth century. At the presidios, all inhabitants were more dependent on external connections with colonial Mexico, but officers and administrators had greater access to both utilitarian wares and tableware through their long-distance connections. After 1740, their near exclusionary access to British tableware indicates that officers and colonial administrators were hoarding some luxury goods, possibly accessed through illicit means.

Strength of Regional Connections

Despite the port's function and centralized location along major trade routes, poor neighborhoods within the port relied more on intraregional exchange networks than external connections for utilitarian wares. While intraregional connections did weaken over time, regionally produced pottery continued to dominate the port's ceramic assemblage, only falling below 50 percent of the total pottery assemblage at the end of the eighteenth century. Even then, regional production continued to supply most utilitarian vessels to the port. Regional exchange along the coastal plain and some limited exchange with the piedmont created social ties with surrounding native populations. At the presidios, colonists also supplemented external supply with local exchange, but to a lesser extent than Veracruz. Within the presidios, regional connections varied between convicts and soldiers on the one hand, and officers and colonial administrators on the other. The last two had greater access to external connections and were less reliant on local production. Meanwhile low ranked soldiers, convicts, and later settlers forged somewhat stronger regional ties for their survival.

Labor Mobility

Regional connections bring into focus labor relations and mobility, which were central to the structure of colonial societies and shaped the form of everyday materials that were found in colonial households. In addition, skilled labor provided a degree of economic mobility. In Veracruz, black slaves and their free Afromestizo descendants learned European crafts and technologies while working on the sugar haciendas or for urban craftsmen. Although potters historically occupied a relatively low rung within the hierarchy of skilled laborers (see Lister and Lister 1977:49, 1987:221,275), supplying the port's main source of regionally produced lead-glazed pottery would have provided minimal economic advantages and differentiated these potters from the ranks of unskilled laborers. Meanwhile, farther away from the port, native labor provided most of the plain utilitarian wares.

In Florida, the first of the Pensacola presidios was founded just as native labor drafts came to an end and within a relatively depopulated region. Although some native groups eventually migrated to the region, the presidios remained reliant on castas from Mexico. Despite previous assumptions, the technological style analysis presented in Chapter 7 and the provenance study in Chapter 8 indicate that both native *and* casta potters were providing pottery for the presidio occupants. Prior to 1740, casta pottery was produced either for their own use or for barter with other low ranked castas, thus offering minimal economic advantage. After 1740, when castas began to produce lead-glazed pottery, there was more potential for mobility, particularly as these wares were also consumed by officers and local administrators. In both Veracruz and Florida, casta production of lead-glazed wares and the limited use of the wheel would have further distinguished their acts of crafting from native potters who supplied most of the plain utilitarian wares to the port and presidios.

Gendered Brokerage

Based on her seminal work at St. Augustine, Deagan (1974, 1983, 1985) argued that because most European colonists were men, women (particularly native and African women) were key cultural brokers, introducing low visibility traditions into domestic spheres. Until recently, this form of gendered brokerage was considered the main pan-American driver of social transformations. This was particularly the case among archaeologists working in the circum-Caribbean region (Deagan 2001, 2003; see also Ewen 1991). Although growing research has demonstrated that other mechanisms played important roles, gendered brokerage cannot be discounted as one among several mechanisms contributing to change. Within the original model, native women were cultural brokers who introduced native and hybrid material culture into colonial households, mainly through intermarriage (Deagan 1974, 1983). Later analyses of gendered brokerage have since indicated that these interactions were far more complex (see review in Voss 2008b; see also Deagan 2001:191). At both the port and the presidios, current historical data suggests that many, if not most, of the gendered relationships were with castas, españolas, and blacks. These diverse women in both Veracruz and Florida, adapted to locally available goods and created their own social networks, introducing varied ceramic traditions into colonial households.

Formal Categorical Activation

In contrast to the relational mechanisms noted above, observed mainly through the production, exchange, and consumption of low visibility plain and lead-glazed utilitarian wares, I investigated the expression of categorical identities through the distribution of highly visible tableware and serving vessels. Formal categorical activation refers to the expression of formalized categories. Colonial archaeologists have mainly focused on the role of Hispanic tableware (primarily majolica) as an expression of Espanidad ("Spanishness"). This focus paralleled historical studies that centered on dualistic categories of Spanish colonizers vs colonized natives, and the later casta system that measured position within the social hierarchy based on the degree of Spanish blood. The appearance of these wares in casta paintings furthers supports their relevance in the expression of a Spanish identity.

Within the poor barrios of the Port of Veracruz, there was little investment in majolica or other European-style tableware during the seventeenth century. This was a period of transition from the géneros de gente to the sistema de casta. During the following century, when the casta system began to erode – due at least in part to socioeconomic mobility – investment in majolica tablewares increased. Similar trends were observed in Northwest Florida among both low ranked castas and even more so among officers and local officials. After 1740, majolica tablewares at the presidios were even higher proportionately than in Veracruz. This trend may have been due to socioeconomic mobility, but also due to the increase in voluntary settlers – particularly women and families.

Regional Categorical Activation

Most studies in the circum-Caribbean have focused solely on European-style tableware and porcelain as expressions of formal categorical identity related to the casta system. Studies in other regions, including colonial Mexico, have shown that regionally-produced serving vessels also made their way onto the colonial table. Tonalá serving vessels had their roots in the pre-Hispanic past but were consumed throughout Spanish colonial America. Other regionally-produced red painted/slipped serving vessels have been found in residential contexts in central Mexico, the port of Veracruz, and Florida.

They also were prominently displayed in some casta paintings (see Figure 5.1). These wares would have been familiar to native, European, and African people, cross-cutting géneros de gente and castas, potentially signaling a broad colonial identity (see Charlton and Fournier García 2010:145 for a similar argument). Historically, there is evidence for the marking of a colonial distinction as early as the sixteenth century when imperial institutions, criollos, and peninsulares began emphasizing differences between American-born and European españoles. In seventeenth-century Veracruz, cofradía constitutions also were differentiating between American-born Afromestizos and new African arrivals (see Chapters 3 and 4). The production of red slipped/painted serving vessels was sufficiently widespread as to allow for the expression of a broad categorical identity that was variably produced at the regional scale. However, this supposition remains tentative and requires more empirical research.

In addition, both Veracruz and Florida had regional styles of highly visible pottery that were not as widespread. At the port, these wares were consistently found in small amounts throughout the colonial period. In Northwest Florida, distinct styles of native serving vessels were only found in colonial contexts until the missions were founded and the native potters who made them became more permanent residents within the region. Officers and local administrators then stopped using them, turning instead to British tableware to supplement their consumption of majolica, potentially to differentiate themselves from both native communities and lower ranked castas.

Discussion: Relations, Categories, and Social Transformations

Social scientists who frame their research using relational and categorical identification often examine the relationship between these modes. A discussed in Chapter 2, changes in relational connections typically precede transformations in social structures and related categorical identities (e.g., Nexon 2009; Tilly 1978, 2001a; see Peeples 2018 for an archaeological example). In Tilly's (2004) formulation, boundary activation is a relational mechanism that can combine with other mechanisms to cause change, but activation also is a mechanism that *constitutes* boundaries. That is, individuals often manipulated categorical symbols in strategic ways to gain advantages, thus potentially causing change. Simultaneously, because activation also constitutes social boundaries, transformations in social categories may be observed through broad shifts in the way categories are expressed.

For both the port and presidios, pottery analyses in Chapter 9 demonstrate that there was a weakening in relational connections with Spain, while the increasing consumption of utilitarian pottery from central Mexico indicates a strengthening of interregional connections within the viceroyalty. At the same time, there was a growing investment in serving vessels. This rise in the relative frequency of tableware included other European wares, as well as porcelain in some contexts, but mainly there was a general rise in the consumption of majolica from central Mexico. While majolica produced in New Spain initially borrowed overt stylistic traditions from Iberia, decorative choices quickly diverged as potters in Puebla and Mexico City developed uniquely

American design elements (McEwan 1992; see also Goggin 1968; Lister and Lister 1982).

While I do not currently have pottery assemblages from elite contexts in Veracruz, I suggested that the significant rise in majolica consumption seen within Afromestizo barrios may indicate a homogenization in the colonial table, at least in terms of the regular use of majolica in commensality. This is a pattern that I did observe at the presidios, where, after 1740, majolica represented an even higher proportion of the tableware found in low-status contexts compared to officer and administrator residential areas. Homogenization in the consumption of majolica has been noted in other regions as well. For instance, Seifert (1977) found that in central Mexico socioeconomic distinctions – measured by majolica consumption – diminished as the relative frequencies of majolica homogenized. Gasco (1993) also has noted a pattern of increased homogenization in majolica consumption among native households in Ocelocalco (1572-1767). At the late colonial site of Presidio San Francisco (1776-1821), Voss (2008a) similarly found a homogenized assemblage of tablewares.

At the Northwest Florida presidios, distinctions between colonists were not particularly evident through majolica consumption, but rather through the use of porcelain and, later, other European tablewares that were obtained through external brokerage. Based on these patterns, I suggest that while majolica may have long served as an indicator of "Espanidad," its categorical connotation changed in many colonial contexts as the overarching social structure transformed from géneros de gente to the sistema de castas. Then, as the sistema began to erode, Espanidad and its related symbolization lost some of its original meaning. Thus, eighteenth century casta paintings reinforced an ideal perception of colonial society that was rapidly changing. Growing consumption of majolica tableware, particularly in low status contexts, likely also reflected alterations in interregional exchange networks with central Mexico. This shift in relational connections and the resulting availability of majolica would have further eroded its effectiveness as a status indicator (see Neff 2014). As these cases demonstrate, relational connections and categorical modes of identification were linked in a continual process of social change.

While the strength of external connections pivoted from Spain to central Mexico, intraregional connections in Veracruz and Northwest Florida remained important. As documented in Chapter 9, most utilitarian pottery recovered from Afromestizo neighborhoods were produced within the region. Among these wares, there was an increase in the use of glazed pottery and a decline in plainwares. The latter vessels were made mainly from clays similar to those collected in zones dominated by native people during the colonial period. Decreases in plainware consumption may indicate a contraction of regional interaction by the end of the eighteenth century. However, it would be useful to identify and track these relations using alternate lines of evidence as this pattern may simply reflect a growing preference for glazed utilitarian pottery. In Northwest Florida, patterns were more mixed. Low-status castas relied increasingly on native utilitarian wares even after locally produced lead-glazed wares became available, while elites increasingly consumed utilitarian wares imported from Mexico, supplemented by local casta and native pottery.

As with external connections and formal categorical activation, consumption of regional serving vessels followed trends in relational connections. In Veracruz, use of regionally produced serving vessels – and the corresponding activation of regional categories– declined as relational connections weakened. A similar pattern was seen in high status contexts at the presidios. In contrast, there was a slight rise in the use of locally produced serving vessels in low status context. However, castas turned to red slipped and painted wares that were similar to those found in Veracruz and central Mexico, rather than incised carinated vessels that were more uniquely associated with Florida native communities. That is, while low status casta turned to locally produced serving vessels to supplement their supply of majolica, they chose wares that were familiar to them and not to those serving vessels that were distinctly "native."

So far in this chapter, I have separately discussed the relational mechanisms of change from the historical and archaeological perspectives. From the historical approach, I also identified four distinct processes, each including a unique sequence of bottom-up and top-down mechanisms of change. In the next section, I combine these data to highlight the unique insights drawn from each independent line of data. Combining historical and archaeological perspectives is not straightforward because of differences in spatial and temporal scales (Alexander 1998; South 1977). In Veracruz, archaeological temporal scales are measured in centuries or multiple decades. In Northwest Florida archaeological temporal scales are finer-grained, but still not nearly as temporally narrow as documents that represent single points in time, from an individual perspective, and often from the top down. Despite these difficulties, the combination of historical and archaeological data allows for a better understanding of the causal processes of change than would be possible from either perspective alone.

Combining Historical and Archaeological Perspectives

Our current understanding of large-scale shifts in the social structure of New Spain are based mainly on the work of historians. Colonial archaeologists have yet to fully engage with these transformations in structure focusing, instead, on general colonizer/colonized dichotomies or the casta system within a particular region. Archaeological data provide two important contributions: 1) independent evidence and a unique perspective regarding processes that scholars already have documented historically, *and* 2) data on mechanisms that are rarely considered by historians or are often difficult to study with documents alone.

Falling within the first category, gendered brokerage, labor mobility, and formal categorical activation are mechanisms that contribute to our understanding of historically documented convergence and site transfer processes. The St. Augustine pattern as originally articulated by Deagan (1974, 1983) hinged on the concept of mestizaje, or biological mixing, that was already recognized historically as being an important driver of Spanish colonial social change. However, while historians can study biological mixture through documents, such as parish records and census data, archaeologists are far better equipped for examining *cultural* mixture, offering an important dimension to the study of convergence processes. It is not surprising, therefore, that many of the broad theoretical frameworks employed by colonial archaeologists fall within this domain (see overview in Chapter 2). Through gendered brokerage, wives and concubines introduced diverse materials into pluralistic households within the domestic sphere. Further, as Deagan's research program developed through new projects in East Florida and the Caribbean, the role of women as cultural brokers expanded to include domestic servants and slaves (Deagan 2001, 2003). Thus, archaeological research extends the study of convergence processes beyond biological mixing and connects gendered brokerage to labor relations.

In Veracruz, biological mixing in the sixteenth and seventeenth century is mainly known historically from anecdotal accounts and the appearance of casta labels, such as mulato or pardo. There is very little evidence of biological mixing with native populations, but native plainwares and slipped comales were recovered from several urban lots within barrios that were dominated by Afromestizos. Thus, archaeological analysis identified cultural mixing and native-Afromestiza interaction in low visibility contexts that are otherwise inaccessible in the historical record. Similar patterns are apparent in Florida where there is, again, only anecdotal evidence of intermarriage and sexual unions between colonists and natives, yet both casta- and native-produced utilitarian wares were adopted in colonial contexts. During the first decades of presidio occupation, there were few women at the presidios, and it is likely that men also were engaged in food preparation using utilitarian wares that were imported or locally produced by casta potters or native women. In sum, the archaeological analysis of gendered brokerage adds nuance to our understanding of interactions that led to both biological *and* cultural mixing, as well as linking gendered interaction to broader labor relations that structured colonial society (see also discussion and comments in Voss 2008b).

Archaeology's contribution to the understanding of labor relations and the broader site transfer process is particularly stark in Florida where it has long been assumed that all locally produced pottery was manufactured by native potters. This assumption stems, at least in part, from St. Augustine's reliance on native labor drafts and the mission system during sixteenth and seventeenth centuries. The growth of free wage labor and the importation of laborers from colonial Mexico reshaped relations at the Pensacola presidios. Historical research suggests that skilled labor offered an avenue for at least some socioeconomic mobility (e.g., Seed 1982). Although potters were not particularly high in status compared to other artisans (Lister and Lister 1977:49, 1987:221,275), it was a skilled occupation that provided individuals with an alternate, though limited, source of income. Pottery production using European glazing technology and the wheel at both the port and presidios socially distinguished castas from native potters, while indicating relational connections between casta and European craftsmen.

As changes to social relations became more durable (frequent and sustaining), adjustments to categorical modes of identification often followed suit, even when there were imperial efforts to prevent it. While Spanish language documents typically describe social categories from a top down perspective, archaeological analyses of formal categorical activation provide important insights from the bottom up. This includes the intentional manipulation of formal categories, as well as local changes to the composition of those categories that colonial scribes tended to mask in documents.

An increasing investment in European-style tableware (particularly majolica) at both the presidios and the poor barrios of the port corresponded with a growing reliance on free wage labor, socioeconomic mobility, and “passing” that was destabilizing the casta system during the eighteenth century. Although casta paintings continued to associate the display of majolica tableware with españoles at the apex of a socio-racial hierarchy, homogenization in their distribution at the presidios, and possibly at the port, undermined their effectiveness as a symbol of distinction between españoles, castas, and blacks. In Florida, majolica marked categorical differences mainly between colonists and native people. Comparable research at native communities is needed to determine if this pattern was similar in central Veracruz.

Moving beyond those mechanisms and processes that have been identified from historical sources, archaeological evidence contributes essential data for tracking the strength and direction of relational connections that are often neglected by historians or are difficult to assess with historical data alone. Regional exchange networks created connections between diverse communities, potentially leading to the creation of regional identities that were rarely of interest to the authors of Spanish-language documents. External connections with other regions were brokered by a relatively limited number of people, creating social and economic advantages for some and introducing non-local materials into colonial markets. Transatlantic and interregional exchange was of more interest to colonial administrators, and, thus, there is more consideration of those exchanges. Nevertheless, historians have yet to explicitly link changes in long-distance exchange to the evolution of the social structure of New Spain.

In Northwest Florida, external connections provided a means for officers and colonial officials to signal distinctions from lower ranked soldiers, while increasing their economic advantage. Some of these brokered connections were illicit, resulting in transactions that are often intentionally hidden in historical sources. The actions of local officers and administrators are important for elucidating mid-level mechanisms that had both top-down and bottom-up effects. Strong external connections with colonial Mexico among administrators and officers contrasted with soldiers and convicts who were more reliant on local connections for their survival. More broadly, the weakening of relations between Spain and the American colonies culminated in a commercial independence that was soon followed by political independence and the end of the Spanish empire in America.

Colonial Transformations and the Persistence of Empires

A significant contribution of my study is a framework for the study of empires that is both empirical and multiscalar, incorporating decades of scholarship on the Spanish American empire by historians and archaeologists working both in core regions and in the frontier borderlands. The mechanism-based approach that I employ facilitates comparison between regions and the identification of reoccurring processes, demonstrated by the application of my framework to two case studies. This approach also allows for the cross-cultural comparison of bottom-up and top-down mechanisms of change, contributing to a much broader discussion about the processes of social transformation, persistence, contraction, and collapse of empires.

Empires are typically defined from a political and top-down perspective that emphasizes the role of the state in imperialism and colonial change (Doyle's [1986] well-known definition of imperialism is cited in Chapter 1). Until the end of the twentieth century, much of the scholarship concerning empires and culture change also took a top-down approach. In colonial America this bias was evident in the unidirectional approach of the acculturation paradigm. Similar approaches dominated the study of more ancient empires as well. For instance, the concept of Romanization grew out of acculturation theory and was heavily biased toward top down explanations (see discussion in Gardner 2013).

Since the 1970s, post-colonial theory has swung the pendulum in the opposite direction, emphasizing local histories and bottom-up responses to imperial expansion (see reviews of post-colonial theory in Gosden 2004 and Van Dommelen 2011). The historical archaeology that developed in North America was greatly influenced by post-colonial theory, tending to focus on the lives of individuals and groups who are rarely or poorly described in documents (Deagan 1988a; Little 1994; see also Wolf 1982). A focus on local history and agency has directed research toward particularism, but, as Gosden (2004:20) has pointed out, local differences are best understood through comparative research.

The approach employed in this study considers both bottom-up and top-down mechanisms, as well as the dialectic between them. Post-colonial scholars tend to emphasize resistance and responses to imperial expansion and colonial rule (Bhabha 1994; Scott 1985). My study demonstrates that colonial people did more than respond to domination, they drove change from the bottom up. Bottom-up mechanisms included resistance through collective action, but also uncoordinated local behaviors that were not always intentional acts of resistance, but that still had emergent effects that could cause large-scale change. I identified causal mechanisms of change that can be examined empirically with historical and archaeological data.

The dialectics between bottom-up and top-down mechanisms reflect the adjustments that were necessary for imperial agents and institutions to maintain control over colonies that were continuously evolving. The formal imposition of social categories, the local inscription of those labels through spatial segregation, the shifting of formal policies that attempted to balance penalties and rewards, and the transfer of groups or individuals across social boundaries were all geared toward maintaining control of colonial labor and resources, while minimizing costs. At the same time, coordinated actions through revolts or for mutual support, as well as uncoordinated actions through biological and cultural mixing and socioeconomic mobility, continually challenged the status quo.

My examination of social transformations at the Port of Veracruz and Northwest Florida was restricted to the colonial period. For Veracruz, this research extended to the end of the eighteenth century. Two decades later, in 1821, the viceroyalty of New Spain collapsed as Mexico declared independence from Spain. As is often the case, the causes of imperial contraction and political collapse are multiple and complex (Cowgill 1988; Tainter 1988, 2016). Specific events in Europe, such as the Napoleonic Wars and the temporary takeover of the Spanish government between 1708 and 1714 certainly contributed to the downfall of the Spanish American empire (Archer 2000).

Oher causes involved the protracted processes of social transformation that had been taking place in the colonies for three centuries – processes described in this study and documented in the Veracruz and Northwest Florida case studies. As Lockhart and Schwartz (1983:422) suggest, "Perhaps the problem of the overflowing middle…was the nearest thing to large-scale social pressure for change connected with independence." That is, social processes of convergence and site transfer (both up *and* down the colonial hierarchy) transformed the colonial social structure, eroding the casta system and, simultaneously, the state's strategy of divide and rule. As a result, there was growing competition for mid-level occupations, not only among castas, but native people, free blacks, and criollos.

Members of diverse categorical groups increasingly shared similar relational positions within colonial society. Competition for employment and barriers to social advancement – still present within the casta system – motivated a large number of individuals to join social movements against the state during the early nineteenth century. The role of social transformations in later movements for independence is indicated within the political writings of well-known revolutionaries Miguel Hidalgo y Costilla and José María Morelos. In 1810, both called for the end of coercive labor regimes and the casta system that had structured the distribution of resources and the organization of labor (Mata 2018).

Hidalgo's famed rebellion failed at least in part because criollo elites continued to support the socio-racial system and the imperial government that legitimized their positions at the apex of colonial society (McAlister 1984:450). Violent collective action by castas, blacks, and native people unnerved local elites who relied on the Crown to suppress threats to their power. Thus, even though the casta system was disintegrating, divisions remained between colonial elites and everyone else. This division was reinforced by the relational position of criollos as important brokers between Spain and the colonies. Importantly, Bourbon reformers of the late eighteenth century undermined that connection by preferencing peninsulares for the colonial bureaucracies and audiencia positions, further weakening external connections with Iberia among criollos. Combined with the strength of regional ties, the stage was set for criollos to eventually join the independence movement.

Changes leading to Mexican independence from Spain highlights the role of dialectic mechanisms of change that contributed to the persistence and political collapse of complex societies. These processes are not always considered in the study of states and empires. As Feinman and Nicholas (2016:46) remark, "While power must be seriously considered, leadership is always dyadic and implies a consideration of the objectives of followers as well as those on top." My study contributes to expanding research on the interaction between commoners and elites in the formation, persistence, and collapse of complex societies (e.g., Blanton and Fargher 2008, 2009; Feinman and Nicholas 2016).

In terms of collapse research, Cowgill (1988:256, 2012:301) rightly asserted that it is essential to identify what has actually collapsed (e.g. political organization, cultural tradition). We should also consider what endures. While Mexican independence resulted in the contraction of the Spanish empire, many aspects of the former colonial society continued on a trajectory that began much earlier. By the mid-eighteenth century, the casta system had already started to destabilize. After independence, the socio-racial hierarchy was formally abolished and the process of nation building underscored distinctions mainly between Europeans and American-born categories. In addition, nineteenth century scholars and politicians emphasized a homogenized national identity of mestizos that recognized only the populace's descent from native and European people – thus subsuming and erasing African history and heritage within a national identity of mestizaje (French 1999; Jiménez Ramos 2009; Purnell 2002). My study thus adds important research on the contribution of diverse people, particularly Afromestizos, to the shaping of the modern nation of Mexico. The research is particularly timely with the forthcoming inclusion of afrodescendiente on the Mexican census for the first time in 2020.

Future Research Directions

The relational mechanisms that I offered here were developed for comparative research. Further refinements and the addition of new mechanisms and processes will certainly be useful and should be explored in future investigations, particularly in other regions and empires. Comparative work is necessary for elucidating if and why mechanisms concatenated differently between contexts and assessing how this variation combined with initial conditions to produce distinct historical trajectories.

In addition, I anticipate the incorporation of new methods for assessing relational connections, such as the use of formal network analysis. From a methodological standpoint, the technological style analysis used to discriminate between Florida native pottery and casta/imported wares presented some overlap. The identification of additional pottery attributes may help to reduce the number of unassigned samples and move samples from the "likely casta/imported" category to a more secure grouping. In addition, this project identified previously unknown trends in pottery production that should guide future research.

In Florida, locally produced lead-glazed pottery was found only in post-1740 contexts. A focused study on a larger sample of lead-glazed wares in these later contexts would be informative for better understanding local technical traditions and evolving labor regimes. A larger sample is also needed to better assess the early local production of Santa María Stamped. These wares were not the focus of my laboratory analyses, but the opportunistic testing of a few of those sherds warrants additional investigation to elucidate early pottery production by castas in Northwest Florida and the potential signaling of identity through highly visible stamped designs brought from central Mexico. At the Port of Veracruz, systematically excavated assemblages are only currently available for two of the poorer Afromestizo neighborhoods. Future archaeological excavations in the central and northern quarters are needed to provide comparative samples for understanding material variation within the port. In short, much work remains to be done, both within the two cases examined for this project, as well as comparative work in other regions.

[1] Mobilization is a process that has received ample attention from political scientists and historical sociologists, and thus there is voluminous literature related to the causal mechanisms involved in this process. Models of mobilization developed by social scientists, such as McAdams et al. 2001, focus on the causal mechanisms that led to contentious events, collective action, and recursive responses by the state actors and institutions. I did not attempt to borrow from these models in my conceptualization of the mobilization process in colonial contexts. Rather, colonial mobilization, as characterized in Figure 10.1, was conceptualized through observation of reoccurring patterns observed from previous historical studies (Chapter 3) and my two case studies (Chapter 4). Unlike the model presented in McAdams et al. 2001, I do not include mechanisms in this process that precede collective action. Rather, my characterization of mobilization begins from the bottom-up mechanism of collective action.

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APPENDIX A

TRANSCRIPTION OF THE ROYAL LISTS OF 1741

FOR THE PRESIDIO ISLA DE SANTA ROSA

Reales Listas, año 1741, Real Contaduría del Presidio de S^{ta} Rossa Punta de Siguenza. AGN Cárceles y Presidios 5753, Expediente 23.

[Cover]
Reales Listas, año de
1741
Real Contaduría del Pres
sidio de S[an]^{ta} Rossa, Punta
de Siguenza.

[f. 1r]
R[ea]l[es] Listas que empiesan a correr desde
primero de Abril de 1741
en que son comprehendidos los Poblado
res y sus mugeres como tambien
sus hijos, y agregados a d[ic]has familias.
Comprehende
asimismo las persona[s] del Precidio
que gozan de racion sin sueldo
y tambien
los forzados que tiene el Precidio

[f. 2r]
Pobladores

D[o]^{n} Joseph Rodrigues	se le formo este
D[oñ]^{a} Manuela Suares	asiento en Mex[i]^{co}.

En pagam[en]^{to} de 4 de Sep[tiemb]^{re} de 1744 percivio
este y las siete familias que se le siguen doze
pagas segun su sueldo las que le vinieron
reguladas.
[rúbrica]

Carlos Lascano	se le formo este
Theresa de Herrera	asiento en
	Mex[i]^{co}.

[f. 2v]

D[o]^{n} Pedro de S[a]^{n} Marttín	se le form [es]
D[oñ]^{a} Rossa de Mendoza	te aciento en
Nota	Mexico.

Que en 27 de Junio de 1743
Se les ano[taron] las plaz[a]^{s} de Pobla
dores en birtud de Decreto

del com[andan]te.

Nota,
Que se padecío equíboco por no haverseles
anotado las Plazas a los conthenidos
por ser, a J[ose]ph de la Vega, y Roza Euge
nia Arismendi.

Albertto Bergara
Juana Jacona
Nota
Que en 27 de Junio de 1743
se le anoto la plaza de Po-
bladora a Juana Jacona
viuda de d[ic]ho Vergara p[o]r
hav[e]r presentado liz[enci]a del
sup[eri]or Govierno, a que se
ñañadio el Decreto del Gov[ernad]or
de la plaza.

Nota
Este se haogo en Abril de 1742
se ignoro el dia por no haver pa
recido mas que la canoa que lo
conducia en m[edia]do Abril.
se les formo este
asciento en Mex[i]co

[f. 3r]
Ju[an] Ygnacio Soliz
Magdalena Garcia

se les formo este
aciento en Mex[i]co.

Nota
En 5 de Mayo 1742 se le concedio liz[enci]a
por el comand[an]te de este Press[idi]o D[o]n Juan de
Yarza p[ar]a q[ue] passe el contenido a el
Reyno d[e] la Nueba España con la
obligaz[io]n de restituirse en el subsequente
situado y de no practicarlo se le anotara
la plaza.

Nota
Se le acude con la razion desde
el dia 11 de Junio 1743 por haver
buelto de la nueba españa.

Nota
Que en 25 de Junio de 1743
se le anoto la plaza de Poblador
a el d[ic]ho Juan Ygnacio de Soliz
y su exposa. Desde cuio dia no
le corre el sueldo. Segun lo dispuesto
por el com[andan]te de esta plaza en Decreto del mismo dia
por el q[ue] le concede liz[enci]a para q[ue] pase con su familia
a la nueba esp[añ]a.

Joseph Fran[cis]^{co} de Sotomayor
Lorenza Dias

se les formo este
aciento en Mexi^{co}.

Nota
Que en 4 de sep[tiemb]^{re} de 1744 se le anotto la Plaza de Poblador ael d[ic]ho J[ose]ph Fran[cis]^{co} de Sotomaior en virtt[u]^{d} del orden berbal del comm[andan]^{te} d[e] eseta Plaza.

En pagamento de 18 de nov[iemb]^{re} de 1745 se le sa tisfizo a D[oñ]^{a} Lorenza Dias el sue[l]do de 12 Pagas por no haverlo aperzevido el situado antezed[en]^{te}.

[f. 3v]
Joseph de la Vega
Rossa Eugenia Arismendi

se les formo est[e]
aciento en 19 de
Abril de 1743

Nota
Que en 27 de Junio de 1743 se les anotó las Plazas de Po bladores en virtud de Dec[re]^{to} del Comm[andan]^{te}

Philivertto Michodel
Fran[cis]^{ca} de la Vega

se le formo este
aciento en 1^{o} de Ma
io 1743

[f. 4r]
Juan Suares
Angela Bozo

se les formo
este asi[en]^{to} en 8 hen[ero]
de 1742.

Nota
En 27 de Junio de 1743 [se] les anoto las plazas que gozaban de Pobladores por Decreto del comandante.

Sevasti[á]n Marttines Garsson
Mariana Bordiñes

se les form[o]
este asient[o]
en 8 de hen[ero] d[e] 1742

[f. 4v]
Fran[cis]^{co} de Solis
Juliana Usunac

se les formo es[te]
asi[en]^{to} en 10 de feb[rero]
d[e] 1742

D[o][n] Pedro de Angulo
D[oñ][a] Maria Maseda
En 2 de Sep[tiembr][e] de 1744 se le anotto
la plasa al contenido en virt[u][d] de
ord[e][n] verval del com[andan][te] d[e] esta plassa
y passo a la de raz[io][n] sola.

se les formo este
asi[en][to] en 17 de
Abrill 1742]

[f. 5r]
Joseph Anttonio Garcia
Maria Salome
Cesso en 5 de Marzo de 1746 segun
consta de la Lista que principi[o] des[d]e 1[0] de Hen[er][o] de 1745.

se les formo este
asi[en][to] en 17 de Abrill
de 1742

[f. 6r]
Real Lista de filiacion de las familias y agregados que
vinieron a este Precidio el presente año de 1741

<u>Primera familia y sus agregados</u>

1. Joseph Rodriguez esp[añol] n[atural] de la Puebla h[ijo] de
   Joseph y Maria Antonia de Ribera B.C.
   B. delgado y ojos pardos………………… 30
2. D[oñ][a] Manuela Suares esposa del d[ic]ho esp[año][la] h[ija] de
   Juan Suares y D[oñ][a] Maria de Leon, n[atura]l de
   Orizaba alta blanca y bermeja…………... 25
3. Joseph Rodriguez h[ijo] de los antecedentes
   blanco bermejo…………………………… 8
4. Anna Rodriguez h[ija] de los d[ic]hos doncella[1]
   M. gruesa trigueña ojos negros…………. 12
5. Anna Josepha de Rozas esp[año]la h[ija] de Fran[cis][co] [2]
   y de Juana Nuñes viuda de matrimonio
   de Luis de Ortega M. color moreno ojos
   pardos con su hija María de Rossas y Simona Roz[a][s]…36
6. Maria Micaela de Rosas esp[año][la] hermana de

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[1] Usso de liz[enci][a] en 25 de Sep[tiemb][re] de 1[7]44
fue ras[iona][da] hasta 30 de Oct[ub][re].

[2] Ussaron de liz[enci][a] madre y
las dos hijas en 25 de Sep[tiemb][re]
1744 y f[uer]on r[a]zionados as
ta 3[0] de Oct[ub][re].

la antecedente viuda de Man[ue][l] pequeña
color moreno ojos negros………………. 16
7. Simona Ramires h[ija] de la antecedente
niña del pecho de mes y medio…….
8. Petra de Acuña mulata libre h[ija] de Maria [3]
Theresa y Nicolas Tolentino color cocho
delgada………………………………... 20
9. Maria Getrudiz Acuña h[ija] de la antecedente [4]
blanca mas que su madre………………… 7

<u>Segunda fam[ili][a] y sus agregados</u>

10. Carlos Joseph Lascano español h[ijo] de
Joseph y de Josepha Maldonado n[atural] de
Mexico B.C. grueso ojos grandes y ne-
gros sarg[en][to] reformado en d[ic]ho Precidio ca[s]ado
con……………………………………… 56

11. Maria Theresa de Herrera h[ija] de Antonio y
Man[ue][la] Santoyo, n[atural] del Pueblo de S[a]n Mig[ue]l de Mex[i][co]
alta trigueña ojos grandes y negros……… 39

[f. 6v]
12. Maria Guadalupe h[ija] de los d[ic]hos doncella n[atura][l] de
Mexico, cariaguileña boca pequeña naris
afilada……………………………………………… 1[…]
13. Juan Antonio Lasc[a]no h[ijo] de los d[ic]hos n[atural] de Mex[i][c[o]]
blanco rubio ojos asules…………………... 6
14. Antonia Garrido parda libre huerfana [d]e los
antecedentes doncella ojos pequeños chata
cocho…………………………………….. 14
15. Maria Gregoria Josepha mestisa n[atura][l] de Mex[i][co]
B.C. ojos grandes y negros……………….16
16. Rosa Eugenia Arismendi natural de San [5]

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[3] Usso de liz[enci]a en 25 de Sep[tiemb][re] [1]744
fue raz[iona][da] hasta 30 de Oct[ub][re].
[4] Usso de liz[enci][a] yden todo como
la madre
[5] Vino el marido de esta
por haver anotado la
plaza de soldado se le
formo asiento de pob[la]
dor y padre de esta
familia.

Angel de Mex[i]co h[ija] de Antonio y Maria
Santoyo, muger de Joseph de la Vega que
sirbe con plaza de soldado en la Arm[a]da
de Barlobento alta delgada, ojos negros…. 32

17. Maria Fran[cis]ca de la Vega h[ija] de Rosa de Aris [6]
mendi y Joseph de la Vega doncella n[atura]l de
Mexico M. ojos negros naris roma y la-
bios gruesos………………………… 19

18. Josepha de la Vega hermana de la antecedente don-
cella natural de Mexico blanca delg[a]da ojos
negros……………………………….. 12

19. Maria Getrudiz de Figueroa española h[ija] de [7]
Manuel y de Josepha Garcia soltera n[atura]l de Mex[i]co
color rosado ojos sarcos…………….. 42

20. Maria Anna de Ribera doncella hija de la
antecedente B.C. carillena ojos grandes
trigueña………………………………. 9

21. Getrudiz Manuela de Abila mestisa soltera [8]
h[ija] de Antonio y Angela Guerrero M. cari
abultada tuerta de un ojo………………. 30

22. Maria Fran[cis]ca Velasco parda blanca hija de Fran[cis]co [9]
y Manuela de Cordoba soltera n[atura]l de Mex[i]co.
B.C. carillena ojos sarcos nariz abierta.

23. Maria Ybarra española h[ija] de Man[ue]l y [10]
de Maria Anna de Cardenas doncella
n[atura]l de Mexico B.C. cariaguileña blanca
rosada ojos p[a]rdos y rasgados…………24

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[6] Esta caso con Phili
berto Mic[h]odel y se l[e]
formo asiento de
pobladores en Mex[ico]
Maio 1741

[7] Usso de liz[enci]a en 25 de Sep[tiemb]re
1744 fue raz[iona]da hasta 30 de
Octt[ub]re

[8] Nota
Uso de lisencia en
25 de Mayo 1743. Y fue
racionada para un me[s]

[9] Usso de liz[enci]a en 25 de Sep[tiemb]re [1]744
fue razionada hasta de
Octt[ub]re.

[10] Usso de liz[enci]a en 25 de Sep[tiemb]re [1]744
Y fue raz[iona]da hasta 30 Oct[ub]re.

Tercera familia y sus agregados

24. Juan Ygnacio de Soliz y Carcamo esp[año]l h[ijo]
de D[on] Joseph y D[oñ]a Fran[cis]ca Sanchez Careño
n[atura]l de Mexico B.C. trigueño ojos negros
sarg[en]to reformado del Precidio de S[a]n Joseph

[f.7r]
Donde sirvio desde su creacion hasta
su demolicion…………………………. 52

25. D[oñ]a Magdalena Garcia su muger h[ija] de D[o]n
Miguel Garcia de la Rosa y D[oñ]a Thomasa Or
t[es] Ladron de Guebara n[atural] de Mex[i]co B.
C.B. rosada ojos negros………………… 42
26. D[oñ]a Anna Jacinta Getrudiz de Soliz hi-
ja de los d[ic]hos natural de la Bahia de
S[a]n Joseph doncella B.C. trigueña ojos
negros nariz afilada…………………….. 21
27. D[oñ]a Maria Anna de Soliz hija de los d[ic]hos
natural del Precidio de S[a]n Joseph doncella
B.C. ojos negros……………………….. 18
28. Augustin Joseph Antonio de Soliz hijo 3o [11]
de los precedentes natural de Mex[i]co tri-
gueño ojos negros………………………..9
29. Maria Anna Joseph de Soliz hijo de los su
se d[ic]hos n[atura]l de Mexico color rosado ojos
negros…………………………………… 5
30. Maria Michaela hija 5a de los d[ic]hos n[atura]l de
Mexico color rosado ojos negros……….. 4
31. Maria Phelipa de Jesus 6[a] hija de los referidos
na[tura]l de Mexico de edad de………... 10 me[se]s
32. Maria Antonia de Leon h[ija] de Miguel y [12]
de Antonia Garcia n[atura]l de Mexico esp[año]la
doncella, B.C. trigueña ojos negros……14
33. Maria Getrudiz de Carmona morisca h[ija] de [13]

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[11] este deserto en 15 de
Maio 1742
[12] Se casó con Simon
Lorenso artillero en
3 de Mayo de 1741.
[13] Esta se casó en 23 de
Mayo 1741 con Joseph

Manuel y de Maria Nicolasa de Zalazar
n[atura]l de Mexico soltera M. carillena ojos
sarcos…………………………………. 19

34. Anna Josepha de los Dolores hija de la anteceden-
te n[atura]l de Mexico trigueña ojos neg[r]os…….3

35. Eugenia Getrudiz Sabedra castisa h[ija] de Fran[cis]co
y de Michaela de Oropesa doncella M. ca-
riredonda ojos negros trigueña…………19

36. Maria Ynes mulata h[ija] de Juan de Peralta
y madre no conocida doncella y libre color
cocho……………………………………17

37. Getrudiz Visenta Ballejo española h[ija] de [14]
Joseph y de Maria Manuela de Ledesma
n[atura]l de Mexico doncella mediana tri-
gueña y chata……….................... 14

[f. 7v]

<u>Quarta familia y agreg[a]dos</u>

38. D[o]n Fran[cis]co Joseph de Sotomaior y Castillo esp[año]l
natural de Orizaba, h[ijo] de D[o]n Thomas y
de D[oñ]a Fran[cis]ca Gimenez soldado que dise fue del
Precidio de Siguenza por tiempo de 8 a[ños] B.C.
B. delgado ojos negros

39. D[oñ]a Lorenza Dias su esposa.

40. D[oñ]a Josepha de Sotoma[i]or segunda hija

41. D[oñ]a Maria de Sotom[ai]or tercera hija

42. D[oñ]a Juana de Sotoma[i]or quarta hija [15]

<u>Nota</u>

43. D[oñ]a Manuela de Sotom[ai]or primera hija de los d[ic]hos

44. D[o]n Fran[cis]co de Sotoma[i]or hijo de los d[ic]hos y Miguel Lopez [16]

45. reputado por hijo desertaron en Veracruz

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de Arroyo esp[añol] y solda
do de los que binieron
de refuerzo.

[14] Usso de liz[enci]a en 25 de Sep[tiemb]re [1]744
fue raz[iona]da hasta 30 de Oct[ub]re.

[15] Nota
Fallecio en 19 nob[iembr]e 1741

[16] Nota
Desertaron

Otra Nota

46. D[oñ]a Maria Magdalena Moreno española hija
de D[o]n Joseph y de D[oñ]a Josepha de Vega y Vique na[tura]l de
Mexico B.C.B. rubia y ojos negros de 20 a[ños] se
quedo en S[a]n Juan de Ulua de orden del Virrey de
nueba españa Duque de la Conquista

47. D[oñ]a Juana Philipade Moya española natural de [17]
Mexico doncella hija de D[o]n Fran[cis]co y D[oñ]a Petra
de Aguilas B.C. blanca rosada buenas facci-
ones…………………………………………… 14

48. D[oñ]a Anna de Jesus y Roxas española natural
de la Puebla h[ija] de Joseph y de D[oñ]a Juana de
Araujo viuda de D[o]n Antonio Pardiñas B.C.
blanca ojos negros…………………………… 24

49. D[oñ]a Anna Maria de Contreras española h[ija] de[18] [19]
Gabriel Perez, y Clara de Contreras viuda
de Nicolas de fuentes nat[ura]l de Mexico, me-
diana blanca ojos pardos……………………… 20

50. Anna Manuela Rodriguez mulata libre h[ija]
de Thomas y de Juana de Estrada soltera
n[atura]l de Mexico color cocho ojos grandes, y
pardos hoiosa …………………………………25

51. Maria Fran[cis]ca de Rueda mulata h[ija] de Martin [20]
y de M[ari]a Luisa de los Angeles alta delgada

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[17] Nota
Se caso a el bordo de
el paquebot[e] del Rey
el 13 de Marzo de [1]741 con
Juan Ygnacio Garcia
soldado

[18] Nota
Uso de licen
cia en 25 de Hen[er]o de 1744
en virtud de despacho
de S.E. como consta
en la nota de su esposo

[19] Nota
Se caso en S[a]n Juan de
Ulua con Lucas de
Abellaneda soldado
de los del refuerzo que
binieron a esta Plaza.

[20] Nota
Se caso con Nicolas
Romero artillero
en 20 de Maio de 1741.

color cocho ojos pardos………………………. 20
52. Maria Luisa de los Angeles mulata prietta
parda cana ciega, alta, delgada como de……… 60

[f. 8r]

Nota

53. D[o]^{n} Ignacio Joachin Moreno y Velasco es-
pañol hermano de D[oñ]^{a} Magdalena se
quedo por enfermo en Veracruz.

Quinta familia y agregados

54. D[o]^{n} Pedro de S[a]^{n} Martin y Salzedo h[ijo] de D[o]^{n} Luis
y de D[oñ]^{a} Josepha de Salzedo n[atura]^{l} del señorio, de
Vilbao alto delgado entrecano ojos pardos
soldado que era de la compañía de infant[erí]a
de Mexico……………………………………40
55. D[oñ]^{a} Rosa Maria de Mendoza su muger h[ija]
de D[o]n Joseph y D[oñ]^{a} Magdalena Ribera n[atura]^{l} de
Pachuca B.C. gruesa, blanca, ojos pardos……….38
56. Miguel de S[a]^{n} Martin y Mendoza h[ijo] de los
antecedente B.C. ojos berdes blanco cari
aguileño…………………………………………20
57. Manuel Antonio segundo de d[ic]hos ojos negros
color rosado……………………………………. 16
58. Getrudiz Picharda castisa h[ija] de Juan y de Fran[cis]^{ca} [21]
doncella carirredonda chica, ojos pardos……… 16
59. Maria de Loreto mulata prieta h[ija] de Geroni-
mo Ardila y Maria Nicolasa M[a]r[tí]n[e]z libre
M. gruesa ojos negros…………………………. 49

Nota

60. Maria Fran[cis]^{ca} Dolores mestisa huerfana donce- [22]
lla carirredonda ojos negros chata se quedo
en la Puebla enferma
61. Maria Zerbantes española h[ija] de Juan y de
Juana Garrido n[atura]^{l} de Mexico doncella B.C.
ojos garzos, cariaguileña berruga bajo del

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[21] Nota
Esta se caso en [Sa]^{n} Juan
de Ulua con Joseph Fran[cis]co
solda[do] [de los] del refuerzo
[22] Se quedo

ojo isquierdo……………………………………25
62. D[oñ][a] Antonia de Abila Perafan española h[ija] [23]
de D[o][n] Santiago Perafan y D[oñ][a] Maria Garni
ca soltera de color moreno alta ojos negros…....19
63. Andrea Antonia Perez h[ija] de Bernabe Pe-
rez y de Maria de la Encarnacion don-
sella trigueña cariaguileña frente espar
cida n[atura]l de Mex[i][co]……………………... 18
64. Pasqual Dionicio Perafan herm[an][o] de Ant[oni][a] sento [24]
plaza de soldado……………………

[f. 8v]

65. Clara Hipolita Ordoñez morisca
hija de Juan Joseph y Maria Antonia
de Arenas soltera M. ojos negros……………… 17

<u>Sexta familia y sus agregados</u>
66. Alberto Joseph de Vergara castizo h[ijo] de D[o][n] Sal [25]
bador de Vergara y D[oñ][a] Fran[cis][ca] Carena n[atura][l] de
Campeche B.C. trigueño ojos pardos…………. 35
67. Juana de Dolores Jacona h[ija] de D[o][n] Miguel [26]
y de D[oñ][a] Maria Getrudiz Ranjel n[atura][l] del R[ea]l
del Monte B.C. trigueña ojos pardos…………. 23
68. Antonia Fran[cis][ca] Vergara hija de los sus d[ic]hos
trigueña cariredonda chata ojos negros…..……..3
69. Maria Fran[cis][ca] de Vergara h[ija] de los referidos tri-
gueña cariredonda ojos pardos 1 año 4 m[ese]s
70. Maria de Figueroa huerfana de los antecedentes
cariredonda chata doncella ojos negros……….. 15
71. Ignacia Xaviera parda libre h[ija] de Bartt[olo][me] [27]
delgado y Getrudiz de la encarn[a]cion n[atura][l] de

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[23] En 25 de Sep[tiemb][re] de [1]744 usso de
liz[enci][a] y fue razionada hasta
30 de Octt[ub][re]
[24] Paso a ser soldado
[25] Nota
Este se haogo en Abril
1742 se ignora el dia
por no haver parecia
mas que la canoa que
lo conducia.
[26] Fallezio
[27] Fallezio en 16 de Sep[tiemb][re]
de 1744

Mexico soltera M. cariabultada color
cocho ojos negros……………………………33
72. Juana Maria de Siguenza parda libre h[ija] [28]
de Phelix de la Cruz y Maria de la Encarnaz[i][on]
soltera n[atura][l] de Mex[i][co] color obscuro ojos
negros………………………………………. 20
73. Ambrocio Moreno mestizo h[ijo] de Juan y [29]
de Phelipa de Jesus n[atura][l] de Mexico soltero
M. color cocho ojos negros
74. D[oñ][a] Anna Maria Lopez española h[ija] de D[o][n] [30]
Juan Antonio y D[oñ][a] Juana Maria More-
no soltera pequeña blanca hoiosa de
viruelas ojos pardos
75. Fran[cis][co] de Ybarra h[ijo] de Manuel y Maria [31]
Anna de Cardenas n[atura][l] de Mexico ojos
pardos prieto………………………………15
76. Joachin de Aguilar h[ijo] de Nicolas y de Ge- [32]
trudiz Pachec[a] n[atura][l] de Toluca B.C. boqui
belfo………………………………………. 21
Maria […] Manuela h[ija] de martimonio de
Anna Josepha de Rosas yncluida en la prim[er][a]
familia pelo lizo ojos negros……………….. 6

[f. 9r]

Nota

Todas las personas pobladoras y agregadas
en [l]a antecedente lista fueron remitidas de or-
den del Virrey de Nueba España a este
Precidio. Y a los padres de ellas se les acudio en
Veracruz se deve entender a los siguiente = Juan
Ignacio de Solis y a su muger = D[o][n] Joseph Ro-

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[28] En 20 de Sep[tiemb][re] de [1]744
fallezio la contenida y
estava razionada hasta
23 del mismo.
[29] Nota
En 16 de Abril de
1742 se le dio liz[enci][a]
para pasar a la
nueba españa.
[30] Yncluida en la 1[a] familia
[31] Nota
Paso a escribir plaza
de soldado
[32] Paso a soldado

driguez y a su muger =Fran[cis][co] de Sotomaior del
Castillo y a su muger=A Pedro de S[a][n] Martin
a su muger = a Alberto Joseph de Vergara y
a su muger = y a Carlos Joseph Lascano y
a su muger sedieron a los d[ic]hos en Veracruz
en 14 de febrero de mil setez[ient][os] quarenta
y uno por oficiales R[ea]l[es] de aquel Puerto dos
pagas adelantadas para cada uno, y otras
dos para sus mugeres a razon de siete p[es][os]
y medio cada paga que importaron todas
ciento y ochenta p[es][os] para sus abios en el
viaje en d[ic]ho dia 14 de Feb[rer][o] y año referido
Ysla de S[an][ta] Rosa primera de Abril mil setez[ient][os]
quarenta y uno.

Por otra lista de ofiz[iale][s] r[eale]s de Veracruz de
15 de Febrero 1741 fueron remitidas las per
sonas siguientes para pobladores de
este Precidio Islas de S[an][ta] Rosa. Primero
de Abril de 1741.

D[oñ][a] Fran[cis][ca] de Torres y Noriega española [33]
soltera h[ija] de Juan natural de Vera-
cruz alta delgada blanca y buena [34]
cara…………………………………………… 25

Maria Cacia parda no mui blanca n[atura][l] de[35]
Veracruz casada con Diego Martin Terra-
no soldado que vino a este Precidio M. ce-
jijunta ojos alegres…………………………….. 20

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[33] Alistada en d[ic]ho puerto
en 23 de Hen[er]o 1741
[34] Nota
Por haver se casado
y por combiene se le
dio liz[enci][a] por el Gov[ernad][or]
para que pase con su
marido a Compeche
en 25 de Mayo 1741
[35] Alistada en 18 de
Hen[er][o] 1741.
Como cabesa de fami
lia por venir con su
marido.

[f. 9v]
Augustin de la Rosa h[ijo] de los antecedentes

Nota Se le dio liz[enci]a por el comandante para que pasase a la Havana en 18 de Mayo 1743.	Alisto ydem
Barbara de la Candelaria viuda par- da obscura h[ija] de Domingo na[tura][l] de Cosamaluapa M. ojos grandes cari ancha…………………………………………………. 21	Alistada yden
Nota A esta se le dio liz[enci][a] para que pasase a Veracruz por el […][te] de la plaza en 15 de Maio.	
Leonarda Raphaela h[ija] de la antece- dente……………………………………………….. 4	Alistada yden
Maria Antonia Lopez h[ija] de Joseph [36] Alamida n[atura][l] de la Ysla del Carmen mu- ger de Lorenzo Justiniano Flores sol dado de ynfanteria de los que vinieron de refuerzo……………………… ………………20	Alisto el mes mo dia volunta riamente para benir con su mari do por cavesa de familia.
Maria Ribera muger lexitima de Sal bador Garcia Robles que paso de soldado con la yfanteria de el refuerzo	Alistada en d[ic]ha Veracruz en 15 de febrero de 1741 volun tariam[en][te] para ir con su marido por cabesa de familia.
Maria Anna de Rubles h[ija] lexibima del antecedente	Alistado el mes media.

[f. 10r]

[36] Nota
Fallecio en

Real Lista
De raciones solas que se distribuien
e[n] los sujetos siguientes.

Ysla de S[an][ta] Rosa
1[o] de Abril 1741

Juan Thomas esclabo de S.M.

Juan de Ribera esclabo de S.M.

Rita Fecundina de la Cruz

Antonio de Cuellar

Juan Andres Turbal

Pedro Antonio Trejo

Bartholeme Thomas Gutierres

Bern[ar][do] Julian Trejo

Nota
Uso de liz[enci][a] el 15 de Maio de
1742 fue racionado para 2
meses p[ar][a] su viaje

Joseph Turbal

Miguel de Cuellar

[f. 10v]

Juana Chucuta
Fallezio

Nicolasa Lorensa de la Cruz

D[o][n] Thomas de Escobar

D[o][n] Antonio Alegre

Se le anoto la plaz[a]
de racion en 11 de
Julio. Se le dio r[a]
zion para un mes por
pasar a la Havana

Angela de Siliz

Sevastian Chinpan

Visente Gutierres

Antonio Tolentino

Margarita de Espinosa

D[oñ]ª Mathea de Escobar

Maria Anna de Torres

Fran[cis]ᶜᵒ de Torres

[f. 11r]

Micaela Fragales

Lino Joseph de Cardenas

Antonia de Cuellar

ojo D[o]ⁿ Bernardo de Buscarons

Nota
Uso de liz[enci]ª el 15 de Maio
de 1742 fue racionado con
los viveres para 2 meses.

Juan Timoteo de Campos

D[oñ]ª Maria Luisa Buscarons

Usso de liz[enci]ª en 25 de Sep[tiemb]ʳᵉ y fue rrazionado
hasta 30 de Oct[ub]ʳᵉ de 1744 a[ño]ˢ.

D[o]ⁿ Fran[cis]ᶜᵒ de Escobar

D[o]ⁿ Juan Antonio Polanco

Nota
Uso de liz[enci]ª en 15 de Ma
yo de 1742 fue racionado

con 2 meses de viv[ere]s p[ar]a su v[ia]je.

Juan Bap[tis]ta Rolando
Nota
Uso de liz[enci]a como el ante
cedente.

Joachin Joseph
Nota
Uso de liz[enci]a ydem

D[o]n Man[ue]l de Marchena
Nota
Uso de liz[enci]a ydem

[f. 11v]

ojo D[o]n Man[ue]l Sanchez
Nota
Uso de liz[enci]a ydem

ojo +P Jazinto Lopez

+P Jazinto de Yta

+P Jazinto Maldonado

+P Jazinto de Aguilar
Nota
Uso de liz[enci]a el dia 9 de Marzo
de 1743 con su amo.

Maria Anna Rosel

Maria Fran[cis]ca Fragales

Josepha Perez

Josepha Guerrero

Nota
Que en 27 de Junio de 1743
se le anoto esta racion por
decreto del com[andan]te.

D[o][n] Diego Ximenez
Nota
En 22 de Mayo de 1743
se le suspendio la racion
por haver pas[a][do] su p[adr]e a la
nueba españa.

Man[ue][l] de Torres
Nota
En prim[er][o] de Marzo de [1]743 se le
suspendio la raz[i][on].

[f. 12r]
Rosalia de los Santos
goza raz[i]on para dispociz[i][on] del
Gov[ernad][or] de esta plaza desde
[…] de octu[br][e] 1741

Jua[n]a Almonasi

Man[ue][l] de Jesus

Miguel Perez hijo del d[ic]ho

Santos de la Cruz hijo del d[ic]ho

Fran[cis][ca] Velasco

Maria de los Dolores

Getrudiz de la Cruz

Juan Blanco
Nota
Por decreto del s[eñ][or] com[andan][te]
Se le anota la razion
en 28 de Junio del 1743
por haver usado de liz[enci][a]

Blas Suares
Se le anoto la racion
en 11 de Julio por pa
sar con sus padres a
la Havana y esta

racionado para esta
semana hasta los a 13
mas se le dio un mes de
racion para el viaje.

Fran[cis][co] de Paduci Suares
Ydem

[f. 12v]

Benito Suarez Ydem

Juana Suarez Ydem

Manuela Suarez Ydem

Esteban Suarez Ydem

ojo Claudio Antonio
Perzive racion este y
Los de que se siguen desde
17 de Junio 1742

Usso de l[icenci][a] en 25 de Sep[tiemb][re] y fue raz[iona][do] hasta 30 de Oct[ub][re].
Juan Baup[tis][ta]

Antonio Joseph

ojo Pedro Antonio

Nota
Deserto en 15 de Maio de 1743
desde cuio dia no tiene raz[i][on]

Nicolas Fran[cis][co]

Joseph Ni[c]olas

ojo P. Jaz[…]o Llerena
Goza raz[i][on] desde 1[o] de hen[er][o]
de [1]743.

D[o][n] Josepha Buscarons

Nota
Percibe racion y los tres que se le siguen desde 15 de Junio 1743.

[f. 13r]

D[o][n] Carlos Buscarons

Fran[cis][co] Joseph Michodel

Getrud[iz] Polanco

Luisa de Sotomaior

Por decreto del com[andan][te] se le formo este asiento para la raz[i][on] en 26 de Junio 1743 y corre desde el Domingo 30

Esteban de Sosa

Maria Ygnacia de Cuellar

Miguel Payan

Alexandro Debato

En 12 de Sep[tiemb][re] uso de liz[enci][a] y Fue rr[ac]ionad[o] hasta 30 de Oct[ub][re] 1744.

Josepha Dorotea Franc[isc][a]

S[e] le formo este asiento en 12 de Jullio 1743 por decreto del com[andan][te].

Micaela Ramos Yndia muger de
Antonio Ximenes Marinero

Se le formo este asiento en 12 de Jullio por disposicion del com[andan][te] 1743

Ana Vergara

Se le formo este asi
ento en 14 de 9^{e} de 1743
por disposicion de la
m^{te}.

Martin Reimundo Palomo

Se le formo asiento conteni
do en plaza de raz[io]n sola
en 13 de febrero de 1744
en virtud de memorial y
decreto da el proveido de
la mismo f[ec]ha.

Pablo Blancas
Usso de liz[enci]^{a} en de Sep[tiemb]^{re} de 1744 y
fue raz[iona]^{do} hasta 30 de octu[b]^{re}.

[f. 13v]
Carlos Cuellar
En 2 de sep[tiemb]^{re} de 1744 se le passo la plaza a la
de cavo de esquadra de la comp[ani]^{a} del comm[andan]^{te}
en virt[u]d del orden verbal de d[ic]ho s[eño]r de [e]ste dia

Se le hasistte razion
sola por hallarse assi
asentado en el quad[er]^{na}
de raziones desde 16
Febrero de 1744

Marzelo Fragales
En 1^{o} de sep[tiemb]re de 1744 se le formo al conthenido
d[e] plaza con el goze de raz[io]^{n} sola y a los catorse
que se […] siguen en virt[u]d de memoriales presen
tados y decrettos a ellos proveidos por el comm[andan]te
de [e]stta plaza.

Nicolassa Anzelmo

Mariano de Santta Maria
<u>Nota</u>
Fallezio el conthenido en 9 de dez[iemb]^{re}
de 1744 y esttava razionado hasta el 24
del mismo.

Franz[is]^{co} de Cuel[l]ar

[f. 14r]
D[o]^{n} Juan Baupra Yarza

D[o]^{n} Joseph de Yarza

Sevastian Maurizio

Juan Miguel

Rossalia de los Santos

[f. 14v]
Luis Joseph Negron

Joseph Morette

Juan Nicolas Casttillo

D[o]^{n} Manuel Buscarons

Joseph Antonio Sossa

Miguel Gueronimo

[f. 15r]

D[o]^{n} Pedro Angulo

En 2 de sep[tiemb]^{re} de 1744 se
le passo la plaza de Hav[an]a
a la de raz[io]^{n} sola en virt[u]^{d}
del ord[e]^{n} verbal del comm[andan]^{te}.

D[oñ]^{a} Maria Mazeda

Josepha de Angulo

Maria Franz[is]^{ca} del Barado

Fran[cis]^{za} Jetrudes Zapatta

En 10 de diz[iemb]re de
1744 se le passo digo
Se le anoto la plaza que go
zava en la comp[añí]a del co
m[andan]te en virt[u]d de su decreto
passandola a esta de raz[io]n
sola.

[f. 16r]
Listta
De los gastadores que han sido remitidos a es-
tte Precidio por el excel[entísi]mo Duque de la conquista
Virrey Gov[ernad]or y Capitan Gen[era]l de Nueba España
en el paquibot de S.M. la Bretaña y dos embar
caziones ma[r]chantas que empiesan a correr
sus raciones por lo que toca a mi cargo desde pri
mero de Abril de mil setez[ient]os quarenta y uno
y sigue.

				años
1.	Juan Rodriguez de Pineda			5
2.	Gaspar Joseph de Arteaga			5
3.	Joachin de Villegas		Paso a ser Artill[eri]o	6
4.	Fran[cis]co Corona	sin tiempo	ydem	0
5.	Joseph Zamora		Deserto en la va landra del rey del co m[an]do de villa panca	3
6.	Bonifacio Joseph de Fuentes			5
7.	Fran[cis]co Bohorques		Paso a soldado	6
8.	Manuel Joseph de Villalobos			4

Usso de liz[enci]a en 25 de sep[tiemb]re 1744 y fue raz[iona]do
hasta 30 de oct[ub]re

9.	Antonio Albares	3

Usso de liz[enci]a de en todo como el
anttezed[en]te

10. Mathias Antonio de Armenta 3

11. Fernando Cobarrubias 6

12. Man[ue]l Garcia y Obando Nota 4
Que fallecio en 2 de Sep[tiembr]e 1742

13. Raphael Visente de Mendoza 4

[f. 16v]

años de destierro

14. Phelipe Garcia español

15. Manuel de Bo[…]as

16. Juan Antonio Montaño paso a soldado

17. Manuel Osorio Nota 6
Que en 25 de Mayo 1743
se le concedio liz[enci]a para
la nueba españa por
tullido se le dio racion
para un mes.

Fallezio en 5 de hen[er]o 1745
y estaria raz[iona]do hast[a] 8 d[ic]ho

18. Xptobal de S[an]ta Anna Arias 4

19. Joseph Dionicio Ximenez 4

20. Sebastian de la Vega Nota 6
Deserto […] de oct[ubr]e 1743

21. Pedro Hernandez Nota 5
Que fallecio en el Hospital

22. Nicolas Caszares Nota 2
En 15 de Maio 1743 se le
concedio liz[enci]a por haver
cumplido el tiempo fue

		racionado p[ar]a un mes.	
23. D[o]n Manuel de Lucena		Nota En 28 de Junio se le anoto la razion que gozaba por pasar a la nueba espana.	4
24. Pedro Joseph de Aguilar			4
25. Nicolas Ramires		Nota Que fallecio en 25 de Julio 1742	2
26. Pedro de Lugo	Sin tiempo 2 años	Nota En 25 de Mayo 1743 se le concedio liz[enci]a para el Ariano no fue probeido para un mes de raciones.	
27. Juan Hernandez	sin tiempo		0
28. Joseph Antonio Camacho	sin t[iem]po	paso a servir a la Artilleria	0
29. Manuel Astudillo por 4 a[ño]s desde 6 de Oct[ubr]e 1740			4
30. Thoribio Sanchez	por el tiempo que el ant[ceden]te		4
31. Marcos Roxas	sin tiempo	Paso a servir a la Artill[eri]a	0
32. Juan Antonio de la Cruz fallecio en 15 de Hen[er]o de 1744	sin t[iem]po		2
33. Sebastian de Loredo	sin t[iem]po	Nota Se le concedio liz[enci]a en 25 de maio 1743 fue raciona do para un mes paso al Reyno.	2
34. Miguel Ger[o]nimo Moreno		Nota En 15 de Maio 1743 se le	2

		concedio liz[enci][a] para pasar al Reyno p[or] haver cump[li][do] fue racionado por un mes.	
35. Ma[n]uel Moreno		a este se le dio la liz[enci][a] como a el antecedente.	2
36. Fran[cis][co] Antonio		Nota Que se le dio su liz[enci][a] en 21 de Abril 1742 y paso a la nueba es paña con 60 dias de raz[ion].	2

[f. 17r]

			Años
37. Domingo Antonio			4
39. Florentino Matheo		Nota Que se le dio su liz[enci][a] en 21 de Abril de 1742 pa[ra] al Reyno	1
40. Miguel de Mendoza	sin t[iem]po	Paso a servir a la Artill[eri][a]	0
41. Domingo Sanchez Quintana			10
42. Lazaro Flores	sin t[iem]po		0
43. Juan Chaparro	sin t[iem]po	Nota Que se haogo en 13 de Abril de 1742	0
44. Pheliz Garcia	sin t[iem]po		0
45. Xptoval Asencio	sin t[iem]po bolbio a desertar en 16 de Oct[ubr][e] 1743 Deserto en 18 de Maio 1743		0
46. Joseph Joachin	sin t[iem]po		0
47. Antonio Joseph Yndio	sin t[iem]po		0

48. Blas Fran[cis]^{co}	sin t[iem]po	deserto	0
49. Juan Salbador	sin t[iem]po deserto en 16 de oct[ubr]^{e} 1743		0
50. Antonio de la Cruz	sin t[iem]po		0
51. Lucas Francisco	sin t[iem]po deserto en 16 de octt[ubr]^{e} 1743		0
52. Pedro Canchola	sin t[iem]po	Nota Que hiso fuga	0
53. Pablo Marcos	sin tiempo		0
54. Gregorio Marcos	sin t[iem]po	Deserto y murio en el camino	0
55. Dionicio de la Cruz	sin t[iem]po		0
56. Santo de la Cruz	sin t[iem]po	estte es la nota de havajo	0
	fallecio en 8 de nob[iembr]^{e} y estava raz[iona]^{do} hastta 15 del mismo.		
murio 57. Manuel Eusebio	sin t[iem]po		0
58. Gaspar Joseph Lobos	sin t[iem]po	[m]urio	0
59. Santiago Hernandez	sin t[iem]po		0

[f. 17v]

			Años
60. M[…]guel Manuel Esteban	sin t[iem]po	murio	0
61. Phelipe Garcia Delicado			4
62. Augustin Reynoso	deserto en 4 de feb[rer]^{o} y lo[…]atar^{n} la mov^{la}		5
63. Urbano Diego	sin t[iem]po		0
64. Juan Miguel	sin t[iem]po		0
65. Joseph Buzeta Bethelemita	Nota		2

Que se le dio [e]ste liz[enci]^{a}
en 25 de ag[os]^{ta} 174[2]

66. Juan Miguel Sanchez Usso de liz[enci]^{a} en 25 de se[ptiemb]re de 1744 3
y fue raz[iona]^{do} hasta […0] de oct[ub]^{re}

67. Matheo Fran[cis]^{co} Guerrero Dererto en […0] de sep[tiembr]^{e} 1743 5

68. Santiago de Aranda sin t[iem]po 0

69. Antonio de la Cruz Mulato sin t[iem]po deserto de d^{nad} en 29 de […] 0
ag[os]^{to} de 1744 y fue […]
jasta 19 de octu[br]^{e}.

70. Pedro de Alba Paso a servir 12
a la artill[eri]^{a}

71. Pedro de Roxas Villalobos Paso a servir 6
a soldado

72. Augustin de la Zerna Paso a soldado

72. Nicolas de Gasca por 8 a[ño]^{s} le corren desde Nota 8
29 de n[oviembr]^{e} del 1734 En 15 de Maio 1743 se le
concedio liz[enci]^{a} para q[ue] pase
a la nueba españa
por haver cump[li]^{do}
fue racionada para
un [m]es.

Los que existianen este precidio.

73. Man[ue]^{l} Pastrana Usso de lz[enci]^{a} en 25 de sep[tiemb]^{re} 1744
fue racionado hasta 30 de oct[ub]^{re}.

74. Joseph de la Rosa Paso a marinero
bolvio a forzado

75. Juan Joseph de Yturralde Paso a marinero
Murio

76. Antonio de los Santos

Diego Viz[en]^{te} desertor de S[a]^{n} Marcos de Avalache

Usso de liz[enci]a en 25 de sep[tiemb]re
1744 y fue raz[iona]do hasta 30 de oct[ub]re

Este año de 1742 en 7 de Abril
77. fue remitido por el gov[iernad]or y contador de

[f. 18r]

Años

Veracruz Gabriel Gutiereres Alias el Piojo por — 10

Deserto en 26 de sep[tiembr]e 1743

78. Joachin de Aguilar — que servir de soldado se le paso la plaza a gastador en 24 de jullio de 1742

79. Joseph de la Rosa — ojo

80. Pedro Juan Ponz

81. Pedro Burget — este y el que se sigue fueron remitidos por el Gov[ernad]or de V[er]a Cruz y se recivieron en 21 de hen[er]o de 1744

En 27 de junio de 1744
segun resetta del comm[andan]te
mejorevione thenerle
asignado al conthenido
Pedro Burguette 8rrs de
salario todas los dias el
que corre desde 9 de f[ebrer]o
de [e]ste pres[en]te año por las
razones que expressa.

82. Juan de Silba

Nota
En 21 de sep[tiemb]re de 1744 se le pa
so la plaza al conthen[i]do a la de
soldado en la comp[añí]a del cap[ita]n
[Do]n Nicolas Ximenez en
virt[u]d de hord[e]n verbal del com[andan]te.

83. Joachin de Aguilar, sirviendo estte la plaza de
marinero se le passo a estta de gastador en 27 de

junio de 1744 en virttud de rezetta del com[andan]te de la plaza de la misma f[ec]ha por el delitto que en ella expreza haver comettido de ladronizio no consta su causa ni t[ie]mpo por el cuia rezetta queda en los autos de rremision en estes archivos.

1744

Fueron remittidos por el governador y ofiz[iale]s r[eale]s de Veracruz diez forzados como consta del auto de su remizion su f[ec]ha 17 de julio de d[ic]ho año t[iem]po y delittos y son los siguienttes.

Gregorio Paulino por 9 años

Ha estte y a las nueve que se le sigun les corre su t[ie]mpo desde 15 de ag[os]to de 1744 añ[o]s

[f. 18v]

Jasinto Assenzio por 7 años

Eujenio Franz[is]co por 4 años

Juan J[ose]ph Ximenez por 4 años

Pedro Josseph de Olasco por 6 años

[f. 19r]

Juan de Dios por 8 años

Anttonio Joseph de Leon por 4 años

Juan de Figueroa por 6 años

Juan Antonio Gomez por 8 años

[f. 19v]

Don Juan J[ose]ph Ugaris a volantad de sus partes
En 2 de Sep[tiemb]re de 1744 se le passo la plaza
al conthenido a la de soldado en la comp[añí]a

del com[andan]te en virt[u]d de horden verbal de
d[ic]ho s[eño]r d[ic]ho dia desde el que goza sueldo.

Fran[cis]co Moreno desertor y forzado que se hallava
en San Marcos de Avalache no constt de t[ie]mpo se
le hassiste con la rraz[io]n desde 14 de sep[tiemb]re 1744

Franz[is]co Zepeda desertar yd[em] del fuertte de S[a]n
Marcos se le hassiste con la rraz[io]n desde 21 de oc[tub]re
de 1744 a[ño]

Fran[cis]co del Casttillo
Que en 10 de diz[iemb]re de 1744 se le passo la plaza
de soldado que servia en la comp[añí]a del com[andan]te
a la de gastador a rraz[io]n y sin sueldo por t[ie]mpo
de 10 años como consta de su nota en d[ic]ha
listta y a los d[eo]s que se siguen por el mismo
delitto servia en la comp[añí]a del cap[ita]n D[o]n Nicolas.

[f. 20r]
Franz[is]co Xavier de Espinosa soldado que
hera de la comp[añí]a del cap[ita]n D[o]n Nicolas Xim[ene]z
por t[ie]mpo de quattro años — sirve desde 10 de
diz[iemb]re de 1744

Leonardo Joseph Perea soldado que hera de la
comp[añí]a comm[andan]te por tiempo de d[eo]s años — sirve desde 10 de
diz[iemb]re de 1744

Fran[cis]co Hernandez soldado que hera de la
compañía del Cap[ita]n D[o]n Nicolas Ximenez por la
dron la condeno el r[eal]l comm[andan]te por quatro años — sirve desde 4 de
hen[er]o de 1745

APPENDIX B

MACROSCOPIC ATTRIBUTE DATA FOR THE TECHNOLOGICAL ANALYSIS

Table B.1. Baseline Macroscopic Attributes Included in the Technological Style Analysis

	Pottery	Sub-	Thick	Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	mm	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
03P0758024a	Dec NA	A1	7.67	1.2430	Sand	Occasion	Coarse	Hand	None	Scrape			
03P0865009a	Dec NA	B1	8.21	1.6693	Grog	Abundant	Coarse	Hand	Smooth		Reduce	None	Slow
03P1045023a	Dec NA	A2	7.62	1.4771	Grog	Frequent	Coarse	Hand	Burnish				
03P1120015a	Dec NA	A3	7.81	1.9031	Grog	Occasion	Coarse	Hand					
03P1339006a	Dec NA	A4	6.11	1.6021	Sand	Common	Fine/Med	Hand	None		Reduce	None	Slow
04P0251036a	Dec NA	A1	7.32	1.4771	Shell	Occasion	Fine/Med	Hand	Smooth				
04P0401002a	Dec NA	A5	7.45	1.6021	Sand	Occasion	Fine/Med	Hand	P. Burn		Reduce	Partial	Rapid
04P0820017a	Dec NA	A1	7.63	1.1644	Sand	Occasion	Coarse	Hand	P. Burn				
04P0867017a	Dec NA	A5	5.50	1.7267	Sand	Occasion	Fine/Med	Hand	P. Burn		Reduce	Partial	Rapid
04P1429010a	Dec NA	A6	6.15	1.2430	Sand	Frequent	Coarse	Hand		Smooth			
04P1432043a	Dec NA	B2	8.55	1.6532	Sand	Frequent	V. Coarse	Hand	P. Burn		Reduce	None	Slow
04P1447011a	Dec NA	B1	8.75	1.2430	Grog	Frequent	Coarse	Hand	Burnish		Reduce	None	Slow
04P1886010a	Dec NA	A7	7.78	1.2430	Grog	Occasion	Coarse	Hand	None		Reduce	Partial	Rapid
04P1924007a	Dec NA	A6	5.12	1.0969	Sand	Frequent	Coarse	Hand	None				
08M0007012a	Plain	A6	9.84	1.0969	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0007015a	Plain	A6	5.15	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape			
08M0011016a	Glazed		5.08	1.0969	Sand	Occasion	Fine/Med			Smooth			
08M0011025a	Plain	A6	6.57	1.2742	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0011025b	Plain	A1	5.82	1.3522	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0011028a	Glazed	A13	4.65	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0011031a	Glazed	A13	5.97	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0011039a	Plain	A1	5.27	1.0000	Sand	Occasion	Fine/Med	Hand	None	Smooth	Oxidize	Partial	Slow
08M0011040a	Plain	A1	7.50	1.1644	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0011049a	Glazed	A15	4.82	1.4771	Sand	Occasion	Fine/Med	Wheel			Oxidize	Full	
08M0012007a	Plain	A1	7.08	1.2742	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0012012a	Plain	A6	10.76	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0012016a	Slip/Pt	A9	9.25	1.3404	Calc	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0019001a	Glazed	A13	11.81	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0030011a	Plain	A6	8.49	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0030015a	Glazed	A13	7.40	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0030017a	Glazed	A13	5.15	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0030018a	Glazed	A11	6.63	1.0969	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0045019a	Plain	A11	3.28	1.9031	Sand		V. Fine	Hand	None	Smooth	Oxidize	Full	
08M0045021a	Plain	A15	4.05	1.9031	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0045023a	Glazed	A13	4.80	1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0045027a	Plain	A6	6.75	1.0969	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0045027b	Plain	A6	4.66	1.0969	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0052001a	Slip/Pt	A8	10.55	1.6693	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0053001a	Plain	A15	5.08	1.9542	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0053001b	Plain	A14	3.84	1.9542	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
08M0053002a	Plain	A14	4.38	1.9542	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
08M0053003a	Plain	A15	4.44	1.9542	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0054009a	Glazed	A16	8.19	1.3674	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Partial	Slow
08M0054010a	Plain	A6	7.93	1.6107	Sand	Common	Fine/Med	Hand	Smooth	None			
08M0057011a	Plain	A11	5.85	1.2742	Sand	Common	Coarse	Hand	None	Smooth	Oxidize	Full	
08M0057012a	Plain	B2	5.84		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
08M0057015a	Plain	A6	9.60	1.0969	Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
08M0059008a	Slip/Pt	A9	5.65	1.0000	Calc	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0062014a	Plain	A1	9.59	1.2742	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0062023a	Plain	A11	5.84	1.9542	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0063011a	Plain	A6	6.92	0.7959	Sand	Common	Fine/Med	Hand	P. Burn	Smooth			
08M0063011b	Plain	A6	6.15	1.3522	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0063012a	Glazed	A16	4.65	1.7267	Sand	Occasion	Fine/Med			Smooth			
08M0065036a	Glazed	A13	5.41	1.0969	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0065037a	Glazed	A13	4.96	1.0969	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0065038a	Glazed	A16	4.00	1.2430	Sand	Occasion	Fine/Med			Smooth			
08M0067035a	Slip/Pt	A9	10.80	1.0170	Sand	Common	V. Coarse	Hand	P. Burn	Smooth	Oxidize	Full	
08M0068001a	Glazed	A16	8.84	1.3096	Sand	Occasion	Fine/Med	Wheel	None	None			
08M0068024a	Glazed	A16	5.98	1.1173	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0068070a	Glazed	A13	4.77	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0068070b	Glazed	A1	8.48	1.1644	Sand	Occasion	Fine/Med	Hand	None	Smooth			
08M0068072a	Slip/Pt	A9	8.63	1.4200	Calc	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0068072b	Slip/Pt	A6	5.77	1.0000	Sand	Frequent	Fine/Med	Hand	None	Smooth	Oxidize	Partial	Slow
08M0131008a	Glazed		5.70	1.5441	Sand	Occasion	Fine/Med			Scrape			
08M0131008b	Glazed		4.97	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0131008c	Glazed		4.36	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0131008d	Glazed			1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0131009a	Plain		9.87	1.2430	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0131026a	Glazed		11.08	1.7782	Sand	Occasion	Fine/Med			Scrape	Oxidize	Partial	Slow
08M0162007a	Plain		5.44	1.2742	Sand	Frequent	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0162008a	Slip/Pt		6.88	1.1931	Sand	Frequent	Fine/Med	Wheel	P. Burn	None	Oxidize	Full	
08M0162010a	Slip/Pt		9.70	1.1761	Sand	Abundant	Coarse	Hand	P. Burn	Smooth			
08M0162018a	Plain		5.58	1.3522	Sand	Common	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0162019a	Plain		6.28	1.7202	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0163008a	Plain	A8	11.47	1.5441	Sand	Occasion	Coarse	Hand	Smooth		Oxidize	Full	
08M0163008b	Plain	A6	7.53	1.4200	Sand	Common	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0163008c	Plain	A6	6.41	1.4200	Sand	Common	Coarse			Smooth			
08M0163008d	Plain	A6	7.30	1.0969	Sand		V. Fine				Oxidize	Partial	Slow
08M0163008e	Plain	A11	6.09	1.7782	Sand	Frequent	V. Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0163008f	Plain		5.34		Sand	Common	Coarse	Hand	None				
08M0163008g	Plain	A1	9.58	1.0969	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0163008h	Glazed	A11	6.27	1.3979	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
08M0163008i	Plain	A6	6.12	1.4200	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0163008j	Plain	A11	5.29	1.6693	Sand	Frequent	Fine/Med	Hand	Scrape	P. Burn	Oxidize	Full	
08M0163013a	Plain	A11	9.58	1.1761	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0163025a	Glazed	A1	5.47	1.0000	Sand	Occasion	Fine/Med		Smooth	Scrape			
08M0163026a	Plain	A11	5.56	1.3522	Sand	Abundant	Coarse	Hand	Scrape	Smooth	Oxidize	Full	
08M0163027a	Glazed	A15	5.92	1.0374	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0163030a	Slip/Pt	A8	7.55	1.9031	Sand	Occasion	Fine/Med	Hand	Scrape		Oxidize	Full	
08M0165011a	Slip/Pt		13.28	1.5441	Sand	Abundant	V. Coarse	Hand	Smooth		Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0165016a	Plain		7.39	1.5441	Sand	Frequent	Fine/Med	Wheel	None	Scrape	Oxidize	Partial	Slow
08M0165016b	Plain		6.81	1.1761	Sand	Frequent	Fine/Med	Hand	Smooth		Oxidize	Full	
08M0165019a	Plain		6.06	1.9031	Sand	Occasion	Fine/Med	Hand	Scrape	P. Burn	Oxidize	Full	
08M0168001a	Plain	A15	3.58	1.9542	Sand	Occasion	Fine/Med		None		Oxidize	Full	
08M0168010a	Plain	A15		1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0171003a	Slip/Pt	A1	4.37	1.7267	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0171004a	Plain	A6	8.84	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0171004b	Plain	A6	6.45	1.2430	Sand	Common	V. Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0171009a	Glazed	B3	6.78	1.0969	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
08M0171012a	Plain	A6	6.53	1.6693	Sand	Common	V. Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
08M0171012b	Plain	A6	6.56	1.6693	Sand	Common	V. Coarse	Hand	Scrape	Scrape			
08M0171012c	Plain	A6	6.05	1.4771	Sand	Common	Coarse	Hand	Smooth	Scrape			
08M0171012d	Plain	A6	6.12	1.4857	Sand	Frequent	Coarse				Oxidize	Partial	Slow
08M0171013a	Plain	A8	4.73	1.9031	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0171014a	Plain	A11	9.94	1.6693	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0171014b	Plain	A14	4.04	1.3979	Sand	Frequent	Fine/Med				Oxidize	Full	
08M0171014c	Plain	A11	12.19	1.9031	Sand	Frequent	Fine/Med	Hand	P. Burn		Oxidize	Full	
08M0171014d	Plain	A11	3.06		Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Full	
08M0171014e	Plain	A6	5.31	1.6693	Sand	Common	Coarse				Oxidize	Partial	Slow
08M0171014f	Plain	A8	4.35	1.9031	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0171016a	Glazed	A16	4.96		Sand	Frequent	Fine/Med			None			
08M0171016b	Glazed	A13	4.75	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0171016c	Glazed	A13	5.71	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0171016d	Glazed	A16	4.09		Sand	Occasion	Fine/Med			None			
08M0171016e	Glazed		5.90	1.0170	Sand	Occasion	Fine/Med						
08M0171017a	Plain	A9	9.93	1.4200	Sand	Frequent	V. Coarse	Hand	Burnish		Oxidize	Full	
08M0171020a	Plain	A11	10.20	1.7202	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0171027a	Plain	A11	7.79		Sand	Frequent	Fine/Med	Hand	P. Burn	None	Oxidize	Full	
08M0172014a	Plain	A6	7.13	1.0969	Sand	Common	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0172014b	Plain	A6	6.45	1.1644	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0172015a	Glazed	A13	5.08	1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0176009a	Glazed		5.30	1.6693	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0176009b	Glazed		3.99	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0176013a	Plain		6.31	1.4200	Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Full	
08M0176013b	Plain		4.80	1.7267	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0176015a	Glazed		4.58	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0192007a	Plain	A6	8.87	1.6021	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0192008a	Plain	A6	6.80	1.2430	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0192008b	Plain	A6	8.41	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0192016a	Plain	A1	7.57	1.0969	Sand	Occasion	Fine/Med				Oxidize	Partial	Slow
08M0192023a	Glazed	A13	6.56	1.0000	Sand	Occasion	Fine/Med			Scrape	Oxidize	Full	
08M0193007a	Plain	A6	6.42	1.6021	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193008a	Plain	A6	11.09	1.1644	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009a	Plain	A6	10.03	1.1644	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009b	Plain	A6	5.85	1.3404	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009c	Plain	A6	5.29	1.4771	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009d	Plain	A6	7.16	1.1644	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009e	Plain	A6	4.81	1.3979	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009f	Plain	A6	5.38	1.1644	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009g	Plain	A6	7.90	1.0682	Sand	Common	Coarse	Hand	Smooth	Scrape			
08M0193009h	Plain	A6	6.26	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009i	Plain	A6	7.29	1.4771	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0193009j	Plain	A6	4.67	1.1644	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193009k	Plain	A6	6.71	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth			
08M0193009l	Plain	A6	6.07	1.4771	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0193009m	Plain	A8	5.93	1.5441	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0193009n	Plain	A6	4.78	1.4200	Sand	Frequent	Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0193009o	Plain	A6	4.43	1.4857	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193011a	Slip/Pt	A8	4.48		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Full	
08M0193012a	Plain	A11	7.53	1.3404	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0193015a	Plain	A11	10.35	1.5224	Sand	Frequent	Fine/Med	Hand	Scrape	Smooth	Oxidize	Full	
08M0193020a	Plain	A8	9.00		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0193020b	Plain	A1	5.05	1.4771	Sand	Occasion	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0193022a	Plain	A1	6.95	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0193022b	Plain	A5	5.58	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
08M0193022c	Plain		5.52	1.1644	Sand	Occasion	Fine/Med	Hand	None	None	Reduce	Partial	Rapid
08M0193022d	Plain		5.88	1.4200	Sand	Occasion	Fine/Med	Hand	None	None	Reduce	Partial	Rapid
08M0193022e	Plain		4.95	1.4200	Sand	Occasion	Fine/Med	Hand	Scrape	None	Reduce	Partial	Rapid
08M0193022f	Plain		5.00	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	None	Reduce	Partial	Rapid
08M0193023a	Glazed	B7	7.16		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
08M0193023b	Glazed	A13	6.66	1.1644	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0193023c	Glazed	A8	5.44	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0193023d	Glazed	A8	6.01	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0193023e	Glazed	A5	4.95	1.1761	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Slow
08M0193023f	Glazed	A8	6.67	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0193023g	Glazed	A8	5.42	1.1173	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0193023h	Glazed	B7	5.25		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
08M0193023i	Glazed	A13	4.53	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0193023j	Glazed	A15	6.80	1.2430	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0193023k	Glazed	A13	5.33	1.2430	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0193023l	Glazed	A14	5.14	1.2430	Sand	Frequent	Fine/Med			None	Oxidize	Full	
08M0193024a	Glazed	A14	4.82	1.1644	Sand		V. Fine	Wheel		None	Oxidize	Full	
08M0193024b	Glazed		5.73	1.4200	Sand		V. Fine			Smooth			
08M0193025a	Slip/Pt	A1	6.14	1.3404	Sand	Occasion	Fine/Med	Hand		Smooth	Oxidize	Partial	Slow
08M0193025b	Slip/Pt	A11	6.07	1.3404	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0193026a	Slip/Pt	A8	4.81	1.7782	Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Oxidize	Full	
08M0193026b	Plain	A13	4.60	1.3979	Sand	Occasion	Fine/Med		Burnish	Burnish	Oxidize	Full	
08M0193026c	Slip/Pt	A8	5.31	1.7202	Calc	Occasion	Fine/Med	Hand	Smooth	Burnish	Oxidize	Full	
08M0193034a	Plain	A6	10.12	1.4200	Sand	Common	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0202012a	Plain	A6	6.67	1.1173	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0205004a	Plain	A8	6.67	1.0170	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0205006a	Plain	A13	3.26	1.4200	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0205006b	Plain	A11	4.45	1.1173	Sand	Common	V. Coarse	Hand	Scrape	Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0205006c	Plain	A11	6.65	1.4200	Sand	Common	Fine/Med	Hand	Smooth		Oxidize	Full	
08M0205006d	Plain	A11	5.81	1.4200	Calc	Common	Fine/Med	Hand	None	Scrape	Oxidize	Full	
08M0205006e	Plain	A6	4.43	1.2742	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0205007a	Plain	A6	6.66	1.0682	Calc	Common	Coarse	Hand	Smooth	None			
08M0205009a	Glazed	A8	4.77	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0215007a	Plain		6.98	1.4200	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0215007b	Plain		8.12	1.6021	Sand	Occasion	V. Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0215007c	Plain		5.37	1.2430	Sand	Frequent	Coarse	Hand	Scrape	Scrape			
08M0215007d	Plain		6.75	1.5441	Sand	Common	Coarse	Hand	None				
08M0215007e	Plain		7.46	1.6693	Sand	Occasion	Fine/Med	Hand		None	Oxidize	Full	
08M0215007f	Plain		5.34	1.5441	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
08M0215007g	Plain		4.96	1.2430	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0215007h	Plain		5.00	1.5441	Sand	Common	V. Coarse	Hand	Smooth	Smooth			
08M0215007i	Plain		10.19	1.4200	Sand	Frequent	Coarse	Hand	Smooth		Oxidize	Partial	Slow
08M0215007j	Plain		7.03	1.2742	Sand	Common	Fine/Med	Hand	None	Scrape			
08M0215007k	Plain		7.79	0.8261	Sand	Common	Fine/Med	Hand	None				
08M0215007l	Plain		8.57	1.2742	Sand	Frequent	Coarse	Hand	Smooth		Oxidize	Partial	Slow
08M0215007m	Plain		8.13	1.5441	Sand	Common	Fine/Med	Hand	Scrape	None	Oxidize	Full	
08M0215029a	Slip/Pt		3.95	1.5224	Calc	Frequent	Coarse	Hand	Smooth	Burnish	Oxidize	Full	
08M0215031a	Glazed		4.64	1.2430	Sand	Common	Fine/Med			Scrape	Oxidize	Full	
08M0215031b	Glazed		4.94	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth			
08M0215032a	Slip/Pt		4.50	1.6693	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0215033a	Glazed		11.90	2.3010	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0215033b	Glazed		6.20	1.4771	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0215038a	Glazed		4.90	1.5441	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0215038b	Glazed		5.41	1.1761	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0215038c	Glazed		4.75	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0215038d	Glazed		6.52	1.2742	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
08M0215038e	Glazed		6.48	1.4200	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
08M0215038f	Glazed		4.25	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape			
08M0215038g	Glazed		4.11	1.0969	Sand	Frequent	Fine/Med			Scrape	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0215038h	Glazed		6.55	1.3979	Calc	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0215038i	Glazed		6.16	1.0170	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0215038j	Glazed		4.21	1.4771	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Full	
08M0215038k	Glazed		6.50	1.1761	Calc	Occasion	Fine/Med	Hand	Smooth	Scrape			
08M0215038l	Glazed		5.59	1.0374	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
08M0215038m	Glazed		5.91	1.0531	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0215038n	Glazed		6.07	1.1931	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Partial	Slow
08M0215038o	Glazed		5.05	1.2430	Sand	Occasion	Fine/Med			Scrape			
08M0215038p	Glazed		6.58	1.4200	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
08M0215038r	Glazed		4.89	1.6021	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Partial	Slow
08M0215038s	Glazed		3.63	1.5441	Sand	Occasion	Fine/Med	Wheel					
08M0215051a	Plain		3.47	1.9031	Sand		V. Fine		None	None	Oxidize	Full	
08M0215051b	Plain		3.85	1.9031	Sand		V. Fine				Oxidize	Full	
08M0215052a	Plain		2.96	1.6693	Sand	Occasion	Fine/Med	Hand	None	Smooth	Oxidize	Full	
08M0215060a	Slip/Pt		6.93		Sand	Common	Fine/Med	Hand	P. Burn		Reduce	None	Slow
08M0215060b	Slip/Pt		13.11	0.9191	Sand	Common	V. Coarse	Hand	Smooth				
08M0215062a	Plain		9.12	1.3522	Sand	Frequent	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0215068a	Plain			1.0969	Sand	Frequent	Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
08M0217010a	Plain		8.89	0.9731	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0217011a	Glazed			1.4857	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0217013a	Glazed		5.83	1.2742	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
08M0217017a	Plain		4.45	2.2041	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0359011a	Glazed		4.24	1.5441	Sand	Occasion	Fine/Med			Scrape	Oxidize	Full	
08M0361005a	Glazed		4.92	0.8261	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0361006a	Plain		4.63	1.0969	Sand		V. Fine				Oxidize	Full	
08M0361006b	Plain				Sand	Occasion	Fine/Med	Hand	None		Reduce	None	Slow
08M0361007a	Slip/Pt		3.30			Rare		Hand	Burnish	Smooth	Oxidize	Full	
08M0365003a	Plain	A6	9.67	1.1644	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0365003b	Plain	A6	4.47	1.3404	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0365004a	Glazed	A8	6.18	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0365007a	Plain	A8	8.36	1.1644	Sand	Occasion	Coarse	Wheel	None	Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0365008a	Glazed	A13	3.81	1.2742	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0365018a	Plain	A6	4.84	1.5441	Sand	Frequent	Coarse	Hand	Smooth	Scrape			
08M0365018b	Plain	A8	7.56	1.6107	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Full	
08M0365019a	Plain	A11	15.47	1.2430	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0365021a	Plain	A9	6.31	0.9191	Calc	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0365022a	Slip/Pt	A11	8.65	1.0969	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Full	
08M0365026a	Glazed	A13	4.14	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0365028a	Plain	A6	10.19	1.3522	Sand	Frequent	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0365029a	Plain	A6	15.55	1.0969	Sand	Frequent	Coarse			Scrape			
08M0366002a	Glazed		5.84	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0366004a	Glazed		6.35	1.5441	Sand	Occasion	Fine/Med			Scrape			
08M0366005a	Plain		8.29	1.4771	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0389007a	Plain	A15	5.97	1.5441	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0389012a	Plain	A9	7.27	1.1761	Sand	Abundant	V. Coarse	Hand	Smooth		Oxidize	Full	
08M0389016a	Plain	A14	3.28	1.6990	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
08M0412002a	Glazed	A13	6.47	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0412002b	Glazed	A13	4.00	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0412002c	Glazed	A13	4.03	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0412002d	Glazed	A1	5.44	1.4200	Sand	Occasion	Fine/Med	Hand	Scrape	Scrape			
08M0412002e	Glazed	A15	7.88	1.2430	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0412007a	Plain	A1	5.69	1.6693	Sand	Occasion	Fine/Med	Hand			Oxidize	Partial	Slow
08M0412007b	Plain	A11	6.05	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0412010a	Plain	A11	5.91	1.5441	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0412014a	Plain	A6	7.40		Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0412014b	Plain	A6	9.97	1.3522	Sand	Frequent	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0412014c	Plain	A6	9.91	1.4771	Sand	Frequent	Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
08M0412017a	Slip/Pt	A11	4.45	2.2041	Sand		V. Fine	Hand	Burnish	P. Burn	Oxidize	Full	
08M0412026a	Plain	A8	2.59	1.9031	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0414002a	Glazed	A13	5.40	1.7267	Sand	Occasion	Fine/Med			Scrape	Oxidize	Full	
08M0414005a	Glazed	A8	5.13	1.1644	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0426019a	Glazed	A8	6.94	1.4771	Sand	Occasion	Fine/Med	Hand	Scrape	Smooth	Oxidize	Full	

	Pottery	Sub-	Thick	Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	mm	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
08M0426019b	Glazed	A11	5.84	1.4771	Sand	Frequent	Fine/Med	Hand	Scrape	Scrape	Oxidize	Full	
08M0426019c	Glazed	A15	3.81	1.5441	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0426019d	Glazed	A8	6.62	1.4200	Sand	Occasion	Fine/Med	Hand	Scrape	Scrape	Oxidize	Full	
08M0426019e	Glazed	A13	5.90	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0426019f	Glazed	A13	3.59	1.4771	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0426021a	Slip/Pt	B6	4.36		Calc	Frequent	Fine/Med	Hand	Smooth	Burnish	Reduce	None	Slow
08M0426022a	Plain	A6	7.66	1.0969	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0426022b	Plain	A6	7.24	1.4200	Sand	Frequent	Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
08M0426022c	Plain	A6	7.26	1.1761	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0426023a	Slip/Pt	A15	11.55	1.2742	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0426024a	Glazed	A15	6.77	1.2430	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0426027a	Plain	A6	6.67	1.4200	Sand	Frequent	Coarse	Wheel	None	None	Oxidize	Partial	Slow
08M0426027b	Plain	B2	7.43		Sand	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
08M0426028a	Glazed	A11	7.35	1.0969	Sand	Frequent	Fine/Med			Scrape	Oxidize	Full	
08M0426029a	Plain	A6	8.58	1.2742	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0427009a	Plain	A8	7.68	1.6693	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0427009c	Plain	B2	6.53	1.1761	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Reduce	None	Slow
08M0427017a	Plain	A6	10.39	1.6693	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0427018a	Plain	A6	9.44	1.4857	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0427026a	Glazed	A11	6.03	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0427026b	Glazed	A8	6.53	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0427030a	Plain	A6	9.91	0.9191	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0427032a	Glazed	A11	5.47	1.1644	Sand	Frequent	Fine/Med			Scrape	Oxidize	Full	
08M0427032b	Glazed	A8	5.45	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0428024a	Glazed	A1	6.41	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth			
08M0428038a	Plain	A6	8.77	1.3522	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0428038b	Plain	A1	9.31	1.0969	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0428038c	Plain	A6	8.02	1.3522	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0430008a	Plain	A1	8.31	1.4771	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0430009a	Plain	A6	9.69	1.2742	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0431012a	Plain	A3	8.41	1.4200	Calc	Occasion	Coarse	Hand	Smooth				

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0431028a	Plain	A1	6.70	0.9731	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0431033a	Glazed	A16	7.91	1.4200	Sand	Occasion	Fine/Med	Wheel		None			
08M0433004a	Glazed	A1	4.00	1.1644	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape			
08M0434009a	Plain	A8	5.39	1.4654	Sand	Occasion	Coarse	Hand	None	Smooth	Oxidize	Full	
08M0435015a	Plain	A8	3.51	1.9542	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0435021a	Plain	A1	7.20	1.5441	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0435022a	Plain	A8	6.71	1.0969	Sand	Occasion	Coarse	Hand	Smooth	Burnish	Oxidize	Full	
08M0436006a	Plain	A6	8.39	1.2742	Sand	Frequent	Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0437009a	Glazed	A13	7.21	1.1644	Sand	Occasion	Fine/Med			Scrape	Oxidize	Full	
08M0437013a	Slip/Pt	A15	5.32	1.4771	Sand	Occasion	Fine/Med	Wheel	None	P. Burn	Oxidize	Full	
08M0437014a	Plain	A6	9.56	1.8451	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0437019a	Glazed	A13	11.17	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0437021a	Plain	B2	8.59	1.0969	Sand	Common	Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
08M0437021b	Plain	A6	8.92	1.9031	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape			
08M0437021c	Plain	B2	5.74		Sand	Frequent	Coarse	Hand	None	Smooth	Reduce	None	Slow
08M0437048a	Glazed	A1	6.84	1.4771	Sand	Occasion	Fine/Med	Hand	Scrape	Scrape			
08M0437052a	Slip/Pt	A6	6.45	1.6021	Calc	Common	Fine/Med	Hand	Smooth	P. Burn			
08M0437054a	Glazed	A16	5.55	1.2430	Sand	Occasion	Fine/Med	Wheel		None			
08M0437076a	Plain	A6	10.20	1.9031	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0441002a	Glazed	A6	5.97	1.4857	Sand	Frequent	Fine/Med		Smooth	Smooth			
08M0441003a	Glazed	A13	8.26	1.0682	Sand	Occasion	Fine/Med			Scrape	Oxidize	Full	
08M0441011a	Glazed	A1	4.82	1.4857	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
08M0441013a	Plain	A8	8.08	1.6693	Sand	Occasion	Coarse	Hand	None	Smooth	Oxidize	Full	
08M0441014a	Plain	A1	7.74	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth			
08M0441015a	Plain	A1	6.10	1.6693	Sand	Occasion	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0441031a	Plain	A8	12.67	1.0969	Sand	Occasion	Coarse	Hand	Scrape	Smooth	Oxidize	Full	
08M0443024a	Plain	A6	9.65	1.8451	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0443025a	Plain	A1	8.66	1.5441	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0443029a	Slip/Pt	A9	9.44	1.3522	Sand	Common	V. Coarse	Hand	P. Burn	Burnish	Oxidize	Full	
08M0443032a	Plain	B2	10.37		Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
08M0444029a	Glazed	A16	4.89	1.5441	Sand	Occasion	Fine/Med			Scrape			

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Abundance	Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0444031a	Slip/Pt	A3	6.26	1.9031	Calc	Occasion	Coarse	Hand	Burnish	Smooth	Oxidize	Partial	Slow
08M0444034a	Plain	B2	6.80		Sand	Frequent	Coarse	Hand	Smooth	Scrape	Reduce	None	Slow
08M0444058a	Plain	A6	7.83	1.4771	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0444059a	Plain	A1	7.42	1.6021	Sand	Occasion	Fine/Med	Hand	Scrape	None			
08M0444061a	Slip/Pt	A11	10.91	1.0000	Sand	Frequent	Coarse	Hand		None	Oxidize	Full	
08M0459006a	Glazed	A1	6.99	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0462002a	Glazed	A8	6.02	1.3404	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0463023a	Plain	A11	2.89	1.7267	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0463028a	Glazed	A13	6.41	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0463035a	Slip/Pt	A5	6.62	1.1761	Sand	Occasion	Fine/Med	Hand	Scrape		Reduce	Partial	Rapid
08M0464020a	Plain	A6	9.05	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0464020b	Plain	A6	5.84	1.4771	Sand	Frequent	Fine/Med	Hand	Smooth	NA	Oxidize	Partial	Slow
08M0465019a	Glazed	A15	4.33	1.5441	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0465031a	Plain		5.56		Sand	Frequent	Fine/Med			Smooth			
08M0465033a	Plain	A1	9.51	1.6693	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0466009a	Plain	A15	4.20	1.9542	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0466010a	Slip/Pt	A6	9.26	1.0682	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0466012a	Plain	A6	7.66	1.7267	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0466033a	Glazed	A6	6.53	1.5441	Calc	Frequent	Fine/Med		Smooth		Oxidize	Partial	Slow
08M0466039a	Plain	A6	6.60	1.0000	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0471013a	Glazed	A8	6.64	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0471014a	Plain	A6	7.39	1.1644	Sand	Common	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0471014b	Plain	A1	9.15	1.4200	Calc	Frequent	Fine/Med	Wheel	None		Oxidize	Partial	Slow
08M0471014c	Plain	A11	9.74	1.0969	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0471016a	Glazed	A11	5.32	1.2430	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0471021a	Plain	A6	10.32	1.3522	Sand	Frequent	Coarse	Hand	Smooth	Smooth			
08M0472006a	Glazed	A11	6.89	1.4200	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
08M0473004a	Slip/Pt	A6	8.49	1.7267	Sand		V. Fine	Hand		P. Burn	Oxidize	Partial	Slow
08M0473006a	Plain		10.02		Sand	Occasion	Fine/Med	Hand	None		Reduce	None	Slow
08M0473007a	Plain	B2	5.87	1.0531	Sand	Frequent	Fine/Med	Hand	Scrape	Scrape	Reduce	None	Slow
08M0473008a	Plain	A11	5.12	1.4771	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0473008b	Plain	A6	8.23	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0473018a	Plain	A1	8.67	1.6021	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0473024a	Plain	A14	5.07	1.9542	Sand		V. Fine	Wheel	None		Oxidize	Full	
08M0473024b	Plain	A15	3.30	1.9542	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0473024c	Plain	A11	3.45	1.9542	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0473024d	Plain	A11	4.00	1.9542	Sand		V. Fine	Hand	Smooth	None	Oxidize	Full	
08M0473026a	Slip/Pt	A6	8.06	1.1644	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0473048a	Slip/Pt	A1	5.12	1.0969	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Partial	Slow
08M0477001a	Glazed	A16	4.37	0.8921	Sand	Occasion	Fine/Med	Wheel	None				
08M0477002a	Glazed	A1	8.52	1.0969	Sand	Occasion	Fine/Med		Smooth	Smooth			
08M0477008a	Plain	A6	6.08	1.0969	Sand	Frequent	Fine/Med	Hand	Scrape	Scrape			
08M0477008b	Plain	A6	6.98	1.0969	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0477008c	Slip/Pt	A6	7.51	0.9731	Sand	Abundant	Coarse	Hand	Smooth	Smooth			
08M0477012a	Glazed	A15	13.12	1.1644	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0477015a	Glazed	A16	7.67	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
08M0477016a	Glazed	A16	7.60	1.4771	Sand	Occasion	Fine/Med			Smooth			
08M0477017a	Glazed	A1	9.79	1.2430	Sand	Occasion	Coarse		Smooth	Smooth	Oxidize	Partial	Slow
08M0477037a	Slip/Pt	A9	6.91	1.3010	Calc	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0477049a	Plain	A6	5.66	1.2430	Calc	Frequent	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0477052a	Plain	A6	6.74	1.7267	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0477054a	Slip/Pt	A1	8.85	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape			
08M0477056a	Plain	A8	3.60	1.9542	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0477056b	Plain	A8	4.94	1.9542	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0477056c	Plain	A8	3.94	1.9542	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0477138a	Slip/Pt	A6	9.03	1.4200	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0478018a	Glazed	A1	6.01	1.3522	Sand	Occasion	Fine/Med		Smooth	Smooth			
08M0478019a	Glazed	A15	6.01	1.2742	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0478028a	Glazed	A8	6.65	1.0969	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Full	
08M0478032a	Plain	A6	5.44		Sand	Frequent	Fine/Med	Hand	Smooth	None			
08M0478032b	Plain	A6	6.58	1.0531	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0478035a	Plain	A1	4.73	1.0969	Sand	Occasion	Fine/Med	Hand	Scrape	None	Oxidize	Partial	Slow

	Pottery	Sub-	Thick	Redness	Inclusion				Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	mm	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
08M0478044a	Plain	A6	9.47	1.0969	Sand	Frequent	Fine/Med	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0478044b	Plain	A4	8.12	1.0969	Sand	Frequent	Fine/Med	Hand	Scrape	Smooth	Reduce	Partial	Rapid
08M0478044c	Plain	A6	11.20	1.1761	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0478045a	Plain	A6	5.98	0.9191	Sand	Common	Fine/Med	Hand	Scrape	Scrape			
08M0479007a	Plain	A6	9.77	1.0000	Sand	Frequent	Fine/Med	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0479007b	Plain	A1	5.18	1.0000	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0482011a	Plain	A6	6.35	1.0000	Sand	Frequent	Fine/Med	Hand	None	Scrape	Oxidize	Partial	Slow
08M0486023a	Plain	A6	7.76	1.2742	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0486024a	Plain	A6	14.42	1.4200	Shell	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0486025a	Plain	A6	7.09	1.4771	Sand	Frequent	Fine/Med	Hand	Scrape	Smooth			
08M0486027a	Plain	A13	7.77	1.2430	Shell	Occasion	Fine/Med	Wheel	NA		Oxidize	Full	
08M0486028a	Plain	A11	4.18	1.0969	Sand	Common	Fine/Med	Hand	Scrape	Scrape	Oxidize	Full	
08M0486028b	Plain	A6	8.51	1.4771	Sand	Frequent	Fine/Med	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0486029a	Glazed	A8	6.41	1.3522	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0486034a	Slip/Pt	A8	2.66	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0486038a	Plain	A11	9.50	1.4200	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0486047a	Plain	A6	6.30	1.0969	Sand	Common	Coarse	Hand	Scrape	Scrape			
08M0486048a	Glazed	A6	6.38	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0486048b	Glazed	A6	4.83	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
08M0486048c	Glazed	A6	5.09	0.9191	Sand	Frequent	Fine/Med		Smooth	Smooth			
08M0486067a	Glazed	A14	7.08	0.7959	Sand	Common	Fine/Med				Oxidize	Full	
08M0486069a	Plain	A15	4.35	1.9542	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0486069b	Plain	A15	4.62	1.9542	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0486072a	Plain	A6	6.83	1.0000	Sand	Common	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0486077a	Plain	A8	7.48	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0488024a	Plain	A6	10.28	1.2430	Sand	Frequent	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0488031a	Plain	A9	6.08	1.5224	Calc	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0489001a	Glazed	A11	6.82	1.4200	Sand	Frequent	Fine/Med	Hand		None	Oxidize	Full	
08M0489002a	Glazed	A1	7.49	1.3522	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0489007a	Plain	A6	7.07	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0493015a	Plain	A6	8.85	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0493018a	Plain	A6	5.03		Sand	Frequent	Coarse	Hand	Smooth	Scrape			
08M0493031a	Plain	A15	4.22	1.9542	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0493031b	Plain	A15	4.81	1.6990	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0584001a	Plain		15.15	1.0969	Sand	Frequent	Fine/Med	Wheel	Smooth	Smooth	Oxidize	Partial	Slow
08M0595015a	Glazed		6.47	1.6693	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0595015b	Glazed		3.36	1.5441	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0595016a	Glazed		5.03	1.4771	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0595027a	Plain		7.47	1.6021	Calc	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0595029a	Plain		4.95	1.4200	Sand	Frequent	Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0601011a	Plain		7.22	1.4200	Sand	Occasion	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0601012a	Glazed		4.52	1.5441	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0601012b	Glazed		3.23	1.6693	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0601012c	Glazed		3.70	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613019a	Plain				Sand	Occasion	Coarse			Smooth			
08M0613077a	Glazed		2.96	1.0374	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0613078a	Glazed			1.4771	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0613092a	Plain		7.07	1.3979	Sand	Common	Fine/Med	Hand	None	None	Oxidize	Full	
08M0613092b	Plain		8.77	1.2742	Sand	Common	Fine/Med	Hand	None	None	Oxidize	Full	
08M0613109a	Plain		4.79	1.7267		Rare		Hand		None	Oxidize	Full	
08M0613129a	Plain		11.49	1.2742	Sand	Frequent	Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0613137a	Slip/Pt		6.53	1.3979	Calc	Frequent	Coarse	Hand	None		Oxidize	Full	
08M0613137b	Slip/Pt		5.39	1.4200	Calc	Frequent	Coarse	Hand	Smooth	P. Burn	Oxidize	Partial	Slow
08M0613138a	Glazed		6.14	1.4857	Sand	Frequent	Fine/Med	Hand		Smooth	Oxidize	Full	
08M0613138b	Glazed		6.55	0.9731	Sand	Occasion	Fine/Med		Smooth	Scrape	Reduce	Partial	Rapid
08M0613138c	Glazed		6.18	1.1644	Sand	Occasion	Fine/Med	Hand	None	Smooth	Oxidize	Partial	Slow
08M0613139a	Plain		5.08		Sand	Frequent	Coarse	Hand	Scrape	Scrape	Reduce	None	Slow
08M0613139b	Plain		7.33	1.8451	Sand	Occasion	Coarse	Hand	Smooth	Smooth			
08M0613139c	Plain		5.74	1.4857	Sand	Frequent	Coarse	Hand	Smooth	Scrape	Reduce	Partial	Rapid
08M0613140a	Glazed		7.03	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613140b	Glazed		5.15	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613140c	Glazed		4.26	1.4771	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Partial	Slow

	Pottery	Sub-	Thick	Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	mm	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
08M0613140d	Glazed		4.30	1.7202	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
08M0613140e	Glazed		3.87	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613140f	Glazed		3.90	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0613140g	Glazed		4.24	0.8921	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0613140h	Glazed		6.30	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613140i	Glazed		6.68	1.2430	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0613140j	Glazed		4.02	1.2430	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0613140k	Glazed		5.73	1.4771	Sand	Frequent	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0613140l	Glazed		6.04	1.2430	Sand	Occasion	V. Coarse	Hand	Scrape	Smooth	Oxidize	Full	
08M0613140m	Glazed		4.99	1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0613140n	Glazed		4.07	1.0969	Sand	Occasion	Fine/Med	Hand	Scrape		Oxidize	Full	
08M0613140o	Glazed		4.69		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
08M0613140p	Glazed		4.39	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0613140q	Glazed		4.09	1.4200	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0613141a	Slip/Pt		5.55	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0613141b	Plain		13.37	1.5441	Sand	Occasion	Coarse	Hand	Scrape	Smooth	Oxidize	Full	
08M0613141c	Plain		3.91	1.9542	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0613142a	Plain		18.23	1.0000	Sand	Occasion	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0613142b	Plain		8.28	1.3522	Sand	Common	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0613142c	Plain		8.05	1.0969	Sand	Common	Coarse	Hand	Scrape	None	Oxidize	Partial	Slow
08M0613142d	Plain		6.59	1.2742	Sand	Frequent	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0613142e	Plain		6.29	1.0969	Sand	Frequent	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0613142f	Plain		6.93	1.2742	Sand	Frequent	Coarse	Hand	Smooth		Oxidize	Partial	Slow
08M0613142g	Plain		7.71	1.1644	Sand	Occasion	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0613142h	Plain		10.90	1.1644	Sand	Frequent	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0613142i	Plain		6.75	1.4200	Sand	Occasion	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
08M0613142j	Slip/Pt		6.40	1.0000	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0613147a	Plain		7.49	1.4654	Calc	Common	Coarse	Hand	None	None			
08M0614008a	Plain		6.47	1.0969	Sand	Frequent	Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
08M0614008b	Plain		7.29	1.2430	Sand	Common	Fine/Med	Hand	Smooth	Smooth			
08M0614008c	Plain		7.05		Sand	Common	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0614008d	Plain		5.79	1.4200	Sand	Common	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0614008e	Plain		9.24	1.1644	Sand	Common	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0614008f	Plain		8.73	1.2430	Sand	Frequent	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0614008g	Plain		5.43	1.0969	Sand	Common	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0614008h	Plain		10.12	1.2430	Sand	Occasion	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0614008i	Plain		8.41	1.2430	Sand	Common	Coarse	Hand	None	None	Reduce	Partial	Rapid
08M0614008j	Plain		8.59	1.0969	Calc	Common	Coarse	Hand	None	None	Oxidize	Partial	Slow
08M0614008k	Plain		5.89	1.4200	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0614008l	Plain		5.98	1.0374	Sand	Occasion	Fine/Med	Hand	Scrape	Smooth	Reduce	Partial	Rapid
08M0614010a	Slip/Pt		6.96	0.9191	Sand	Occasion	Fine/Med	Hand	None		Oxidize	Full	
08M0614010b	Slip/Pt		7.65	1.6693	Sand	Occasion	Fine/Med	Hand	Scrape	Burnish	Oxidize	Full	
08M0614011a	Slip/Pt		4.23		Sand	Occasion	Fine/Med	Hand	Burnish	Burnish	Oxidize	Full	
08M0614016a	Plain		11.32	1.2742	Sand	Frequent	V. Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0614018a	Slip/Pt		5.81	1.3404	Calc	Frequent	Coarse	Hand	Smooth				
08M0614026a	Glazed		6.78	1.0969	Shell	Occasion	Coarse	Hand		None	Oxidize	Full	
08M0614026b	Glazed		6.83	1.7782	Sand	Occasion	Fine/Med	Hand	Smooth	None	Oxidize	Full	
08M0614026c	Glazed		4.64	1.4771	Sand	Occasion	Fine/Med	Hand		None	Oxidize	Full	
08M0614028a	Plain		5.11	1.0969	Sand	Common	Coarse	Hand	Scrape	None	Oxidize	Full	
08M0614028b	Plain		12.85	0.9191	Calc	Common	Coarse	Hand	None	Smooth	Oxidize	Full	
08M0614028c	Plain		6.34	1.6021	Sand	Occasion	Fine/Med	Hand	Smooth	None			
08M0614034a	Glazed		9.23	1.1761	Sand	Frequent	Fine/Med	Wheel		None	Oxidize	Full	
08M0614076a	Plain		8.15	1.1761	Sand	Occasion	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
08M0614084a	Glazed		8.44	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0614085a	Glazed		7.33	1.0170	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0614109a	Glazed		4.84	1.2430	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0614109b	Glazed		5.60	1.2430	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0614109c	Glazed		6.65	1.2430	Sand	Occasion	Fine/Med			Smooth			
08M0614109d	Glazed		8.50	1.2430	Sand	Frequent	Fine/Med	Hand		Smooth	Oxidize	Full	
08M0614109e	Glazed		5.79	1.1931	Sand	Occasion	Fine/Med	Wheel	None	Scrape	Oxidize	Full	
08M0614109f	Glazed		4.83	1.6107	Sand	Occasion	Fine/Med			Smooth			
08M0614109g	Glazed		5.66		Sand	Occasion	Fine/Med		Smooth	Scrape	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0614109h	Glazed		3.88	1.0170	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0614109i	Glazed		5.04	1.5441	Sand	Occasion	Fine/Med			Scrape			
08M0614109j	Glazed		5.59	1.6693	Sand	Occasion	Fine/Med		Smooth	Scrape			
08M0614109l	Glazed		5.50	1.0969	Sand	Frequent	Fine/Med			Scrape	Oxidize	Full	
08M0619006a	Plain		9.23	1.0969	Sand	Common	Coarse	Hand	None	Burnish	Oxidize	Partial	Slow
08M0711001a	Glazed	A13	9.59	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0711009a	Glazed	A1	7.03	1.3404	Sand	Occasion	Fine/Med	Hand	Smooth	Scrape			
08M0711009b	Glazed	A15	6.40	1.5441	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0711009c	Glazed	A13	5.64	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
08M0711010a	Glazed	A16	6.58	1.8451	Sand	Occasion	Fine/Med			Scrape			
08M0711012a	Plain	A1	6.08	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Partial	Slow
08M0711015a	Slip/Pt	A11	9.07	1.4654	Sand	Common	Fine/Med	Hand	P. Burn	Smooth	Oxidize	Full	
08M0711016a	Plain	A8	6.66	1.4200	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0712007a	Glazed	A13	5.07	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0712012a	Plain	A6	8.23	1.2430	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0720011a	Plain	A1	7.53	1.4654	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0720012a	Plain	A1	7.42	1.3404	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0720013a	Glazed	A15	12.00	1.1644	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0720020a	Plain	A8	5.46	1.6021	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0720025a	Slip/Pt	A11	6.50	1.6693	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0755005a	Plain		10.33	1.5441	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Slow
08M0755016a	Plain		16.58	1.2430	Sand	Frequent	V. Coarse	Hand	None	Smooth	Oxidize	Partial	Slow
08M0756002a	Glazed		10.38	1.6021	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
08M0760015a	Glazed		6.54		Sand	Occasion	Fine/Med		Smooth	Scrape	Reduce	None	Slow
08M0760015b	Glazed		7.37	1.6021	Sand	Occasion	Fine/Med	Wheel	None	Scrape			
08M0760018a	Glazed		5.33	1.6021	Sand	Occasion	Fine/Med	Hand	Smooth	None			
08M0762010a	Plain		8.20	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0762011a	Plain		8.53	1.4771	Sand	Frequent	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0763019a	Slip/Pt		6.62	1.0969	Sand	Occasion	Fine/Med	Wheel	None	Scrape			
08M0763020b	Plain		4.88	1.3522	Sand	Occasion	Fine/Med	Hand	None	None			
08M0763021a	Plain		6.65	1.9031	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0763062a	Glazed		6.43	1.6021	Sand	Occasion	Fine/Med	Hand	Scrape	Scrape	Reduce	Partial	Slow
08M0763072a	Slip/Pt		4.49	1.9031	Calc	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0763074a	Plain		11.11	1.0969	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
08M0763074b	Plain		7.55	1.1644	Sand	Frequent	Coarse	Hand	None	Smooth	Reduce	Partial	Rapid
08M0763074c	Plain		7.53	0.9420	Sand	Common	Coarse	Hand	Scrape	None	Reduce	Partial	Rapid
08M0763075a	Plain		4.38	1.6693	Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Full	
08M0763080a	Glazed		11.51	1.6693	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
08M0763080b	Glazed		9.09	1.3404	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0763080c	Glazed		5.78	1.6693	Sand	Occasion	Fine/Med			Scrape	Oxidize	Partial	Slow
08M0763080d	Glazed		4.25	1.6693	Sand	Occasion	Fine/Med	Wheel	None	Smooth			
08M0763080e	Glazed		4.39	1.6693	Sand	Occasion	Fine/Med	Wheel	None	Smooth			
08M0763080f	Glazed		5.66	1.4771	Sand	Frequent	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0763080g	Glazed		4.17	0.8921	Sand	Occasion	Fine/Med	Wheel	None				
08M0764006a	Plain		7.15	1.6021	Sand	Common	Coarse	Hand	Smooth	Scrape	Oxidize	Partial	Slow
08M0764006b	Plain		8.02	1.1931	Sand	Common	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0764007a	Plain		6.47	1.8451	Sand		V. Fine	Hand	None	Smooth	Oxidize	Full	
08M0764010a	Glazed		6.95		Sand	Occasion	Fine/Med		Smooth	Scrape	Reduce	None	Slow
08M0764026a	Glazed		3.68	1.4771	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0764026b	Glazed		4.00	1.4771	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
08M0764026c	Glazed		6.27		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
08M0764026d	Glazed		6.38	0.9731	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
08M0764026e	Glazed		6.86		Sand	Occasion	Fine/Med	Wheel		None	Reduce	None	Slow
08M0764029a	Plain		10.95	1.1644	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
08M0764038q	Glazed		3.50	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
08M0765006a	Plain	A11	11.34	1.0000	Sand	Common	Fine/Med	Hand	None	Smooth	Oxidize	Full	
08M0765007a	Plain	A6	4.85	1.4200	Sand	Common	Fine/Med	Hand		None			
08M0765007b	Plain	A6	8.59	1.1644	Sand	Frequent	Fine/Med	Hand	None	None			
08M0765008a	Plain	A6	10.22	1.1644	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0765010a	Glazed	A13	5.60	1.0374	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0793029a	Glazed	A15	7.64	1.4771	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0794011a	Plain	A1	12.56	1.2742	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0794011b	Plain	A6	5.60	1.0969	Sand	Frequent	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0794034a	Plain	A1	6.84	1.6107	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth			
08M0795005a	Glazed	A15	6.88	1.4771	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0795005b	Glazed	A15	5.86	1.6693	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0802083a	Slip/Pt	A9	5.33	1.0000	Calc	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
08M0806060a	Plain	A6	8.01	1.4200	Sand	Frequent	Coarse	Hand	Scrape	Smooth			
08M0808086a	Plain	A6	9.15	1.0682	Sand	Frequent	Coarse	Hand	Scrape	Smooth	Oxidize	Partial	Slow
08M0808086b	Plain	A1	14.47	1.0682	Sand	Occasion	Coarse	Hand	Scrape	Scrape	Oxidize	Partial	Slow
08M0808089a	Glazed	A1	6.04	1.0374	Sand	Occasion	Fine/Med		Smooth	Scrape			
08M0811068a	Glazed	A13	6.35	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0811105a	Plain	A6	8.03	1.3522	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0822002a	Glazed	A15	5.41	1.4771	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
08M0822014a	Glazed	A11	8.07	1.6107	Sand	Frequent	Fine/Med	Hand	Smooth	Scrape	Oxidize	Full	
08M0822024a	Slip/Pt	A11	4.28	2.2041	Sand		V. Fine	Hand	Burnish	Burnish	Oxidize	Full	
08M0830012a	Plain	A6	12.74	1.2430	Calc	Common	Coarse	Hand	P. Burn	None			
08M0837023a	Glazed	A15	6.21	1.4771	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
08M0837023b	Glazed		5.75	1.0969	Sand	Frequent	Fine/Med	Wheel					
08M0837023c	Glazed	A13	6.68	1.4771	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0837023d	Glazed	A13	5.72	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
08M0837023e	Glazed	A13	5.81	1.4857	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Full	
08M0838070a	Slip/Pt	A6	14.34	0.8921	Sand	Frequent	Coarse	Hand		Scrape	Oxidize	Partial	Slow
08M0845080a	Plain	A6	8.41	1.4200	Sand	Frequent	Coarse	Hand	Smooth	Scrape			
08M0845080b	Plain	A6	7.63	1.2742	Sand	Frequent	Coarse	Hand	None	Scrape	Oxidize	Partial	Slow
08M0846040a	Plain	A2	6.70	1.4200	Shell	Occasion	V. Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0846042a	Glazed	A8	7.22	1.4771	Sand	Occasion	Fine/Med	Hand	Scrape	Smooth	Oxidize	Full	
08M0846042b	Glazed	A1	6.26	1.6021	Sand	Occasion	Fine/Med		Smooth	Smooth			
08M0846042c	Glazed	A16	5.16	1.3096	Sand	Occasion	Fine/Med			Scrape			
08M0846042d	Glazed	A16	4.61	1.1644	Sand	Occasion	Fine/Med	Wheel					
08M0846042e	Glazed	A1	4.78	1.3522	Sand	Occasion	Fine/Med		Smooth	Scrape	Oxidize	Partial	Slow
08M0846048a	Plain	A6	9.65	1.0969	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
08M0846053a	Plain	A11	8.42	1.3404	Sand	Frequent	V. Coarse	Hand	Smooth	Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
08M0846084a	Slip/Pt	A11	3.42	1.5441	Sand		V. Fine	Hand	Smooth	Smooth	Oxidize	Full	
08M0846102a	Plain	A6	5.80	1.1761	Sand	Frequent	Coarse	Hand	None	Scrape			
08M0846102b	Plain	A11	5.96	1.4200	Calc	Common	Coarse	Hand	Smooth	Scrape	Oxidize	Full	
08M0859001a	Slip/Pt	A9	9.26	1.3010	Calc	Common	Fine/Med	Hand		Burnish	Oxidize	Full	
08M0859009a	Glazed	A8	6.07	1.0682	Sand	Occasion	V. Coarse			Smooth	Oxidize	Full	
08M0860018a	Slip/Pt	A9	7.97	1.0000	Calc	Common	Coarse	Hand		Smooth	Oxidize	Full	
09F0383001a	Dec NA	A8	6.59	1.7267	Sand	Occasion	Fine/Med	Hand	P. Burn		Oxidize	Full	
09F0453001a	Dec NA	A2	5.59	1.5441	Grog	Abundant	V. Coarse	Hand		Smooth	Oxidize	Partial	Slow
09F0453002a	Dec NA	A3	5.61	1.6021	Grog	Occasion	Coarse	Hand	Scrape				
09F0453002b	Dec NA	A9	5.63	1.8451	Grog	Common	V. Coarse	Hand	Smooth		Oxidize	Full	
09F0455003a	Dec NA	A7	6.02	1.6693	Grog	Occasion	Coarse	Hand	P. Burn	Burnish	Reduce	Partial	Rapid
09F0469019a	Dec NA	A3	4.80	1.6693	Grog	Occasion	V. Coarse	Hand			Oxidize	Full	
09F0489007a	Dec NA	A7	5.77	1.7267	Grog	Occasion	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
09F0489010a	Dec NA	A7	7.96	1.7267	Grog	Occasion	V. Coarse	Hand			Reduce	Partial	Rapid
09F0538001a	Dec NA	A2	10.97	1.6693	Grog	Frequent	V. Coarse	Hand			Oxidize	Partial	Slow
09F0578007a	Dec NA	B1	5.78		Grog	Frequent	V. Coarse	Hand			Reduce	None	Slow
09F0580002a	Dec NA	A10	6.86	1.7267	Grog	Frequent	V. Coarse	Hand	None	Smooth	Reduce	Partial	Rapid
09F0580003a	Dec NA	A7	5.14		Grog	Occasion	Coarse	Hand			Reduce	Partial	Rapid
09F0632003a	Dec NA	B3	6.96	1.1644	Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	None	Slow
09F0673004a	Dec NA	B4	5.27		Shell	Occasion	Coarse	Hand		Smooth	Reduce	None	Slow
09F0673007a	Dec NA	A3	5.53	1.2430	Shell	Occasion	Coarse	Hand	Smooth				
09F0675001a	Dec NA	B3	6.46		Shell	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow
10F1183021a	Dec NA	A1	7.72	1.6021	Sand	Occasion	V. Coarse	Hand			Oxidize	Partial	Slow
10F1198006a	Dec NA	A11	8.02	1.2430	Sand	Abundant	Fine/Med	Hand			Oxidize	Full	
10F1215001a	Dec NA	A2	7.97	1.1173	Grog	Frequent	Coarse	Hand	Smooth	Smooth			
10F1229001a	Dec NA	B3	5.83	1.4771	Sand	Occasion	Coarse	Hand	P. Burn		Reduce	None	Slow
10F1229001b	Dec NA	A6	6.33	1.6693	Sand	Frequent	Coarse	Hand		Smooth			
10F1244002a	Dec NA	A5	6.17	1.8451	Sand	Occasion	Fine/Med	Hand	Burnish		Reduce	Partial	Rapid
10F1247001a	Dec NA	A6	5.70	1.6021	Sand	Frequent	V. Coarse	Hand	P. Burn		Oxidize	Partial	Slow
10F1247001b	Dec NA	A6	4.56		Sand	Frequent	V. Coarse	Hand	P. Burn				
10F1247004a	Dec NA	A11	7.02	1.7267	Sand	Common	Coarse	Hand	None	None	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
10F1280004a	Dec NA	B3	6.65		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
10F1283001a	Dec NA	A3	7.50	1.7267	Shell	Occasion	Coarse	Hand	Smooth		Oxidize	Partial	Slow
10F1284001a	Dec NA	A9	7.41	1.9031	Shell	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Oxidize	Full	
10F1302001a	Dec NA	A9	7.95	1.9031	Shell	Abundant	V. Coarse	Hand	None		Oxidize	Full	
10F1305004a	Dec NA	A5	4.81	1.7267	Sand	Occasion	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
10F1306002a	Dec NA	A5	6.54	1.7267	Sand	Occasion	Coarse	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
10F1306003a	Dec NA	A4	5.50		Sand	Frequent	Coarse	Hand	Burnish		Reduce	None	Slow
10F1346001a	Dec NA	A6	9.04	1.6021	Sand	Frequent	Coarse	Hand	P. Burn	Smooth			
10F1346002a	Dec NA	A5	7.13	1.9031	Sand	Occasion	Coarse	Hand		None	Reduce	Partial	Rapid
10F1359002a	Dec NA	A9	7.36	1.6021	Grog	Common	V. Coarse	Hand	Smooth		Oxidize	Full	
10F1413011a	Dec NA	A7	7.67	1.9031	Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
10F1413019a	Dec NA	A3	5.96	1.6021	Grog	Occasion	V. Coarse	Hand	Scrape		Oxidize	Partial	Slow
10F1413019b	Dec NA	A7	5.45	1.5441	Grog	Occasion	V. Coarse	Hand	None		Reduce	Partial	Rapid
10F1413019c	Dec NA	A6	5.21	1.4771	Sand	Common	V. Coarse	Hand	None				
10F1415002a	Dec NA	A10	6.89	1.7267	Grog	Frequent	Coarse	Hand			Reduce	Partial	Rapid
10F1415002b	Dec NA	A3	5.61	1.5441	Grog	Occasion	Coarse	Hand		Smooth	Oxidize	Full	
10F1434005a	Dec NA	B1	5.28		Grog	Frequent	Coarse	Hand		Scrape	Reduce	None	Slow
10F1435001a	Dec NA	A3	5.56	1.6693	Grog	Occasion	Coarse	Hand			Oxidize	Partial	Slow
10F1435003a	Dec NA	A1	5.99	1.3096	Sand	Occasion	Coarse	Hand	None				
10F1465001a	Dec NA	B3	8.28	1.6021	Sand	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
10F1474001a	Dec NA	A7	6.56	1.7267	Grog	Occasion	Coarse	Hand	Smooth	Scrape	Reduce	Partial	Rapid
10F1645002a	Dec NA	A4	5.72	1.5441	Sand	Frequent	Coarse	Hand	P. Burn		Reduce	Partial	Rapid
10F1705007a	Dec NA	A4	8.37	1.7267	Sand	Frequent	Coarse	Hand	P. Burn		Reduce	Partial	Rapid
10F1705007b	Dec NA	A1	5.43	1.7267	Sand	Occasion	Coarse	Hand	P. Burn		Oxidize	Partial	Slow
10F1746002a	Dec NA	B5	4.65		Shell	Abundant	V. Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
10F1863001a	Dec NA	A3	4.84		Grog	Occasion	Coarse	Hand	P. Burn				
11F2061003a	Dec NA	B3	7.70		Sand	Occasion	Fine/Med	Hand	P. Burn	Scrape	Reduce	None	Slow
11F2083007a	Dec NA	B5	6.83		Shell	Common	V. Coarse	Hand	Smooth	Scrape	Reduce	None	Slow
11F2120001a	Dec NA	A3	7.46	1.5441	Grog	Occasion	V. Coarse	Hand	Smooth		Oxidize	Partial	Slow
11F2137002a	Dec NA	B1	7.54		Grog	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
11F2225001a	Dec NA	A5	6.08	1.7267	Sand	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
11F2271001a	Dec NA	A3	8.28	1.1644	Grog	Occasion	V. Coarse	Hand	Burnish		Oxidize	Partial	Slow
11F2272001a	Dec NA	A6	7.63	1.8451	Sand	Common	V. Coarse	Hand	Smooth				
11F2293003a	Dec NA	B6	4.57		Sand	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
11F2360001a	Dec NA	A2	7.49	2.2041	Shell	Frequent	Fine/Med	Hand	Burnish	Burnish			
11F2376005a	Dec NA	A3	7.45	1.5441	Grog	Occasion	V. Coarse	Hand	Burnish	Smooth			
11F2377002a	Dec NA	A9	5.80	1.7267	Shell	Frequent	Coarse	Hand			Oxidize	Full	
11F2378001a	Dec NA	A7	6.99	1.5441	Grog	Occasion	V. Coarse	Hand			Reduce	Partial	Rapid
11F2421003a	Dec NA	A7	6.66	1.7267	Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
11F2428002a	Dec NA	A6	6.24	1.6693	Sand	Frequent	Coarse	Hand	P. Burn		Oxidize	Partial	Slow
11F2453001a	Dec NA	A3	4.88	1.5441	Grog	Occasion	Coarse	Hand	Smooth		Oxidize	Full	
11F2453003a	Dec NA	A7	5.63	1.7267	Grog	Occasion	Coarse	Hand		Smooth	Reduce	Partial	Rapid
11F2453004a	Dec NA	A7	5.79	1.6693	Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
11F2456001a	Dec NA	A7	7.70	1.5441	Grog	Occasion	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
11F2457002a	Dec NA	A6	9.27	1.6021	Sand	Frequent	V. Coarse	Hand	Smooth		Oxidize	Partial	Slow
11F2458002a	Dec NA	A7	6.83	1.5441	Grog	Occasion	Coarse	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
11F2495001a	Dec NA	A10	5.52	1.7267	Grog	Common	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
11F2495001b	Dec NA	A7	5.34	1.6693	Grog	Occasion	Coarse	Hand	Scrape		Reduce	Partial	Rapid
11F2511005a	Dec NA	B4	5.25	1.6693	Grog	Occasion	Coarse	Hand	P. Burn	Smooth	Reduce	None	Slow
11F2511006a	Dec NA	A7	6.57	1.6693	Grog	Occasion	V. Coarse	Hand	P. Burn		Reduce	Partial	Rapid
11F2516004a	Dec NA	A10	6.98	1.6021	Shell	Common	V. Coarse	Hand	Smooth	Scrape	Reduce	Partial	Slow
11F2597001a	Dec NA	A4	6.37	1.7267	Sand	Common	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
11F2620002a	Dec NA	A7	6.86	1.9031	Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
11F2621002a	Dec NA	A6	6.57	1.9031	Sand	Frequent	Coarse	Hand	P. Burn		Oxidize	Partial	Slow
11F2629002a	Dec NA	A3	4.97	1.7267	Grog	Occasion	V. Coarse	Hand					
11F2629002b	Dec NA	A3	6.75	1.7267	Grog	Occasion	Coarse	Hand		Smooth	Oxidize	Full	
11F2629003a	Dec NA	A10	7.09	1.6693	Grog	Common	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
11F2645002a	Dec NA	A6	6.78	1.4857	Sand	Common	Coarse	Hand	P. Burn		Oxidize	Partial	Slow
11F2654001a	Dec NA	A10	7.22	1.4857	Grog	Common	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
11F2674001a	Dec NA	A2	7.02	1.1173	Shell	Abundant	V. Coarse	Hand		Smooth			
11F2697003a	Dec NA	B4	5.94		Shell	Occasion	Coarse	Hand			Reduce	None	Slow
11F2712001a	Dec NA	A3	5.24	1.7267	Grog	Occasion	Coarse	Hand	Smooth		Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick mm	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
11F2723002a	Dec NA	A10	6.44		Shell	Common	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
11F2733003a	Dec NA	A7	5.80	1.5441	Grog	Occasion	Fine/Med	Hand	Smooth		Reduce	Partial	Rapid
11F2834001a	Dec NA	A4	6.28	1.6693	Sand	Frequent	Coarse	Hand			Reduce	Partial	Rapid
11F2860004a	Dec NA	A6	6.20	1.7267	Sand	Frequent	V. Coarse	Hand	Smooth		Oxidize	Partial	Slow
11F2860004b	Dec NA	A11	5.92	1.7267	Sand	Common	V. Coarse	Hand	None		Oxidize	Full	
11F2881002a	Dec NA	A1	7.28	1.7267	Sand	Occasion	V. Coarse	Hand	P. Burn		Oxidize	Partial	Slow
11F2886005a	Dec NA	A2	6.52	1.7267	Grog	Frequent	V. Coarse	Hand	P. Burn		Oxidize	Partial	Slow
11F2886006a	Dec NA	A6	6.61	2.2041	Sand	Common	V. Coarse	Hand	None				
11F2886006b	Dec NA	A11	5.86	1.7267	Sand	Frequent	V. Coarse	Hand	None		Oxidize	Full	
11F2902001a	Dec NA	A11	5.39	1.9031	Sand	Common	V. Coarse	Hand	None		Oxidize	Full	
11F2902001b	Dec NA	A4	6.38	1.7267	Sand	Frequent	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
11F2902002a	Dec NA	A7	6.53	1.7267	Grog	Occasion	V. Coarse	Hand	P. Burn		Reduce	Partial	Rapid
11F2991001a	Dec NA	A7	5.56	1.7267	Grog	Occasion	V. Coarse	Hand	None		Reduce	Partial	Rapid
98N8267005a	Dec NA	B1	5.96	1.2430	Grog	Common	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow

Note: For more information on sub-clusters (clusters within analytical sub-sets A and B) see Chapter 7. For details on attributes also see Chapter 7 and particularly Table 7.8. Dec NA=Decorated Florida native; Thick = Average thickness (mm); Redness Index calculated from Munsell colors of oxidized pastes.; Form = Primary Forming Techniques; Sh/Fin = Shaping and Finishing; Firing Atmos. = Firing Atmosphere; Oxid.= Oxidation; V. Fine = Very Fine; Fine/Med = Fine Medium; V. Coarse = Very Coarse; Wheel = Wheel-thrown; Hand = Hand-built; P. Burn= Poorly Burnished; The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa Maria (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F)

Table B.2. Presidio Macroscopic Attributes Included in the Technological Style Analysis

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
03P0111007a	Plain	B1	5.13		Shell	Frequent	Coarse		P. Burn	P. Burn	Reduce	None	Slow
03P0447004a	Glazed	B7	4.64	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
03P0447008a	Plain	A15	4.06	1.1761	Sand	Occasion	Fine/Med	Wheel	Smooth	None	Oxidize	Full	
03P0447011a	Plain	A2	7.23		Shell	Common	V. Coarse			Smooth	Oxidize	Partial	Slow
03P0447011b	Plain	A2	7.34	1.0969	Shell	Abundant	V. Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
03P0447011c	Plain	A2	6.53	1.0969	Shell	Abundant	V. Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
03P0447019a	Plain	B2	5.81		Sand	Common	Fine/Med	Hand	Smooth		Reduce	None	Slow
03P0447020a	Plain	B4	4.74		Grog	Occasion	Fine/Med			None	Reduce	None	Slow
03P0451005a	Glazed	A13	4.19	1.3674	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0453002a	Slip/Pt	A9	5.26	1.1761	Shell	Frequent	Coarse				Oxidize	Full	
03P0453004a	Plain	B2	5.85	2.2553	Sand	Frequent	Coarse	Hand	Scraped		Reduce	None	Slow
03P0592002a	Glazed	A13	4.32	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0592002b	Glazed	A13	3.90	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0592002c	Glazed	A13	3.99	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0592002d	Glazed	A13	4.48	1.5441	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
03P0592005a	Glazed	A14	4.21	1.4857	Sand		V. Fine	Wheel		None	Oxidize	Full	
03P0593017a	Plain	B2	7.06		Sand	Common	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
03P0593017b	Plain	A13	3.57	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0593027a	Plain	A9	6.30	1.4857	Shell	Frequent	V. Coarse			Scraped	Oxidize	Full	
03P0595001a	Slip/Pt	A15	6.14	1.1761	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
03P0663001a	Plain	B5	7.70	1.0969	Shell	Abundant	V. Coarse	Hand		Smooth	Reduce	None	Slow
03P0663002a	Plain	A7	8.14	1.4771	Grog	Occasion	Coarse	Hand	None	Burnish	Reduce	Partial	Rapid
03P0664021a	Plain	A4	6.64	1.5441	Sand	Frequent	Fine/Med			Smooth	Reduce	Partial	Rapid
03P0664022a	Plain	A6	5.10	1.5441	Sand	Abundant	Fine/Med		Smooth	Smooth	Oxidize	Partial	Slow
03P0664024a	Plain	A12	5.77	1.6107	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
03P0664024b	Plain	A5	6.83	1.6693	Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	Partial	Rapid
03P0664030a	Plain	A6	9.60	1.5441	Sand	Abundant	Fine/Med	Hand	Scraped				
03P0664031a	Plain	A4	4.22	1.7267	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
03P0664038a	Glazed	A13	4.21	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0664038b	Glazed	A11	5.16	1.6693	Sand	Common	Fine/Med		Smooth	Smooth	Oxidize	Full	
03P0664038c	Glazed	A13	4.28	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0664039a	Slip/Pt	A16	6.98	1.1761	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
03P0694029a	Slip/Pt	A16	6.07	1.0531	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
03P0694032a	Glazed	A12	5.37	1.6693	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
03P0694033a	Glazed	A12	5.25		Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
03P0694033b	Glazed	B7	5.78		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
03P0694034a	Glazed	A15		1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0694035a	Glazed	A13	5.56	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0694036a	Glazed	A13	3.91	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0694036b	Glazed	A13	8.32	1.7267	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
03P0694037a	Plain	B7	6.70	1.1644	Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
03P0694038a	Plain	A4	4.89		Sand	Frequent	Fine/Med			Scraped	Reduce	Partial	Rapid
03P0694042a	Plain	A10	5.37		Grog	Common	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
03P0694043a	Plain	B4	6.82		Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	None	Slow
03P0694046a	Slip/Pt	B3	5.29		Sand	Occasion	Fine/Med		P. Burn	Smooth	Reduce	None	Slow
03P0694048a	Plain	B4	5.12		Shell	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
03P0694048b	Plain	B2	5.01		Sand	Occasion	V. Coarse	Hand		Scraped	Reduce	None	Slow
03P0711027a	Plain	A11	4.60	1.7267	Sand		V. Fine	Hand	Scraped	Scraped	Oxidize	Full	
03P0711027b	Plain	A13	6.09	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0711029a	Glazed	A14	4.69	1.0531	Sand		V. Fine				Oxidize	Full	
03P0711032a	Glazed	A14	5.39	1.6021	Sand		V. Fine		Smooth		Oxidize	Full	
03P0711036a	Plain	B6	7.13		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
03P0711038a	Plain	B5	10.55		Sand	Common	V. Coarse				Reduce	None	Slow
03P0711041a	Plain	A4	4.64		Sand	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Slow
03P0711042a	Glazed	A13	3.38	1.4857	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0711046a	Plain	A3	5.49		Grog	Occasion	Fine/Med	Hand	Smooth	Burnish			
03P0711047a	Plain	A5	7.84		Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
03P0711048a	Plain	A7	6.60	1.6693	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
03P0711048b	Plain	B3	8.17	1.1644	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
03P0723006a	Plain	A11	5.66	1.6107	Sand	Common	Coarse				Oxidize	Full	
03P0736011a	Glazed	A14	3.46	1.0531	Sand		V. Fine				Oxidize	Full	
03P0736012a	Glazed	A13	7.79	1.6021	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P0736022a	Plain	A3	6.86		Grog	Occasion	Fine/Med	Hand					
03P0736025a	Plain	B3	4.36		Sand	Occasion	Coarse	Hand	Smooth	Scraped	Reduce	None	Slow
03P0736026a	Plain	A9	8.21	1.3522	Shell	Frequent	V. Coarse	Hand	None	Smooth	Oxidize	Full	
03P0758020a	Colono	A12	6.48	2.2041	Sand	Occasion	Fine/Med		P. Burn		Reduce	Partial	Rapid
03P0809005a	Glazed	A13	3.83	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
03P0809009a	Plain	A10	5.48	1.0969	Shell	Common	V. Coarse	Hand			Reduce	Partial	Rapid
03P0809009b	Plain	B1	7.26		Shell	Frequent	V. Coarse	Hand	Burnish	Burnish	Reduce	None	Slow
03P0809010a	Plain	A5	7.74		Sand	Occasion	Fine/Med	Hand	None	Smooth	Reduce	Partial	Rapid
03P0809017a	Plain	A10	4.96		Grog	Frequent	V. Coarse	Hand	None		Reduce	Partial	Rapid
03P0819010a	Plain	B4	5.99		Grog	Occasion	V. Coarse		Smooth	Smooth	Reduce	None	Slow
03P0819011a	Plain	A2	7.25	1.6693	Grog	Frequent	V. Coarse	Hand	Smooth	Smooth			
03P0821015a	Plain	B2	7.05		Sand	Common	Fine/Med	Hand	Scraped	Scraped	Reduce	None	Slow
03P0821016a	Slip/Pt	A14		1.4857	Sand	Frequent	Fine/Med				Oxidize	Full	
03P0850009a	Glazed	A14	3.60	1.5441	Sand	Frequent	Fine/Med				Oxidize	Full	
03P0850013a	Plain	A4	6.75		Sand	Frequent	Fine/Med		Burnish		Reduce	Partial	Rapid
03P0850015a	Plain	A13	3.36	1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
03P0851010a	Glazed	B8	4.84	1.4771	Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
03P0851011a	Glazed	A16	5.58	1.3404	Sand	Occasion	Fine/Med	Wheel		None			
03P0851016a	Slip/Pt	A10	5.78	1.5441	Shell	Frequent	V. Coarse	Hand	Scraped	P. Burn	Reduce	Partial	Rapid
03P0851017a	Plain	B6	7.07		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
03P0851018a	Plain	A5	7.12		Sand	Occasion	Fine/Med	Hand	Burnish	None	Reduce	Partial	Rapid
03P0851018b	Plain	A12	7.24	1.7267	Sand	Occasion	Fine/Med			None	Reduce	Partial	Rapid
03P0957003a	Glazed	A11	5.84	1.6693	Sand	Frequent	Fine/Med			Scraped	Oxidize	Full	
03P1565002a	Colono	A4	5.55	1.6021	Shell	Common	Fine/Med		Smooth	Smooth	Reduce	Partial	Rapid
03P1583010a	Plain	B3	4.60		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
03P1583010b	Plain	B7	4.26		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
03P1583011a	Plain	A1	7.55		Sand	Occasion	Fine/Med	Hand	Smooth	None	Oxidize	Partial	Slow
03P1587001a	Plain	A5	7.58	1.0969	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
03P1587002a	Glazed	A13	4.15	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P1587002b	Glazed	A13	4.07	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P1587003a	Glazed	A13	4.05		Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
03P1593002a	Glazed	A13	4.22	1.3096	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
03P1595004a	Plain	B7	7.68		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
03P1627001a	Plain	B3	4.55		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
03P1627002a	Plain	B4	5.77		Grog	Occasion	Fine/Med	Hand			Reduce	None	Slow
03P1627004a	Glazed	A14	3.47	1.5441	Sand		V. Fine				Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
03P1628005a	Plain	B4	4.61	1.4200	Grog	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
03P1628006a	Plain	B3	4.16		Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow
03P1628007a	Plain	A7	6.68	1.4857	Grog	Occasion	Coarse	Hand	None	None	Reduce	Partial	Rapid
03P1628008a	Plain	B5	5.68		Shell	Common	V. Coarse				Reduce	None	Slow
03P1628009a	Glazed	A13	3.36	1.4200	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
03P1628010a	Glazed	A11	3.35	1.4857	Sand	Frequent	Fine/Med		Smooth		Oxidize	Full	
03P1638003a	Glazed	B8	3.22		Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
03P1698001a	Glazed	A16	3.84	1.6693	Sand	Occasion	Fine/Med	Wheel	None				
03P1701001a	Glazed	A13	4.46	1.5441	Sand	Occasion	Fine/Med		None	Scraped	Oxidize	Full	
03P1703002a	Glazed	A15	5.53	1.6021	Sand	Occasion	Fine/Med	Wheel		Smooth	Oxidize	Full	
03P1727001a	Plain	B1			Shell	Frequent	Coarse		Smooth		Reduce	None	Slow
04P0001088a	Colono	B3	7.62	1.1644	Shell	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
04P0119007a	Plain	A7	5.77	1.6693	Grog	Occasion	V. Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
04P0157006a	Glazed	A15	4.45	1.5441	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P0157006b	Glazed	A13	4.81	1.6021	Sand	Occasion	Fine/Med			Scraped	Oxidize	Full	
04P0157006c	Glazed	A13	4.12	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0157006d	Glazed	A12	3.60		Sand	Occasion	Fine/Med			Scraped	Reduce	Partial	Rapid
04P0157007a	Glazed	A12	5.12	1.4857	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
04P0157008a	Glazed	B7	4.09		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0157014a	Plain	A14	3.69	1.7267	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
04P0157015a	Plain	A7	7.34	1.6693	Grog	Occasion	V. Coarse	Hand	P. Burn	Scraped	Reduce	Partial	Rapid
04P0157017a	Plain	A10	8.17	1.6693	Grog	Common	Coarse	Hand	Smooth	Scraped	Reduce	Partial	Rapid
04P0157019a	Plain	B4	7.14		Grog	Occasion	V. Coarse	Hand		Smooth	Reduce	None	Slow
04P0157019b	Plain	A3	6.60	1.6693	Grog	Occasion	Coarse			None			
04P0157019c	Plain	B4	5.73		Grog	Occasion	V. Coarse			Smooth	Reduce	None	Slow
04P0157020a	Plain	B5	4.61		Shell	Common	V. Coarse			Smooth	Reduce	None	Slow
04P0195011a	Plain	A7	4.79		Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0294004a	Glazed	A13	5.55	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0320005a	Plain	A6	7.61	1.4771	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth			
04P0320005b	Plain	A5	8.01	1.6693	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
04P0320005c	Plain	A5	5.01		Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0320005d	Plain	B7	4.28		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0320024a	Plain	A1	5.49	1.6693	Sand	Occasion	Fine/Med	Hand	Burnish	Scraped	Oxidize	Partial	Slow
04P0320024b	Plain	B3	4.99		Sand	Occasion	Fine/Med	Hand	P. Burn		Reduce	None	Slow
04P0320027a	Plain	A3	7.35		Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn			
04P0340024a	Plain	A7	6.97	1.6693	Grog	Occasion	Fine/Med	Hand	Smooth	Scraped	Reduce	Partial	Rapid
04P0340024b	Plain	A5	6.38	1.7267	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
04P0340026a	Plain	A7	7.34	1.4771	Grog	Occasion	V. Coarse	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
04P0340035a	Glazed	B7	5.18		Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
04P0340037a	Glazed	A15	7.11	1.1173	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P0340038a	Glazed	A12	4.85	1.4857	Sand	Occasion	Fine/Med		Smooth		Reduce	Partial	Rapid
04P0465015a	Glazed	A16	6.08	1.7267	Sand	Occasion	Fine/Med			Smooth			
04P0465016a	Glazed	A1	5.02	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth			
04P0465025a	Plain	A6	5.60	1.6693	Sand	Frequent	Fine/Med			Smooth	Oxidize	Partial	Slow
04P0465025b	Plain	A10	5.81		Grog	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0465027a	Plain	B3	5.13		Sand	Occasion	Fine/Med	Hand	P. Burn	Scraped	Reduce	None	Slow
04P0465028a	Plain	A9	5.63	1.5441	Shell	Occasion	V. Coarse	Hand	P. Burn	Scraped	Oxidize	Full	
04P0465033a	Plain	B4	6.37		Shell	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
04P0465038a	Plain	B1	7.06	1.7782	Grog	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
04P0466006a	Plain	A7	7.45	1.6693	Grog	Occasion	Coarse	Hand	None	Scraped	Reduce	Partial	Rapid
04P0466006b	Plain	A5	7.66	1.2430	Sand	Occasion	Fine/Med	Hand	None		Reduce	Partial	Rapid
04P0466008a	Plain	A6	8.80		Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
04P0466013a	Plain	B4	5.84	1.4771	Grog	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	None	Slow
04P0466016a	Glazed	A15	4.93	1.3096	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
04P0466017a	Glazed	A13	5.32	1.5441	Sand	Occasion	Fine/Med			Scraped	Oxidize	Full	
04P0466018a	Glazed	A13	5.31	1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0491012a	Plain	B2	3.53		Sand	Common	Fine/Med				Reduce	None	Slow
04P0520009a	Plain	B6	6.99	1.3404	Sand	Occasion	Fine/Med	Hand	Burnish	Burnish	Reduce	None	Slow
04P0557006a	Plain	B6	8.21		Sand	Occasion	Fine/Med		Burnish	P. Burn	Reduce	None	Slow
04P0557010a	Plain	A8	3.28	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Full	
04P0557012a	Plain	A11	7.01	1.2430	Sand	Frequent	Fine/Med			Scraped	Oxidize	Full	
04P0557014a	Slip/Pt	A8	9.98	1.1173	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Type	Inclusion Abundance	Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0559009a	Plain	A11	5.84	1.4857	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
04P0559013a	Plain	B1	6.12		Shell	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
04P0561001a	Plain	B2	7.13		Sand	Frequent	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
04P0572009a	Plain	A5	7.32	1.7267	Sand	Occasion	Fine/Med	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
04P0572011a	Glazed	A1	5.14	1.6693	Sand	Occasion	Fine/Med		Smooth		Oxidize	Partial	Slow
04P0572012a	Plain	A4	8.09		Sand	Frequent	V. Coarse	Hand	None	None	Reduce	Partial	Rapid
04P0573013a	Plain	B4	6.03		Shell	Occasion	Coarse			P. Burn	Reduce	None	Slow
04P0573014a	Plain	A5	6.46		Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Reduce	Partial	Rapid
04P0573016a	Plain	B4	6.87		Grog	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
04P0573016b	Plain	B3	4.88		Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	None	Slow
04P0573016c	Plain	B3	7.07	1.5441	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	None	Slow
04P0573020a	Plain	A7	6.76	1.3979	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0587003a	Plain	B7	4.23		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0587007a	Plain	A10	6.41	1.6693	Shell	Common	V. Coarse	Hand		None	Reduce	Partial	Rapid
04P0608013a	Colono	A5	6.04	1.7267	Sand	Occasion	Fine/Med		Smooth	P. Burn	Reduce	Partial	Rapid
04P0636005a	Plain	B2	6.11		Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P0636006a	Plain	B7	6.44		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P0639003a	Plain	B2	6.66		Sand	Common	Fine/Med	Hand		Smooth	Reduce	None	Slow
04P0643009a	Plain	B2	5.18		Sand	Frequent	V. Coarse				Reduce	None	Slow
04P0643011a	Plain	A5	6.93		Sand	Occasion	Fine/Med	Hand	None	Smooth	Reduce	Partial	Rapid
04P0688011a	Plain	B3	5.82		Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow
04P0688011b	Plain	B7	5.82		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0688013a	Plain	B3	6.93	1.1644	Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow
04P0688013b	Plain	A4	5.59	1.6021	Sand	Common	Fine/Med	Hand	None	None	Reduce	Partial	Rapid
04P0688015a	Plain	A3	7.60	1.3404	Grog	Occasion	V. Coarse	Hand					
04P0688015b	Plain	A6	5.70	1.6693	Sand	Frequent	Fine/Med	Hand	None				
04P0688015c	Plain	B4	5.29		Shell	Occasion	V. Coarse	Hand	Scraped	Scraped	Reduce	None	Slow
04P0688015d	Plain	B5	6.92		Shell	Frequent	V. Coarse			None	Reduce	None	Slow
04P0688015e	Plain	A8	5.90	1.9031	Shell	Occasion	V. Coarse	Hand	None	None	Oxidize	Full	
04P0688018a	Plain	A4	6.24	1.2430	Sand	Frequent	Fine/Med	Hand	Scraped	Scraped	Reduce	Partial	Rapid
04P0688018b	Plain	A4	5.32	1.5441	Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0688018c	Plain	A5	7.52	1.4771	Sand	Occasion	Fine/Med	Hand	None		Reduce	Partial	Rapid
04P0688018d	Plain	A6	8.90	1.1644	Sand	Frequent	Fine/Med	Hand	None				
04P0688020a	Glazed	B4	7.02	1.2430	Grog	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0688020b	Glazed	A13	3.81	1.7267	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P0688020c	Glazed	A13	3.86	1.2430	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
04P0688020d	Glazed	A13	3.12	1.8451	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0688020e	Plain	A13	7.04	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688021a	Plain	A5	5.78		Sand	Occasion	Fine/Med	Hand	Scraped	Smooth	Reduce	Partial	Rapid
04P0688023a	Slip/Pt	A8	4.75	0.9731	Shell	Occasion	Coarse		Smooth	Smooth	Oxidize	Full	
04P0688024a	Glazed	A13	4.78	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688025a	Glazed	A15	5.40	1.5441	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P0688026a	Glazed	A12	3.57	1.6693	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
04P0688026b	Glazed	A15	6.80	1.6021	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P0688027a	Glazed	A13	5.93	1.7267	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0688027b	Glazed	A13	3.96	1.5441	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
04P0688027c	Glazed	B7	6.48	1.2430	Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0688027d	Glazed	A15	4.55	1.1644	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P0688027e	Glazed	A13	4.59	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688027f	Glazed	A13	3.69	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688027g	Glazed	A13	3.67	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688027h	Glazed	A12	4.39	1.6021	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
04P0688027i	Glazed	A13	4.12	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688027j	Glazed	A13	4.62	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0688027k	Glazed	A13	3.53	1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0689007a	Glazed	B7	5.76		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0689011a	Plain	B7	9.49		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
04P0689012a	Plain		4.61	1.3096	Sand	Occasion	Fine/Med						
04P0689013a	Plain	B7	5.81		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0690005a	Glazed	A13	5.43	1.3096	Sand	Occasion	Fine/Med	Wheel	Smooth	Scraped	Oxidize	Full	
04P0690006a	Glazed	A6	5.80	1.5441	Sand	Frequent	Fine/Med		Smooth	Smooth	Oxidize	Partial	Slow
04P0690007a	Glazed	A13	4.94	1.6693	Sand	Occasion	Fine/Med		Smooth	Scraped	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0690007b	Glazed	B7	5.64	1.4771	Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0690007c	Glazed	A13	3.49	1.6107	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0690008a	Glazed	A14	4.60	1.2430	Sand	Common	Fine/Med			Smooth	Oxidize	Full	
04P0690010a	Slip/Pt	A9	5.55	1.2430	Calc	Frequent	Coarse		Smooth	Smooth	Oxidize	Full	
04P0690012a	Plain	A10	5.90		Shell	Frequent	V. Coarse	Hand			Reduce	Partial	Rapid
04P0690013a	Plain	B4	6.86		Grog	Occasion	Coarse	Hand	None	Smooth	Reduce	None	Slow
04P0691005a	Glazed	A12	4.27	1.7267	Sand	Occasion	Fine/Med			Scraped	Reduce	Partial	Rapid
04P0691010a	Slip/Pt	A9	5.57	1.1173	Shell	Common	Coarse		Smooth	Smooth	Oxidize	Full	
04P0692008a	Glazed	A13	3.36	1.3096	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0692011a	Plain	B3	3.99		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P0692014a	Plain	B4	6.23		Grog	Occasion	Coarse	Hand			Reduce	None	Slow
04P0692015a	Plain	B7	7.23		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0693007a	Plain	A7	6.29		Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0693008a	Plain	A12	7.51	1.0531	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
04P0693009a	Plain	B4	4.45		Grog	Occasion	Fine/Med	Hand		Smooth	Reduce	None	Slow
04P0693011a	Plain	A4	6.68		Sand	Frequent	Fine/Med	Hand			Reduce	Partial	Rapid
04P0693013a	Plain	A3	5.72	1.3096	Grog	Occasion	Coarse		Smooth		Oxidize	Full	
04P0693015a	Glazed	A13	4.22	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0693017a	Glazed	A16	4.28		Sand	Occasion	Fine/Med			Scraped			
04P0693017b	Glazed	A13	3.84	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0694011a	Glazed	A13	3.60	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0694011b	Glazed	B7	3.29		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P0694012a	Glazed	A14	5.21	1.2430	Sand	Frequent	Fine/Med				Oxidize	Full	
04P0694013a	Glazed	A13	5.36	1.4857	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0694014a	Glazed	A13	4.49	1.4857	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0694014b	Plain	A15	3.61	2.2041	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
04P0694016a	Slip/Pt	A11	5.04	1.0969	Shell	Abundant	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P0694022a	Plain	A1	5.83	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth			
04P0694022b	Plain	A1	6.11	1.6693	Sand	Occasion	Fine/Med	Hand	Smooth		Oxidize	Partial	Slow
04P0694022c	Plain	A7	7.89	1.7267	Grog	Occasion	V. Coarse				Reduce	Partial	Rapid
04P0694022d	Plain	B3	6.91	1.4771	Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Abundance	Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0694022e	Plain	A5	6.92	1.4200	Sand	Occasion	Fine/Med	Hand	Scraped	Scraped	Reduce	Partial	Rapid
04P0694023a	Plain	A5	6.00	1.3096	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0694025a	Plain	B7	6.85	1.6693	Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
04P0694025b	Plain	A5	5.13	1.6693	Sand	Occasion	Fine/Med	Hand		Scraped	Reduce	Partial	Rapid
04P0694025c	Plain	B3	6.51	1.1644	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P0694025d	Plain	A7	6.42	1.7267	Grog	Occasion	Fine/Med	Hand	Smooth	None	Reduce	Partial	Slow
04P0694025e	Plain	A13	5.51	1.3674	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0694025f	Slip/Pt	A13	4.17	1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0694025g	Plain	B7	8.19		Sand	Occasion	Fine/Med	Hand	None	Smooth	Reduce	None	Slow
04P0694025h	Plain	B1	6.30		Grog	Frequent	V. Coarse				Reduce	None	Slow
04P0694026a	Plain	A9	6.75	1.6021	Shell	Occasion	V. Coarse	Hand		Smooth	Oxidize	Full	
04P0694026b	Plain	A7	6.72	1.4771	Shell	Occasion	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
04P0694027a	Plain	A3	10.30	1.5441	Grog	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
04P0705002a	Plain	A11	4.24	1.6693	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
04P0727025a	Slip/Pt	A6	10.06	1.1761	Sand	Frequent	Fine/Med	Wheel	None	P. Burn	Oxidize	Partial	Slow
04P0727028a	Glazed	A13	3.45	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P0727029a	Glazed	A13	3.60	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P0727029b	Glazed	A15		1.3010	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0729007a	Plain	B3	6.12		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
04P0729008a	Glazed	B7	3.15		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P0779009a	Glazed	A16	4.93	1.4771	Sand	Occasion	Fine/Med			Scraped			
04P0779010a	Glazed	B7	4.63		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P0779011a	Glazed	A13	3.31	1.7202	Sand	Occasion	Fine/Med				Oxidize	Full	
04P0779012a	Plain	B3	6.71		Sand	Occasion	Fine/Med	Hand	None	P. Burn	Reduce	None	Slow
04P0779014a	Plain	A8	7.46	1.7267	Sand	Occasion	Fine/Med	Hand			Oxidize	Full	
04P0779016a	Glazed	B2	6.03	1.6021	Sand	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P0779017a	Plain	B2	5.22		Shell	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P0780001a	Plain	B2	8.48	1.6021	Sand	Common	Fine/Med	Hand	None	None	Reduce	None	Slow
04P0780001b	Plain	B2	4.81		Sand	Frequent	Fine/Med			Scraped	Reduce	None	Slow
04P0780003a	Plain	B2	6.23		Sand	Common	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P0790006a	Plain	B2	6.19	1.6021	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0790013a	Plain	A7	6.74	1.1644	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
04P0802006a	Glazed	A13	5.70	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0802006b	Glazed	A15	4.40	1.3674	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P0802009a	Plain	B4	7.82		Grog	Occasion	V. Coarse	Hand	None	Smooth	Reduce	None	Slow
04P0802009b	Plain	A3	6.44	1.6107	Grog	Occasion	Coarse	Hand	Smooth		Oxidize	Partial	Slow
04P0811009a	Plain	B4	7.27		Grog	Occasion	Fine/Med	Hand	Scraped	Scraped	Reduce	None	Slow
04P0811009b	Plain	B7	6.05		Sand	Occasion	Fine/Med	Hand		Scraped	Reduce	None	Slow
04P0812002a	Plain	B7	7.83	1.4771	Sand	Occasion	Fine/Med	Hand	None	Scraped	Reduce	None	Slow
04P0812004a	Glazed	A12	6.53	1.1847	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
04P0812005a	Slip/Pt	A5	4.51	1.7267	Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	Partial	Rapid
04P0813007a	Glazed	A1	5.65	1.4200	Sand	Occasion	Fine/Med		Smooth	Smooth			
04P0813010a	Plain	A13	5.16	1.0969	Sand	Occasion	Fine/Med	Hand			Oxidize	Full	
04P0856054a	Colono	B1	5.79	1.1644	Grog	Common	V. Coarse		P. Burn	P. Burn	Reduce	None	Slow
04P0859040a	Colono	A10	6.85	1.4771	Grog	Common	Coarse		P. Burn	P. Burn	Reduce	Partial	Rapid
04P0867025a	Colono	B4	6.81	1.3979	Grog	Occasion	Coarse	Hand		P. Burn	Reduce	None	Slow
04P0875008a	Glazed			1.3096	Sand	Occasion	Fine/Med						
04P0875010a	Glazed	A13	4.37	1.6107	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P0875011a	Glazed	A16	4.15	1.4771	Sand	Occasion	Fine/Med	Wheel		Scraped	Oxidize	Partial	Slow
04P0950009a	Glazed	A15	3.71	1.5441	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P0950010a	Glazed	A15	4.16	1.0969	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P0950011a	Glazed	A1	4.74	1.4200	Sand	Occasion	Fine/Med		Smooth	Smooth			
04P0968009a	Colono	A13	8.13	1.0969	Sand	Occasion	Fine/Med		Burnish	Burnish	Oxidize	Full	
04P0974015a	Glazed	A16	4.19	1.7267	Sand	Occasion	Fine/Med	Wheel	Smooth	None	Oxidize	Partial	
04P0974017a	Plain	A4	7.73		Sand	Frequent	Fine/Med			Smooth	Reduce	Partial	Rapid
04P0974018a	Plain	A1	7.48		Sand	Occasion	Fine/Med	Hand	None	P. Burn	Oxidize	Partial	Slow
04P0974019a	Plain	B2	7.15	1.4771	Sand	Frequent	Fine/Med	Hand	Smooth	Scraped	Reduce	None	Slow
04P0974020a	Plain	B7	5.55		Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	None	Slow
04P0974024a	Plain	B7	6.57		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P0993006a	Glazed	A1	5.31	1.4771	Sand	Occasion	Fine/Med		Smooth	Scraped	Oxidize	Partial	Slow
04P0993008a	Glazed	A13	4.50	1.6021	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
04P0993016a	Plain	B4	7.26		Shell	Occasion	V. Coarse			Smooth	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P0993018a	Plain	B7	6.60		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
04P0993019a	Plain	A6	6.22		Sand	Frequent	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
04P0993020a	Plain	B4	7.22		Grog	Occasion	Coarse	Hand	Scraped	Scraped	Reduce	None	Slow
04P1031005a	Glazed	B2	5.15	1.4771	Sand	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P1031009a	Plain	B4	4.92		Grog	Occasion	Fine/Med		None	Smooth	Reduce	None	Slow
04P1031010a	Plain	A2	6.99	1.6021	Grog	Frequent	V. Coarse	Hand		None			
04P1053006a	Plain	B2	6.72		Sand	Frequent	Fine/Med	Hand	Scraped	Smooth	Reduce	None	Slow
04P1053007a	Plain	B4	5.95		Grog	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
04P1054007a	Plain	B4	6.32		Grog	Occasion	Coarse	Hand	P. Burn		Reduce	None	Slow
04P1054008a	Plain	B2	4.97		Sand	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P1054008b	Plain	B4	6.90		Grog	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P1071010a	Plain	B7	4.68		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P1071011a	Plain	A3	7.06	1.7267	Grog	Occasion	V. Coarse	Hand	Smooth	None	Oxidize	Partial	Slow
04P1071016a	Slip/Pt	A8	5.54	1.0531	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P1071017a	Glazed	A13	7.98	1.6107	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P1071018a	Glazed	A14	7.81	1.4857	Sand		V. Fine				Oxidize	Full	
04P1081004a	Plain	A3	10.40	1.2430	Grog	Occasion	Coarse	Hand	None	None			
04P1082008a	Plain	B7	4.37		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P1082014a	Slip/Pt	B4	5.64		Grog	Occasion	Coarse				Reduce	None	Slow
04P1082021a	Glazed	A12	4.49	1.5441	Sand	Occasion	Fine/Med		Smooth	Scraped	Reduce	Partial	Rapid
04P1082032a	Plain	B4	5.59		Grog	Occasion	V. Coarse	Hand	Scraped	Smooth	Reduce	None	Slow
04P1092005a	Plain	A1	7.83	1.6107	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
04P1092006a	Glazed	A12	5.16	1.6693	Sand	Occasion	Fine/Med		Smooth	Scraped	Reduce	Partial	Rapid
04P1092007a	Glazed	B7	5.26		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1094011a	Plain	A1	8.28	0.8751	Sand	Occasion	Fine/Med	Hand	Smooth				
04P1094011b	Plain	A7	5.51		Grog	Occasion	Coarse				Reduce	Partial	Rapid
04P1094012a	Plain	A6	8.13	0.9731	Sand	Frequent	Fine/Med						
04P1113005a	Plain	B2	7.57		Sand	Frequent	Fine/Med				Reduce	None	Slow
04P1159012a	Slip/Pt	A6	7.07	0.9420	Sand	Frequent	Fine/Med	Hand	Smooth				
04P1159014a	Glazed	A13	3.47	1.3096	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1180005a	Colono	A2	7.48	1.4857	Grog	Common	Coarse		Smooth		Oxidize	Partial	Slow

	Pottery	Sub-		Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	Thick	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
04P1197037a	Colono	A2	5.25	1.4771	Grog	Common	Coarse		Scraped	Scraped			
04P1206041a	Slip/Pt	A16	8.73	1.0969	Sand	Occasion	Fine/Med	Wheel	Smooth	None	Oxidize	Partial	Slow
04P1206042a	Plain	A14	4.47	1.6107	Sand		V. Fine	Wheel	None	Smooth	Oxidize	Full	
04P1206042b	Plain	B4	3.65		Grog	Occasion	Coarse	Hand	Smooth	Scraped	Reduce	None	Slow
04P1206045a	Glazed	A16	4.98	1.4857	Sand	Occasion	Fine/Med	Wheel	None	Scraped			
04P1206045b	Glazed	A11	8.89	1.6693	Sand	Frequent	Fine/Med		Smooth		Oxidize	Full	
04P1206045c	Glazed	A15	3.88	1.6107	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
04P1206045d	Glazed	A15	5.46	1.4857	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
04P1206045e	Glazed	A15	3.54	1.8451	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1206045f	Glazed	A15		1.9031	Sand	Occasion	Fine/Med	Wheel	None	Scraped	Oxidize	Full	
04P1206045g	Glazed	A15	3.80	1.8451	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
04P1206045h	Glazed	A14	4.90	1.4857	Sand	Frequent	Fine/Med	Wheel	None	Scraped	Oxidize	Full	
04P1206045i	Glazed	B7	3.73		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1206046a	Glazed	A13	5.25	1.7267	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P1206050a	Plain	B3	5.32		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P1206051a	Plain	A4	7.46		Sand	Common	Fine/Med	Hand	Scraped	Scraped	Reduce	Partial	Rapid
04P1206051b	Plain	A7	4.80	1.3522	Grog	Occasion	Coarse	Hand	Smooth		Reduce	Partial	Rapid
04P1206052a	Plain	B3	4.87		Sand	Occasion	Coarse				Reduce	None	Slow
04P1206053a	Plain	B7	5.42		Sand	Occasion	Coarse			None	Reduce	None	Slow
04P1206053b	Plain	B3	4.11		Sand	Occasion	Coarse	Hand			Reduce	None	Slow
04P1239016a	Plain	A5	6.86	1.4200	Shell	Occasion	Coarse			None	Reduce	Partial	Rapid
04P1239016b	Plain	A7	7.14		Shell	Occasion	Coarse			None	Reduce	Partial	Rapid
04P1239016c	Plain	A10	8.14		Shell	Frequent	Coarse	Hand			Reduce	Partial	Rapid
04P1239016d	Plain	A7	5.02		Shell	Occasion	V. Coarse	Hand	None	Smooth	Reduce	Partial	Rapid
04P1239017a	Plain	A12	4.45		Sand	Occasion	Fine/Med			None	Reduce	Partial	Rapid
04P1239017b	Plain	B2	4.45		Sand	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P1239017c	Plain	A4	6.46	1.6693	Sand	Common	Fine/Med		Burnish	Smooth	Reduce	Partial	Rapid
04P1239019a	Plain	B1	5.38	1.4771	Shell	Abundant	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
04P1239023a	Glazed	A14	5.71	1.4200	Sand		V. Fine	Wheel	None	Smooth	Oxidize	Full	
04P1239026a	Plain	B4	5.92	1.0969	Grog	Occasion	Coarse	Hand		Smooth	Reduce	None	Slow
04P1239028a	Slip/Pt	B2	4.63		Sand	Common	Fine/Med			Smooth	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P1239029a	Glazed	A14	4.31	1.0969	Sand		V. Fine			Smooth	Oxidize	Full	
04P1239031a	Glazed	B8	4.58		Sand	Occasion	Fine/Med	Wheel		None	Reduce	None	Slow
04P1239032a	Glazed	A16		1.1644	Sand	Occasion	Fine/Med	Wheel	None	Scraped			
04P1239033a	Glazed	B7	3.09		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1239033b	Glazed	A13	3.55	1.5441	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
04P1239033c	Glazed	A15	3.59		Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
04P1239033d	Glazed	A13	5.29	1.6107	Sand	Occasion	Fine/Med			Scraped	Oxidize	Full	
04P1239033e	Glazed	B8	4.74		Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
04P1239033f	Glazed	A15	4.29	1.5441	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
04P1239033g	Glazed	A13	4.10	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1239033h	Glazed	A15	2.78	1.9031	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1239034a	Plain	A6	8.45	1.0170	Sand	Frequent	V. Coarse	Hand	None	Scraped	Oxidize	Partial	Slow
04P1239034b	Glazed	A11		0.9731	Sand	Common	V. Coarse				Oxidize	Full	
04P1239034c	Plain	A14	4.66	1.5441	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
04P1239034d	Slip/Pt	A6	4.66	1.8451	Sand	Frequent	Coarse			Smooth	Oxidize	Partial	Slow
04P1239077a	Glazed	A13	4.09	1.5441	Sand	Occasion	Fine/Med			Scraped	Oxidize	Full	
04P1289010a	Plain	A7		1.4200	Grog	Occasion	Coarse	Hand			Reduce	Partial	Rapid
04P1289010b	Plain	B2	5.59		Sand	Frequent	Fine/Med	Hand	Smooth	Scraped	Reduce	None	Slow
04P1289010c	Plain	B3	5.10		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P1289011a	Plain	A5	8.35		Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	Partial	Rapid
04P1289011b	Plain	A4	8.08	1.7267	Sand	Frequent	Fine/Med	Hand		Smooth	Reduce	Partial	Rapid
04P1289011c	Plain	A12	6.37	1.5441	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
04P1289013a	Plain	A6	5.70	1.4857	Sand	Abundant	Fine/Med				Oxidize	Partial	Slow
04P1289014a	Plain	B1	4.75		Shell	Frequent	Coarse	Hand		None	Reduce	None	Slow
04P1289015a	Plain	A7	5.18	1.4200	Grog	Occasion	Coarse	Hand			Reduce	Partial	Rapid
04P1289016a	Slip/Pt	A14	5.16	0.8921	Sand	Frequent	Fine/Med	Wheel	None		Oxidize	Full	
04P1289018a	Plain	A11	4.76	1.6693	Sand		V. Fine	Hand	Smooth	None	Oxidize	Full	
04P1289019a	Slip/Pt	A13	3.13	1.8451	Sand	Occasion	Fine/Med		Smooth		Oxidize	Full	
04P1289022a	Glazed	A14		1.6021	Sand	Frequent	Fine/Med				Oxidize	Full	
04P1289023a	Glazed	A15	3.95		Sand	Occasion	Fine/Med				Oxidize	Full	
04P1289024a	Glazed	A15	3.77	1.7267	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P1289024b	Glazed	B7	3.86		Sand	Occasion	Fine/Med		Smooth	None	Reduce	None	Slow
04P1289024c	Glazed	A15	3.06	1.6693	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P1289024d	Glazed	A15	3.22	1.7267	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1289024e	Glazed	A15	3.17	1.6107	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
04P1289024f	Glazed	A15	4.68	1.7267	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1289024g	Glazed	B7	3.36		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1289024h	Glazed	A12			Sand	Occasion	Fine/Med			Scraped	Reduce	Partial	Rapid
04P1289024i	Glazed	A12	2.53	1.4857	Sand	Occasion	Fine/Med			Scraped	Reduce	Partial	Rapid
04P1345003a	Plain	B7	5.80		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
04P1346014a	Plain	A5	6.10	1.4771	Sand	Occasion	Fine/Med	Hand		None	Reduce	Partial	Rapid
04P1346014b	Plain	A5	4.23	1.7267	Sand	Occasion	Fine/Med	Hand			Reduce	Partial	Rapid
04P1346015a	Plain	A4		1.6107	Sand	Common	Fine/Med	Hand	None		Reduce	Partial	Rapid
04P1346016a	Plain	A7		1.6107	Shell	Occasion	Coarse	Hand	Smooth		Reduce	Partial	Rapid
04P1346018a	Plain	B5	6.62		Shell	Common	V. Coarse	Hand	None	Smooth	Reduce	None	Slow
04P1346018b	Plain	B5	5.80		Shell	Common	V. Coarse	Hand	None	None	Reduce	None	Slow
04P1346018c	Plain	A2	6.04	1.6693	Grog	Frequent	V. Coarse	Hand	Smooth		Oxidize	Partial	Slow
04P1346019a	Plain	A10		1.6107	Shell	Common	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
04P1346041a	Glazed	A13	3.80	1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1346041b	Glazed	A13	4.32	1.6693	Sand	Occasion	Fine/Med			Scraped	Oxidize	Full	
04P1346041c	Glazed	A15	3.69	1.8451	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1346041d	Glazed	A15	5.43	1.6693	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
04P1346041e	Glazed	A15	3.91	1.7267	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1346041f	Glazed	A15	3.42	1.8451	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1346041g	Glazed	A15		1.4857	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1346041h	Glazed	A15	4.37	1.5441	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1346041i	Glazed	A13	4.04	1.3096	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1346042a	Glazed	A13	4.04	1.3096	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1407002a	Plain	A10	7.01	1.6693	Shell	Frequent	V. Coarse	Hand			Reduce	Partial	Rapid
04P1408005a	Glazed	A13	4.29	1.4857	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1409004a	Plain	B1	6.07		Grog	Frequent	V. Coarse				Reduce	None	Slow
04P1409004b	Plain	A5	6.93	1.6693	Shell	Occasion	Coarse			None	Reduce	Partial	Rapid

	Pottery	Sub-		Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	Thick	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
04P1409013a	Glazed	A12	4.36		Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
04P1409013b	Glazed	A15	3.37		Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
04P1409013c	Glazed	B7	3.75		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1409013d	Glazed	B7	4.02		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1409013e	Glazed	B7	4.14		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
04P1409014a	Glazed	A12	4.54	1.2430	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
04P1409015a	Glazed	B7	3.82		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1409025a	Plain				Sand	Common	Fine/Med						
04P1414007a	Plain	B7	5.21		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
04P1414007b	Plain	A7	7.13		Grog	Occasion	Coarse	Hand			Reduce	Partial	Rapid
04P1414008a	Plain	A7	6.10	0.8921	Grog	Occasion	V. Coarse	Hand			Reduce	Partial	Rapid
04P1414008b	Slip/Pt	A2	7.25	1.4771	Shell	Frequent	V. Coarse			Scraped			
04P1414009a	Plain	B5	5.86	1.4200	Shell	Common	V. Coarse	Hand			Reduce	None	Slow
04P1414009b	Plain	B5	5.63		Shell	Frequent	V. Coarse			Scraped	Reduce	None	Slow
04P1414009c	Plain	B5	6.70		Shell	Common	V. Coarse	Hand		Scraped	Reduce	None	Slow
04P1414009d	Plain	B4	5.65		Grog	Occasion	V. Coarse	Hand			Reduce	None	Slow
04P1414009e	Plain	A7	5.97		Shell	Occasion	V. Coarse			Smooth	Reduce	Partial	Rapid
04P1414009f	Plain	B5	6.74		Shell	Common	V. Coarse			Scraped	Reduce	None	Slow
04P1414009g	Plain	A10	6.14	1.0531	Shell	Common	V. Coarse				Reduce	Partial	Rapid
04P1414010a	Plain	B4	6.26		Grog	Occasion	Coarse				Reduce	None	Slow
04P1414011a	Plain	B4	6.20	1.4200	Grog	Occasion	Coarse	Hand		Smooth	Reduce	None	Slow
04P1414011b	Plain	B4	5.73		Grog	Occasion	Coarse	Hand		Smooth	Reduce	None	Slow
04P1414012a	Glazed	A13	3.22	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1414013a	Glazed	A13	3.59	1.3096	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P1414014a	Glazed	B7	3.59		Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
04P1414015a	Glazed	B7	3.72	1.2430	Sand	Occasion	Fine/Med				Reduce	Full	Slow
04P1414015b	Glazed	B7	3.60	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	Full	Slow
04P1414016a	Glazed	A15	3.45		Sand	Occasion	Fine/Med				Oxidize	Full	
04P1414016b	Glazed	B7	3.99		Sand	Occasion	Fine/Med		Smooth	Scraped	Reduce	None	Slow
04P1414016c	Glazed	A15	3.64		Sand	Occasion	Fine/Med				Oxidize	Full	
04P1414016d	Glazed	A13	3.45	1.1644	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
04P1414016e	Glazed	A15	3.29		Sand	Occasion	Fine/Med				Oxidize	Full	
04P1461012a	Glazed	B7	4.82	1.4200	Sand	Occasion	Fine/Med			Smooth	Reduce	Full	Slow
04P1461012b	Glazed	A12	3.85		Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
04P1461012c	Glazed	B7	4.10		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
04P1461012d	Glazed	B7	3.83		Sand	Occasion	Fine/Med		Smooth		Reduce	None	Slow
04P1461012e	Glazed	B7	3.77		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1461012f	Glazed	A13	4.42	1.6107	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
04P1461013a	Glazed		5.11	1.0969	Sand	Occasion	Fine/Med						
04P1461014a	Glazed	A13	4.68	1.3522	Sand	Occasion	Fine/Med				Oxidize	Full	
04P1461015a	Glazed	A12	5.73	1.4857	Sand	Occasion	Fine/Med		Smooth		Reduce	Partial	Rapid
04P1461016a	Glazed	A16	6.48	1.6693	Sand	Occasion	Fine/Med	Wheel	None	Smooth			
04P1461017a	Plain	A10	6.57	1.4200	Grog	Common	V. Coarse	Hand	None	Smooth	Reduce	Partial	Rapid
04P1461018a	Plain		5.96		Grog	Frequent	Fine/Med						
04P1461019a	Plain	B5	6.57		Grog	Common	V. Coarse		None	Smooth	Reduce	None	Slow
04P1461019b	Plain	B4	5.56		Grog	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
04P1461019c	Plain		6.02		Sand	Occasion	Fine/Med						
04P1777005a	Plain	B3	5.98		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
04P1777006a	Glazed	A11	4.37	1.3674	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
04P1805021a	Colono	B2	8.69	2.2041	Sand	Frequent	Fine/Med		Smooth	Scraped	Reduce	None	Slow
04P1816012a	Glazed	A12	3.31	1.1761	Sand	Occasion	Fine/Med		Smooth		Reduce	Partial	Rapid
04P1816012b	Glazed	A13	4.14	1.6021	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
04P1816013a	Glazed	A13	5.49	1.5441	Sand	Occasion	Fine/Med		Smooth	Scraped	Oxidize	Full	
04P1816015a	Glazed	B7	3.67		Sand	Occasion	Fine/Med				Reduce	None	Slow
04P1816016a	Plain	B7	6.39		Sand	Occasion	Fine/Med	Hand	None	Smooth	Reduce	None	Slow
04P1816016b	Plain	A12	4.85	1.7267	Sand	Occasion	Fine/Med	Hand			Reduce	Partial	Rapid
04P1817005a	Plain	A7	5.64	1.4857	Grog	Occasion	Fine/Med	Hand	Smooth		Reduce	Partial	Rapid
04P1817006a	Plain	B2	6.10		Sand	Frequent	Fine/Med			Smooth	Reduce	None	Slow
04P1817007a	Plain	B1	6.60		Shell	Common	V. Coarse	Hand		P. Burn	Reduce	None	Slow
04P1817008a	Plain	B4	6.47		Shell	Occasion	Coarse	Hand	P. Burn	Burnish	Reduce	None	Slow
04P1871010a	Colono	A10	9.21	1.1644	Grog	Common	Coarse		P. Burn	P. Burn	Reduce	Partial	Rapid
04P2016008a	Plain	B7	6.84		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow

	Pottery	Sub-		Redness		Inclusion			Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	Thick	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
05F1021001a	Plain	A1	5.38	1.6107	Sand	Occasion	Coarse	Hand	P. Burn	Scraped	Oxidize	Partial	Slow
05F1101001a	Plain	A5	5.99	1.5441	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
05F1168001a	Glazed	B8	2.56		Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	None	Slow
05F1212001a	Glazed	A12		1.5441	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
05F1212003a	Plain	A1	5.89		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Partial	Slow
05F1233002a	Plain	A5	4.96	1.6693	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
05F1278001a	Slip/Pt	A13	4.01	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
05F1438001a	Glazed	B8	3.95		Sand	Occasion	Fine/Med	Wheel		None	Reduce	None	Slow
05F1551005a	Glazed	A13	4.62	1.3096	Sand	Occasion	Fine/Med				Oxidize	Full	
05F1670001a	Glazed	A15	3.12	1.4771	Sand	Occasion	Fine/Med	Wheel	None		Oxidize	Full	
05F1807001a	Plain	B6	6.46		Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Reduce	Partial	Slow
05F1807002a	Plain	A13	3.55	1.7267	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
05F1920003a	Plain	A10	8.14	1.7267	Shell	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
05F1936001a	Plain	B2			Sand	Frequent	Fine/Med		Burnish		Reduce	None	Slow
05F1936001b	Plain	B7	7.44		Sand	Occasion	Fine/Med	Hand	None	None	Reduce	None	Slow
05F1945003a	Glazed	A1	5.41	1.7267	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
05F1945004a	Glazed	A13	4.03	1.1173	Sand	Occasion	Fine/Med				Oxidize	Full	
05F1984004a	Glazed	B4		1.2430	Grog	Occasion	Coarse	Wheel		None	Reduce	None	Slow
05F1984005a	Slip/Pt	A2	6.61	1.6693	Grog	Frequent	Coarse		Smooth	Smooth			
05F1984007a	Slip/Pt	A15	8.01	1.0969	Sand	Occasion	Fine/Med	Wheel	Smooth	None	Oxidize	Full	
05F1984012a	Glazed	A16	5.07	1.7267	Sand	Occasion	Fine/Med			Smooth			
05F1984012b	Glazed	A16	5.23	1.6693	Sand	Occasion	Fine/Med	Wheel		None			
05F1984012c	Glazed	B7	3.67		Sand	Occasion	Fine/Med				Reduce	None	Slow
05F1985003a	Glazed	A15	3.97	1.7267	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
05F1985004a	Glazed	A14	4.59	1.1761	Sand		V. Fine			Smooth	Oxidize	Full	
05F1985006a	Plain	B2	6.47		Sand	Common	Fine/Med				Reduce	None	Slow
05F1985006b	Plain	A5	5.39	1.7267	Sand	Occasion	Fine/Med	Hand	P. Burn	Burnish	Reduce	Partial	Rapid
05F1985006c	Plain	A6	7.56	1.6693	Sand	Frequent	Fine/Med			P. Burn			
05F1985007a	Plain	A6	6.80	1.6693	Sand	Frequent	Coarse	Hand	P. Burn	P. Burn	Oxidize	Partial	Slow
05F1992001a	Plain	A14	4.39	1.7267	Sand		V. Fine				Oxidize	Full	
05F1999002a	Plain	A14	3.42	1.7267	Sand		V. Fine				Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
05F1999003a	Plain	B2	4.98		Sand	Frequent	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2005006a	Plain	A1	5.77		Sand	Occasion	Coarse	Hand	P. Burn	P. Burn			
05F2006001a	Glazed	A13	3.42	1.4857	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2006002a	Glazed	A12	2.96		Sand	Occasion	Fine/Med	Wheel		None	Reduce	Partial	Rapid
05F2006003a	Plain	A1	4.40	1.5441	Sand	Occasion	Fine/Med	Hand	Burnish	Scraped			
05F2007002a	Glazed	A16	4.43	1.4857	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Partial	Slow
05F2007002b	Glazed	A13	4.98	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2007002c	Glazed	A15	4.98	1.6693	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
05F2007002d	Glazed	B7	5.11		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
05F2007002e	Glazed	A13	3.67	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2007003a	Glazed	B7	5.36	1.7267	Sand	Occasion	Fine/Med				Reduce	Partial	Slow
05F2007011a	Plain	A6	7.88	1.5441	Sand	Frequent	Fine/Med	Hand	P. Burn	Burnish	Oxidize	Partial	Slow
05F2007012a	Plain	B1	5.55		Shell	Frequent	Coarse	Hand	Smooth		Reduce	None	Slow
05F2041009a	Glazed	B8	4.92	1.2430	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	None	Slow
05F2041011a	Plain	A8	4.85	1.6693	Sand	Occasion	Coarse	Hand	P. Burn	P. Burn	Oxidize	Full	
05F2041012a	Plain	A13	5.05	1.9031	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
05F2041014a	Plain	A1			Sand	Occasion	Coarse	Hand	Burnish				
05F2041014b	Plain	A6	7.26	1.6693	Sand	Frequent	V. Coarse		P. Burn	P. Burn	Oxidize	Partial	Slow
05F2041014c	Slip/Pt	A12	5.58	1.7267	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
05F2048001a	Glazed	A16	4.29	1.7267	Sand	Occasion	Fine/Med	Wheel	None	Scraped			
05F2060001a	Plain	A3	5.16	1.7267	Grog	Occasion	Coarse		P. Burn	P. Burn	Oxidize	Full	
05F2060002a	Glazed	A11	5.27	1.1761	Sand	Common	Fine/Med		Smooth	Smooth	Oxidize	Full	
05F2062005a	Plain	A10	6.31		Shell	Common	V. Coarse				Reduce	Partial	Rapid
05F2062006a	Plain	A5	6.88	1.4771	Sand	Occasion	V. Coarse		Burnish	Burnish	Reduce	Partial	Rapid
05F2098001a	Glazed	A16	6.50	1.7267	Sand	Occasion	Fine/Med	Wheel	None	Smooth			
05F2098002a	Slip/Pt	A3	3.90	1.0969	Shell	Occasion	Coarse	Hand		Burnish	Oxidize	Partial	Slow
05F2100001a	Glazed	B8	4.35	1.2430	Sand	Occasion	Fine/Med	Wheel		None	Reduce	None	Slow
05F2121001a	Plain	B6	7.33		Sand	Occasion	Fine/Med	Hand	Burnish	Burnish	Reduce	None	Slow
05F2121002a	Plain	A8	4.59	1.8451	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Full	
05F2176001a	Plain	A8	5.31	1.9031	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
05F2191001a	Glazed	A15	3.33	1.3674	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	

	Pottery	Sub-		Redness	Inclusion				Interior	Exterior	Firing		Cool
Sample No.	Category	Cluster	Thick	Index	Type	Abundance	Size	Form	Sh/Fin	Sh/Fin	Atmos.	Oxid.	Rate
05F2191001b	Glazed	A16		1.6693	Sand	Occasion	Fine/Med				Oxidize	Partial	Slow
05F2192003a	Slip/Pt	B4	3.59		Grog	Occasion	Coarse				Reduce	None	Slow
05F2192004a	Plain	B6	5.09		Sand	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2204001a	Glazed	A15	4.67	1.7267	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
05F2244004a	Slip/Pt	A6	6.39	1.0531	Sand	Common	Fine/Med		Smooth	P. Burn	Oxidize	Partial	Slow
05F2244005a	Slip/Pt	A11	5.46	1.1761	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
05F2244006a	Glazed	A11	3.93	1.0170	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
05F2244007a	Plain	A5	5.15		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
05F2244008a	Glazed	A16	5.02		Sand	Occasion	Fine/Med			Smooth			
05F2244010a	Plain	B6	5.53		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2244010b	Plain	A12	5.96	1.6693	Sand	Occasion	Fine/Med		Burnish	P. Burn	Reduce	Partial	Rapid
05F2257001a	Glazed	A15	4.71	1.7267	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
05F2257002a	Glazed	A16	6.71	1.7267	Sand	Occasion	Fine/Med			Smooth			
05F2257003a	Glazed	B8	4.08		Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
05F2257005a	Glazed	A15	4.25	1.1173	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
05F2257008a	Plain	A12	6.03	1.9031	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
05F2257008b	Plain	B7	3.77		Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
05F2259001a	Plain	A6	5.50	1.8451	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Partial	Slow
05F2259001b	Plain	A5	6.68	1.9031	Sand	Occasion	Fine/Med	Hand	Burnish	Smooth	Reduce	Partial	Rapid
05F2259001c	Plain	B7			Sand	Occasion	Fine/Med			P. Burn	Reduce	None	Slow
05F2259003a	Glazed	A13	5.11	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2259003b	Glazed	A13	3.69	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2259003c	Glazed	A13	3.72	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2259003d	Glazed	A16			Sand	Occasion	Fine/Med	Wheel	None				
05F2259005a	Glazed	A15	4.36		Sand	Occasion	Fine/Med				Oxidize	Full	
05F2260003a	Slip/Pt	A14	6.39	1.0000	Sand	Frequent	Fine/Med				Oxidize	Full	
05F2260004a	Glazed	A14		1.2430	Sand		V. Fine	Wheel	None	None	Oxidize	Full	
05F2260005a	Plain	A13	4.65	1.4771	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2260007a	Slip/Pt	A9	6.31		Shell	Frequent	Coarse				Oxidize	Full	
05F2260008a	Plain	A6	4.20	1.7267	Sand	Common	Fine/Med			Scraped	Oxidize	Partial	Slow
05F2260009a	Glazed	A12	3.95	1.9031	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
05F2260010a	Plain	A11	7.45	1.9031	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Full	
05F2260010b	Plain	A4	6.57		Sand	Frequent	Fine/Med			P. Burn	Reduce	Partial	Rapid
05F2260010c	Plain	A4	4.97	1.7267	Sand	Common	Fine/Med				Reduce	Partial	Rapid
05F2265001a	Plain	A12		1.5441	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
05F2265001b	Plain	A12	6.77	1.7267	Sand	Occasion	Fine/Med			Scraped	Reduce	Partial	Rapid
05F2265003a	Glazed	A13	9.01	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2265003b	Glazed	A13	6.48	1.7267	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2265004a	Glazed	A15	3.97	1.5441	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
05F2265004b	Glazed	B7	3.98		Sand	Occasion	Fine/Med				Reduce	None	Slow
05F2265005a	Plain				Sand	Occasion	Fine/Med			P. Burn			
05F2267001a	Plain	A10	5.56	0.9731	Shell	Common	V. Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
05F2267002a	Glazed	A14	5.55	1.2430	Sand	Frequent	Fine/Med				Oxidize	Full	
05F2268001a	Glazed	B7	4.55	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	Full	Slow
05F2281002a	Glazed	A15	4.30	1.3096	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
05F2314003a	Plain	B7	6.60		Sand	Occasion	Fine/Med				Reduce	None	Slow
05F2316001a	Glazed	A13	4.81	1.3674	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2324003a	Plain	A7	4.03		Grog	Occasion	Coarse		Smooth	Scraped	Reduce	Partial	Rapid
05F2324004a	Glazed	A13	6.22	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2324005a	Plain	B1	4.37		Grog	Frequent	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2346010a	Glazed	A13	5.39	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2346010b	Glazed	A13	5.79	1.3522	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2346011a	Plain				Grog	Frequent	Coarse						
05F2346013a	Plain	A7	5.71	1.5441	Grog	Occasion	Coarse	Hand	Burnish	Smooth	Reduce	Partial	Rapid
05F2364004a	Glazed	B8	2.92		Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	None	Slow
05F2364004b	Glazed	A12	4.02	1.7267	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
05F2364007a	Plain	B6	6.06		Sand	Occasion	Fine/Med	Hand	Burnish	Burnish	Reduce	None	Slow
05F2365002a	Glazed	B7	6.66		Sand	Occasion	Fine/Med			Scraped	Reduce	None	Slow
05F2371001a	Glazed	B7			Sand	Occasion	Fine/Med				Reduce	None	Slow
05F2371001b	Glazed	A8	6.92	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
05F2371002a	Glazed	A13	8.69	1.0969	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2371003a	Plain	A7	12.22		Grog	Occasion	V. Coarse				Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
05F2371004a	Plain	A1	5.68	2.2041	Sand	Occasion	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
05F2372004a	Plain	B6	7.17		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2372010a	Slip/Pt	A3	6.37	1.4771	Grog	Occasion	Coarse		Smooth		Oxidize	Full	
05F2372011a	Glazed	A1	5.23	1.7267	Sand	Occasion	Fine/Med			Smooth	Oxidize	Partial	Slow
05F2372011b	Glazed	B7	2.93		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
05F2372011c	Glazed	B8	2.65		Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
05F2372011d	Glazed	B7	3.70		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
05F2435005a	Plain	A7	4.84	1.6693	Shell	Occasion	Coarse	Hand	Smooth	Scraped	Reduce	Partial	Rapid
05F2463001a	Slip/Pt	A7	5.68	1.1761	Shell	Occasion	Coarse			Burnish	Reduce	Partial	Rapid
05F2466001a	Slip/Pt	A4	8.99	1.1847	Sand	Frequent	Fine/Med	Hand	Scraped		Reduce	Partial	Rapid
05F2466002a	Slip/Pt	A1	6.65	1.4771	Sand	Occasion	Fine/Med		P. Burn	P. Burn	Oxidize	Partial	Slow
05F2466003a	Plain		3.87	1.6693	Sand	Occasion	Fine/Med						
05F2466004a	Slip/Pt	A6	6.43	1.6693	Shell	Frequent	Coarse		Smooth	Smooth	Oxidize	Partial	Slow
05F2466005a	Glazed	A13	4.08	1.7267	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2479001a	Plain	A3	5.34	1.5441	Grog	Occasion	Coarse	Hand	Burnish	None			
05F2479002a	Plain	B6	6.92		Sand	Occasion	Coarse	Hand	Burnish	P. Burn	Reduce	None	Slow
05F2479003a	Plain	A4	5.09	1.7267	Sand	Frequent	Fine/Med		Smooth	Smooth	Reduce	Partial	Slow
05F2479004a	Plain	B6	5.52		Sand	Occasion	Coarse	Hand	Burnish	P. Burn	Reduce	None	Slow
05F2479005a	Glazed	A12	3.64		Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
05F2479007a	Glazed	A13	3.43	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2484001a	Plain	A1	6.18	1.6693	Sand	Occasion	Coarse	Hand	P. Burn	P. Burn			
05F2486001a	Plain	B4	6.39		Grog	Occasion	Coarse		Burnish		Reduce	None	Slow
05F2486002a	Slip/Pt	B7	5.21		Sand	Occasion	Fine/Med				Reduce	None	Slow
05F2486003a	Slip/Pt	A6	7.94	1.5441	Sand	Frequent	Fine/Med		P. Burn	P. Burn	Oxidize	Partial	Slow
05F2527001a	Glazed	A12	5.43	1.5441	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
05F2531002a	Slip/Pt	A8	3.86	1.4857	Shell	Occasion	Coarse		Smooth	Smooth	Oxidize	Full	
05F2534001a	Plain	B4	6.13		Grog	Occasion	Fine/Med	Hand	P. Burn	Scraped	Reduce	None	Slow
05F2534001b	Plain	A7	3.60	2.2041	Grog	Occasion	Fine/Med				Reduce	Partial	Rapid
05F2534002a	Plain	B2	5.28		Sand	Frequent	Fine/Med	Hand	Burnish	Scraped	Reduce	None	Slow
05F2534003a	Plain	A13	2.80	1.6107	Sand	Occasion	Fine/Med		P. Burn	Scraped	Oxidize	Full	
05F2534004a	Glazed	A12	4.49		Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
05F2534004b	Glazed	A12	5.42	1.6693	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
05F2534004c	Glazed	B7	3.81		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
05F2534004d	Glazed	A13	3.21	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2534004e	Glazed	A13	4.10	1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2536002a	Glazed	A16	4.44	1.7267	Sand	Occasion	Fine/Med				Oxidize	Partial	Slow
05F2536003a	Glazed	A14	3.90	1.2430	Sand		V. Fine			Scraped	Oxidize	Full	
05F2536003b	Glazed	A14	3.89	1.1761	Sand		V. Fine				Oxidize	Full	
05F2537001a	Glazed	A15	3.70	1.0531	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
05F2537001b	Glazed	A13	4.23	1.5441	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
05F2537002a	Plain	A1	9.82	1.9031	Sand	Occasion	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
05F2543001a	Glazed	A15	3.85	1.1761	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
05F2584001a	Plain	B6	6.67		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
05F2584002a	Plain	A4	5.53	1.7267	Sand		V. Fine	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
05F2584003a	Glazed	A15		1.5441	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2584004a	Glazed	A13	4.19	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2584006a	Glazed	A12	3.38	1.4857	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
05F2584007a	Glazed	A13	2.88	1.6021	Sand	Occasion	Fine/Med				Oxidize	Full	
05F2619002a	Plain	B6	6.65		Sand	Occasion	Fine/Med		P. Burn	Burnish	Reduce	None	Slow
05F2619003a	Plain	A14			Sand	Frequent	Fine/Med				Oxidize	Full	
05F2669002a	Glazed	A14	3.32	1.5441	Sand	Frequent	Fine/Med				Oxidize	Full	
05F2669003a	Slip/Pt	A6	6.73	1.6693	Sand	Frequent	Fine/Med		P. Burn	P. Burn	Oxidize	Partial	Slow
05F2669004a	Glazed	B7	3.21		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
05F2762004a	Glazed	A16		2.2041	Sand	Occasion	Fine/Med				Oxidize	Partial	Slow
05F2762005a	Glazed	A12	4.21	1.4200	Sand	Occasion	Fine/Med				Reduce	Partial	Rapid
05F2762006b	Plain	A4	5.10	1.5441	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Slow
05F2762007a	Plain	A16		1.5441	Sand	Occasion	Fine/Med			P. Burn	Oxidize	Partial	Slow
05F2762008a	Slip/Pt	B7	4.21		Sand	Occasion	Fine/Med				Reduce	None	Slow
06F4641001a	Plain	B2	5.80		Sand	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
06F4693001a	Glazed	A13	2.67	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
06F4696002a	Glazed	A15	2.68	1.5441	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Full	
06F4696003a	Glazed	A14	3.00	0.7993	Sand	Rare	V. Fine	Wheel		None	Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
06F6268001a	Plain	A3			Grog	Occasion	Coarse	Hand	Smooth				
95N1478008b	Plain	B4	4.82		Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
95N1478009b	Plain	A5	6.56		Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
95N1478009c	Plain	A4	5.76	1.0969	Sand	Frequent	Fine/Med	Hand	Smooth		Reduce	Partial	Rapid
95N1479011b	Glazed	B8	5.25	1.4771	Sand	Frequent	Fine/Med	Wheel	None	None	Reduce	None	Slow
95N1479011c	Glazed	B7	4.24		Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
95N1479011d	Glazed	A13	4.21	1.4857	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
95N1551044a	Colono	B4	5.59	1.4771	Grog	Occasion	Coarse		P. Burn	P. Burn	Reduce	None	Slow
95N1569032a	Colono	B4	5.34	1.1173	Grog	Occasion	V. Coarse	Hand	P. Burn	Burnish	Reduce	None	Slow
95N1609054a	Colono	A10	6.46	1.1644	Grog	Frequent	Coarse		Smooth	P. Burn	Reduce	Partial	Rapid
95N1611015a	Colono	A3	5.85	1.0374	Grog	Occasion	V. Coarse			P. Burn			
95N1659010a	Colono	A2	5.87	1.1931	Grog	Frequent	Coarse		Smooth	Burnish			
95N1774012a	Glazed	A12	4.39	1.4771	Sand	Occasion	Fine/Med	Wheel		None	Reduce	Partial	Rapid
95N1774012b	Glazed	A16	4.47	1.5441	Sand	Occasion	Fine/Med	Wheel	None				
95N1774012c	Glazed	A12	5.24	1.8451	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	Partial	Rapid
95N1774012d	Glazed	A16	4.41	1.4857	Sand	Occasion	Fine/Med	Wheel	None	None			
95N1774012e	Glazed	A13	7.09	1.2430	Sand	Occasion	Fine/Med				Oxidize	Full	
95N1774012f	Glazed	A16	4.50	1.6693	Sand	Occasion	Fine/Med	Wheel	None				
95N1774012g	Glazed	A15	4.66	1.5441	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
95N1774012h	Glazed	B8	5.51	1.2430	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	None	Slow
95N1774012i	Glazed	A13	4.67	1.4857	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
95N1774035a	Plain	A1		1.7267	Sand	Occasion	Coarse	Hand	Smooth		Oxidize	Partial	Slow
95N1774035b	Plain	A5	8.27	1.5441	Sand	Occasion	Coarse	Hand	Smooth		Reduce	Partial	Rapid
95N1774035c	Plain	A5		1.5441	Sand	Occasion	Coarse	Hand	Smooth		Reduce	Partial	Rapid
95N1774035d	Plain	A4		1.5441	Sand	Common	Coarse	Hand	Smooth		Reduce	Partial	Rapid
95N1774035e	Plain	A6		1.7267	Sand	Frequent	Coarse	Hand	Smooth		Oxidize	Partial	Slow
95N1774039a	Slip/Pt	A8	4.57	1.7267	Sand	Occasion	Fine/Med	Hand	Scraped	Smooth	Oxidize	Full	
95N1774040a	Plain	B7	6.13		Sand	Occasion	Fine/Med	Hand	Smooth	None	Reduce	None	Slow
95N1774040b	Plain	A6	4.92	1.4200	Sand		V. Fine	Hand			Oxidize	Partial	Slow
95N1774046a	Plain	A3	11.07	1.2430	Grog	Occasion	V. Coarse	Hand	Smooth		Oxidize	Partial	Slow
95N1774053a	Plain	A5	9.80	1.0969	Sand	Occasion	V. Coarse	Hand			Reduce	Partial	Rapid

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
95N1774054a	Plain	A5	8.81	1.0531	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
95N1774054b	Plain	A2	6.57	0.9731	Grog	Frequent	V. Coarse	Hand					
95N1774065a	Plain	A10	6.62	1.5441	Grog	Common	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
95N1776024a	Slip/Pt	A14	7.91	1.4771	Sand	Common	Fine/Med	Wheel	None	Scraped	Oxidize	Full	
95N1776027a	Plain	A10	10.09	1.1761	Grog	Frequent	Coarse	Hand	P. Burn		Reduce	Partial	Rapid
95N1776028a	Plain	A7	5.64	0.9731	Grog	Occasion	V. Coarse	Hand	Scraped	P. Burn	Reduce	Partial	Slow
95N1776028b	Plain	A2	7.64	1.4857	Grog	Frequent	Coarse	Hand	Smooth	Scraped	Oxidize	Partial	Slow
95N1776029a	Plain	A4	7.47	0.9731	Sand	Frequent	Fine/Med	Hand		Scraped	Reduce	Partial	Rapid
95N1776032a	Plain	B2	5.20	1.1173	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
95N1776034a	Plain	A4		1.5441	Sand	Frequent	Coarse	Hand	Scraped		Reduce	Partial	Rapid
95N1776034b	Plain	A2	7.22	1.7267	Shell	Common	Coarse	Hand	Smooth				
95N1776034c	Plain			1.5441	Shell	Common	Coarse	Hand	Smooth				
95N1811019a	Plain	A6	5.60	1.7267	Sand	Frequent	Fine/Med	Hand	Smooth	Scraped			
95N1811020a	Plain	B6	5.80		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
95N1811022a	Plain	A10	6.58	1.4857	Shell	Frequent	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
95N1811025a	Slip/Pt	A6	6.88	0.9731	Sand	Frequent	Fine/Med	Hand			Oxidize	Partial	Slow
95N1811028a	Plain	B8	4.53		Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	None	Slow
95N1811029a	Plain	A5		1.8451	Sand	Occasion	Fine/Med	Hand	Smooth	Scraped	Reduce	Partial	Slow
95N1812006a	Plain	B6	5.92		Sand	Occasion	Fine/Med	Hand	Smooth	P. Burn	Reduce	None	Slow
95N1867020a	Colono	B5	5.34	1.0374	Grog	Common	V. Coarse		Smooth		Reduce	None	Slow
96N2173029a	Plain	B4	5.04	1.1644	Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N2173029b	Plain	A3	6.36	1.6693	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
96N2173029c	Plain	B4	8.53		Grog	Occasion	V. Coarse	Hand		P. Burn	Reduce	None	Slow
96N2173030a	Plain	B6	5.57		Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Reduce	None	Slow
96N2173030b	Plain	A3	6.14	1.2430	Grog	Occasion	Coarse	Hand	P. Burn		Oxidize	Partial	Slow
96N2173030c	Plain	A7	4.21	1.4200	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
96N2173030d	Plain	B2	6.21		Sand	Frequent	Fine/Med	Hand			Reduce	None	Slow
96N2173030e	Plain	A7	8.01	1.4200	Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
96N2173030f	Plain	B3	6.00		Sand	Occasion	Fine/Med	Hand			Reduce	None	Slow
96N2173030g	Plain	A10		1.5441	Shell	Frequent	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
96N2173030h	Plain	B6	6.90		Sand	Occasion	Fine/Med	Hand	Smooth	P. Burn	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion			Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
					Type	Abundance	Size						
96N2173030i	Plain	A7	6.84		Grog	Occasion	Coarse	Hand	None	P. Burn	Reduce	Partial	Rapid
96N2173030j	Plain	A7	5.59		Grog	Occasion	Coarse			Scraped	Reduce	Partial	Rapid
96N2173030k	Plain	B6	5.61		Sand	Occasion	Fine/Med	Hand	Burnish	Smooth	Reduce	None	Slow
96N2173030l	Plain	B7	7.41		Sand	Occasion	Fine/Med	Hand		None	Reduce	None	Slow
96N2173032a	Plain	A10	7.37	1.1644	Grog	Frequent	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
96N2173032b	Plain	B4	5.33		Grog	Occasion	Coarse	Hand	Burnish	Burnish	Reduce	None	Slow
96N2173032c	Plain	A2	6.53	1.4857	Grog	Frequent	Coarse	Hand	P. Burn	P. Burn			
96N2173032d	Plain	A3	7.44	1.5441	Grog	Occasion	Coarse	Hand	P. Burn	Burnish	Oxidize	Partial	Slow
96N2173045a	Slip/Pt	B7			Sand	Occasion	Fine/Med				Reduce	None	Slow
96N2173048a	Plain	A9	6.82	1.3522	Grog	Frequent	Coarse	Hand	P. Burn	P. Burn	Oxidize	Full	
96N2175015a	Plain	B1	5.86		Grog	Abundant	Coarse	Hand		Smooth	Reduce	None	Slow
96N2175015b	Plain	A2	7.46	1.1761	Grog	Frequent	Coarse	Hand	P. Burn	Scraped	Oxidize	Partial	Slow
96N2175015c	Plain	A2	7.26	1.0531	Grog	Frequent	V. Coarse	Hand			Oxidize	Partial	Slow
96N2177011a	Plain	B4			Grog	Occasion	V. Coarse	Hand		Smooth	Reduce	None	Slow
96N2177011b	Plain	A3	6.25	1.0374	Grog	Occasion	Coarse	Hand	Smooth				
96N2177011c	Plain	A7	4.92	1.1761	Grog	Frequent	Coarse				Reduce	Partial	Rapid
96N2177012a	Plain	B1	5.85		Grog	Abundant	V. Coarse	Hand	P. Burn	Burnish	Reduce	None	Slow
96N2177012b	Plain	A10	6.30		Grog	Common	Coarse	Hand		Smooth	Reduce	Partial	Rapid
96N2177014a	Plain	A10	5.65	1.5441	Grog	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N2177014b	Plain	A9	4.89	1.0170	Grog	Common	Coarse	Hand	P. Burn	Burnish	Oxidize	Full	
96N2184010a	Glazed	B8	6.28	1.4771	Sand	Occasion	Fine/Med	Wheel		None	Reduce	Partial	Slow
96N2184014a	Plain	B1	5.82		Grog	Common	V. Coarse	Hand		P. Burn	Reduce	None	Slow
96N2870001a	Plain	B2	5.44	1.0969	Sand	Frequent	Coarse	Hand		P. Burn	Reduce	None	Slow
96N3651001a	Glazed	A1	4.64	1.3096	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Partial	Slow
96N4245001a	Plain	A7	7.63		Grog	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4398047a	Glazed	A16	4.99	1.4771	Sand	Occasion	Fine/Med	Wheel		None	Oxidize	Partial	Slow
96N4398048a	Glazed	B7	4.74	1.2430	Sand	Occasion	Fine/Med			Smooth	Reduce	None	Slow
96N4538009a	Glazed	B8	6.39	1.6021	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	Partial	Slow
96N4538010a	Glazed	A14	4.56	0.8921	Sand	Common	Fine/Med				Oxidize	Full	
96N4539011a	Plain	A4	6.72	1.3522	Sand	Frequent	Fine/Med	Hand	Scraped	None	Reduce	Partial	Rapid
96N4539012a	Plain	B6	5.65		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
96N4539013a	Slip/Pt	B3	5.82		Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow
96N4541009a	Plain	A3	4.73	1.0170	Grog	Occasion	Coarse	Hand	Smooth	None			
96N4541009b	Plain	A8	5.67	1.3096	Sand	Occasion	Fine/Med	Hand		Smooth	Oxidize	Full	
96N4541010a	Glazed	B7	6.49	1.4771	Sand	Occasion	Fine/Med		Smooth		Reduce	None	Slow
96N4541010b	Glazed	B8	5.60	1.4771	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	None	Slow
96N4541010c	Glazed	A16	3.26	1.4857	Sand	Occasion	Fine/Med			Smooth			
96N4541011a	Plain	B6	5.86		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4541012a	Plain	B1	5.27		Shell	Frequent	V. Coarse	Hand		Smooth	Reduce	None	Slow
96N4541012b	Plain	A3	6.45		Grog	Occasion	V. Coarse	Hand	Smooth	P. Burn	Oxidize	Partial	Slow
96N4541012c	Plain	B4	7.05		Grog	Occasion	V. Coarse	Hand	Smooth	Burnish	Reduce	None	Slow
96N4542001a	Glazed	B8	4.33	1.4771	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	None	Slow
96N4542001b	Glazed	B7	5.39	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
96N4542001c	Glazed	B8	4.88		Sand	Occasion	Fine/Med	Wheel	None		Reduce	None	Slow
96N4542001d	Glazed	A16	4.73	1.4200	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Partial	Slow
96N4542001e	Glazed	B7	3.48		Sand	Occasion	Fine/Med				Reduce	None	Slow
96N4542001f	Glazed		3.33	1.5441	Sand	Occasion	Fine/Med						
96N4542001g	Glazed	A12	4.98		Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	Partial	Rapid
96N4542002a	Plain	B6	6.30		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4542002b	Plain	B2	4.10		Sand	Frequent	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542002c	Plain	B6	5.07		Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Reduce	None	Slow
96N4542002d	Plain	A1	5.87	1.1644	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Oxidize	Partial	Slow
96N4542002e	Plain	B2	5.39		Sand	Frequent	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542002f	Plain	A4	6.13	1.6693	Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4542002g	Plain	A5	6.71	1.1761	Sand	Occasion	Fine/Med	Hand		Smooth	Reduce	Partial	Rapid
96N4542002h	Plain	B6	4.75		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542002i	Plain	B6	5.57		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542002j	Plain	B6	6.18		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542003a	Plain	A1	6.90	1.3522	Sand	Occasion	Fine/Med	Hand	Smooth	P. Burn	Oxidize	Partial	Slow
96N4542003b	Plain	A2	5.20	1.4200	Grog	Frequent	Coarse	Hand	Smooth	Smooth			
96N4542003c	Plain	A7	5.28	1.2430	Grog	Occasion	Coarse	Hand		P. Burn	Reduce	Partial	Rapid
96N4542003d	Plain	B7	8.66		Sand	Occasion	Fine/Med	Hand	Smooth		Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
96N4542003e	Plain	B6	4.75		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542003f	Plain	B6	5.58		Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4542004a	Plain	A7	7.74	1.0969	Grog	Occasion	V. Coarse	Hand	Burnish	P. Burn	Reduce	Partial	Rapid
96N4542005a	Plain	A3	4.53	0.9731	Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Oxidize	Partial	Slow
96N4542006a	Plain	B4	7.52		Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
96N4542007a	Glazed	A12	3.83	1.6693	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	Partial	
96N4542008a	Plain	A9	6.26	1.6693	Grog	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
96N4542009a	Plain	A6	6.46	1.7267	Sand	Common	Fine/Med		Smooth	Scraped			
96N4542009b	Plain	A11	6.88	1.3096	Sand	Frequent	Coarse	Wheel	Smooth	Smooth	Oxidize	Full	
96N4542023a	Glazed	B7	5.51	1.4771	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
96N4542024a	Plain	A10	6.18	1.0969	Grog	Common	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
96N4542026a	Plain	A11	5.28	1.1761	Sand	Common	Fine/Med	Hand		Smooth	Oxidize	Full	
96N4542027a	Plain	B4	7.67		Grog	Occasion	Coarse	Hand	P. Burn	Burnish	Reduce	None	Slow
96N4542028b	Plain	A3	6.71	1.6693	Grog	Occasion	V. Coarse	Hand		Burnish	Oxidize	Partial	Slow
96N4542029a	Plain	A3	6.74	1.7267	Grog	Occasion	Coarse	Hand		P. Burn	Oxidize	Partial	Slow
96N4542033a	Plain	B6	5.76		Sand	Occasion	Fine/Med	Hand	P. Burn	Burnish	Reduce	None	Slow
96N4543003a	Plain	B4	5.78		Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4543010a	Glazed	A12	3.65	1.3096	Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
96N4548002a	Plain	A9	6.95		Grog	Common	Coarse	Hand		Burnish	Oxidize	Full	
96N4548002b	Plain	A3	6.56		Grog	Occasion	Coarse	Hand		P. Burn			
96N4549005a	Plain	A10	5.53		Grog	Frequent	Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4549006a	Glazed	B7	3.71		Sand	Occasion	Fine/Med				Reduce	None	Slow
96N4549015a	Plain	A2	6.05	1.1931	Grog	Frequent	Coarse	Hand	P. Burn	P. Burn			
96N4549015b	Plain	A4	6.34	1.6693	Sand	Common	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4549015c	Plain	B6	5.33		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4549015d	Plain	A7	6.61		Grog	Occasion	Coarse	Hand	None	P. Burn	Reduce	Partial	Rapid
96N4549015e	Plain	A6	5.72		Sand	Common	Fine/Med	Hand		P. Burn			
96N4554006a	Plain	A7	7.09		Grog	Occasion	Coarse	Hand	Burnish	P. Burn	Reduce	Partial	Rapid
96N4578010a	Glazed	A12	4.77	1.6693	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	Partial	Rapid
96N4582005a	Plain	A11	5.17	1.2430	Sand	Common	Fine/Med	Hand	Smooth		Oxidize	Full	
96N4589028a	Plain	A3	6.14	1.0969	Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn			

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96N4589029a	Plain	B6	6.52	1.1644	Sand	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
96N4644009a	Plain	A7	8.19		Grog	Occasion	Coarse	Hand	Smooth	Scraped	Reduce	Partial	Rapid
96N4644030a	Plain	A3	8.46	1.3404	Grog	Occasion	Coarse				Oxidize	Partial	Slow
96N4644030b	Plain	A7	6.22		Grog	Occasion	Coarse	Hand	P. Burn	Scraped	Reduce	Partial	Rapid
96N4644030c	Plain	A3	6.32	0.9731	Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn			
96N4644030d	Plain	A7	6.99	1.0969	Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4644030e	Plain	A8	6.88	0.9191	Sand	Occasion	Fine/Med	Hand	Burnish	P. Burn	Oxidize	Full	
96N4644030f	Slip/Pt	B4	6.12		Grog	Occasion	Fine/Med	Hand	Smooth	P. Burn	Reduce	None	Slow
96N4644032a	Slip/Pt	A2	5.85	1.0170	Grog	Common	V. Coarse		P. Burn	P. Burn	Oxidize	Partial	Slow
96N4644034a	Slip/Pt	A5	6.20	1.1644	Sand	Occasion	Fine/Med		P. Burn	P. Burn	Reduce	Partial	Rapid
96N4644036a	Slip/Pt	A2	6.60	1.0170	Shell	Abundant	V. Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
96N4644037a	Plain	A7	6.90		Grog	Occasion	Fine/Med	Hand	Burnish	Burnish	Reduce	Partial	Slow
96N4644042a	Glazed	A15	8.24	1.4857	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
96N4652013a	Plain	B4	6.96		Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4659020a	Plain	A7	5.56	0.9731	Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4659021a	Slip/Pt	B4	5.41	0.8921	Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	None	Slow
96N4659022a	Plain	B4	6.43		Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4664011a	Plain	B4	6.42		Grog	Occasion	Coarse	Hand	P. Burn		Reduce	None	Slow
96N4664013a	Glazed	B7	4.69	0.9731	Sand	Occasion	Fine/Med				Reduce	Partial	Slow
96N4664014a	Glazed	A16	5.84	1.2430	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Partial	Slow
96N4668010a	Plain	B4	7.06		Grog	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4668011a	Plain	A7	6.41	0.8921	Grog	Occasion	Coarse	Hand		P. Burn	Reduce	Partial	Rapid
96N4668013a	Slip/Pt	A8	5.92	1.1761	Sand	Occasion	Fine/Med		Smooth	Smooth	Oxidize	Full	
96N4693001a	Glazed	A14	9.48	1.4771	Sand	Common	Fine/Med	Wheel	None		Oxidize	Partial	Slow
96N4795027a	Colono		7.00	1.3979	Grog	Occasion	V. Coarse		Smooth				
96N4818002a	Plain	A3	7.25	1.6021	Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Oxidize	Full	
96N4818003a	Plain	A1	8.67	1.5441	Sand	Occasion	Fine/Med	Hand			Oxidize	Partial	Slow
96N4850009a	Colono	A6	5.83	1.2430	Shell	Frequent	Coarse		Scraped	Scraped	Oxidize	Partial	Slow
96N4880001a	Plain	B6	7.35		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N4881001a	Plain	B1	6.10		Grog	Frequent	V. Coarse	Hand	Smooth	Smooth	Reduce	None	Slow
96N4888012a	Glazed	A15	4.94	1.3096	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	

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96N4911001a	Plain	A4	14.24		Sand	Common	Fine/Med		Smooth	Smooth	Reduce	Partial	Rapid
96N4934021a	Glazed	B7	3.32		Sand	Occasion	Fine/Med				Reduce	None	Slow
96N4934021b	Glazed	A12	3.23	1.4857	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	Partial	Rapid
96N4934021c	Glazed	A16	2.48	1.2430	Sand	Occasion	Fine/Med	Wheel	None	None			
96N4934021d	Glazed	B8	3.21		Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	None	Slow
96N4934021e	Glazed	B8	3.34		Sand	Occasion	Fine/Med	Wheel		None	Reduce	None	Slow
96N4934021f	Glazed	A16	5.52	1.7267	Sand	Occasion	Fine/Med	Wheel	None	None			
96N4934021g	Glazed	A16	6.15	1.5441	Sand	Occasion	Fine/Med	Wheel	None	None	Reduce	Full	Slow
96N4934027a	Plain	A9	7.00	1.7267	Grog	Common	Coarse	Hand			Oxidize	Full	
96N4934030a	Plain	A3	8.71	0.9731	Grog	Occasion	Coarse		Burnish	Smooth			
96N4934032a	Slip/Pt	A13	7.24	0.8921	Sand	Occasion	Fine/Med				Oxidize	Full	
96N4934034a	Plain	A3	8.39	1.4200	Grog	Occasion	Coarse	Hand	Burnish	Smooth			
96N4934037a	Glazed	A15	3.30	1.3096	Sand	Occasion	Fine/Med	Wheel	None	None	Oxidize	Full	
96N4934041a	Plain	A7	6.20		Grog	Occasion	Fine/Med	Hand		P. Burn	Reduce	Partial	Rapid
96N4934042a	Plain	A10	8.62	0.9731	Grog	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
96N4934042b	Plain	A7	7.70		Grog	Occasion	Coarse	Hand		Smooth	Reduce	Partial	Rapid
96N4934044a	Plain	A7	7.24	0.8921	Grog	Occasion	V. Coarse	Hand	Smooth		Reduce	Partial	Rapid
96N4934048a	Plain	A7	6.64	1.0969	Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
96N4934062a	Slip/Pt	A14	5.70	1.7267	Sand		V. Fine		P. Burn	Smooth	Oxidize	Full	
96N4934062b	Slip/Pt	A15	4.04	1.9031	Sand	Occasion	Fine/Med				Oxidize	Full	
96N4934063a	Plain	B4	7.35		Grog	Occasion	Coarse	Hand	P. Burn	Burnish	Reduce	None	Slow
96N4934092a	Plain	B4	6.77		Grog	Occasion	V. Coarse	Hand		Smooth	Reduce	None	Slow
96N4934092b	Plain	B1	7.41		Grog	Common	Coarse	Hand	Smooth	Burnish	Reduce	None	Slow
96N5004011a	Plain	B1	5.26		Grog	Frequent	Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
96N5004013a	Plain	A2	5.62	0.8921	Grog	Frequent	V. Coarse	Hand	P. Burn	P. Burn	Oxidize	Partial	Slow
96N5015001a	Colono	A2	5.60	0.9731	Grog	Frequent	Coarse		Burnish		Oxidize	Partial	Slow
96N5019001a	Plain	A6	9.85	1.2430	Sand	Frequent	Fine/Med	Hand	None	Smooth	Oxidize	Partial	Slow
96N5023001a	Plain	A14	11.74	1.2430	Sand	Common	Fine/Med	Wheel	None	None	Oxidize	Full	
96N5105006a	Glazed	A16	10.17	1.5441	Sand	Occasion	Fine/Med	Wheel	None	None			
96N5121005a	Plain	A3	7.39	0.9191	Grog	Occasion	V. Coarse	Hand	None	Smooth			
96N5121005b	Plain	A10	5.33		Grog	Frequent	V. Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid

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96N5121005c	Plain	A7	8.87	1.6107	Grog	Occasion	V. Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
96N5139001a	Glazed	A13	6.07	1.2430	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
96N5139001b	Glazed	B3	6.24	1.5441	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
96N5150001a	Glazed	A15	4.25	1.2430	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
96N5156021a	Plain	A9	6.69	0.8921	Grog	Common	V. Coarse	Hand	P. Burn	P. Burn	Oxidize	Full	
96N5345001a	Colono	A3	6.18	0.8751	Grog	Occasion	V. Coarse		P. Burn	Burnish			
96N5601001a	Stamped	A6	7.41	1.3096	Sand	Common	Fine/Med		Smooth	Smooth	Oxidize	Partial	Slow
98N5139001c	Glazed	A13	4.60	1.6693	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
98N6982013a	Stamped	B2	6.72		Sand	Frequent	Fine/Med	Hand	None	Scraped	Reduce	None	Slow
98N6982013b	Stamped	A11	6.33	1.2430	Sand	Common	Fine/Med	Hand	None	Smooth	Oxidize	Full	
98N6982016a	Plain	B8	5.04		Sand	Occasion	Fine/Med		None	None	Reduce	None	Slow
98N6982016b	Plain	A8	5.73	1.2742	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
98N6982017a	Plain	A11	4.54	1.3096	Sand	Common	Fine/Med		Smooth	Smooth	Oxidize	Full	
98N6982018a	Plain	A14	4.44	1.5441	Sand	Common	Fine/Med	Wheel	None	None	Oxidize	Full	
98N6982025a	Plain	A9	6.34	0.8921	Grog	Common	V. Coarse	Hand	P. Burn	Burnish	Oxidize	Full	
98N6982026a	Plain	B4	4.77		Grog	Occasion	Coarse	Hand			Reduce	None	Slow
98N6982029a	Plain	A8	8.13	0.8921	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Full	
98N6995016a	Colono	A3	7.54	1.7267	Grog	Occasion	V. Coarse		P. Burn	P. Burn	Oxidize	Partial	Slow
98N7240010a	Plain	A9	6.09	1.5441	Grog	Frequent	V. Coarse	Hand	Burnish	Burnish	Oxidize	Full	
98N7240010b	Plain	A2	7.07	0.9731	Grog	Frequent	V. Coarse	Hand	Burnish	P. Burn	Oxidize	Partial	Slow
98N7240010c	Plain	B1	5.50		Grog	Frequent	Coarse	Hand	Burnish	P. Burn	Reduce	None	Slow
98N7241009a	Slip/Pt	A7	7.03	1.1644	Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	Partial	Rapid
98N7242012a	Plain	B3	5.93	0.9731	Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	None	Slow
98N7242013a	Glazed	A6	6.05	1.2430	Sand	Common	Fine/Med			Smooth	Oxidize	Partial	Slow
98N7242014a	Plain	A10	6.43		Grog	Frequent	V. Coarse	Hand			Reduce	Partial	Rapid
98N7329009a	Plain	A1	5.98	1.4200	Sand	Occasion	Fine/Med	Hand	Smooth	None	Oxidize	Partial	Slow
98N7329014a	Plain	B4	7.09		Grog	Occasion	Coarse	Hand	Scraped	Smooth	Reduce	None	Slow
98N7329017a	Plain	A7	6.39	0.8751	Grog	Occasion	Coarse	Hand	Burnish	P. Burn	Reduce	Partial	Rapid
98N7329019a	Plain	B4	6.57		Grog	Occasion	V. Coarse	Hand		Burnish	Reduce	None	Slow
98N7441013a	Plain	B6	7.02		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7441014a	Plain	B4	5.82		Grog	Occasion	Coarse	Hand	Smooth	Smooth	Reduce	None	Slow

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
98N7441015a	Plain	B4	6.79	0.9731	Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7441020a	Plain	A7	12.84	1.1761	Grog	Occasion	V. Coarse	Hand	P. Burn	Smooth	Reduce	Partial	Rapid
98N7441021a	Plain	A11	6.48	1.1761	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
98N7441026a	Glazed	A12	5.56	1.5441	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Reduce	Partial	Rapid
98N7842023a	Plain	B4	6.18		Grog	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7842024a	Plain	B6	6.23		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7842026a	Plain	A6	8.29	0.8921	Sand	Common	V. Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
98N7842026b	Plain	A13	7.12	1.1761	Sand	Occasion	Fine/Med	Wheel	None	Smooth	Oxidize	Full	
98N7842037a	Stamped	B2	6.71	1.1644	Sand	Frequent	Fine/Med		Smooth	Smooth	Reduce	None	Slow
98N7842040a	Plain	B2	3.84		Sand	Abundant	Fine/Med	Hand	Smooth	Smooth	Reduce	None	Slow
98N7842041a	Plain	B7	7.24	1.4857	Sand	Occasion	Fine/Med		Smooth	None	Reduce	None	Slow
98N7842045a	Plain	A7	7.80	1.0000	Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
98N7842046a	Plain	B6	5.58		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7842047a	Plain	A6	4.10	1.1761	Sand	Abundant	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
98N7842054a	Plain	B6	4.41		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7842055a	Plain	A1	7.10	1.1761	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn			
98N7842056a	Plain	B6	6.03		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7843004a	Plain	A5	7.01	1.4200	Sand	Occasion	Fine/Med	Hand			Reduce	Partial	Rapid
98N7844036a	Plain	A6	6.89	1.1761	Sand	Common	Fine/Med	Hand	Smooth	Smooth	Oxidize	Partial	Slow
98N7844037a	Plain		6.27	1.0170	Sand	Common	Coarse			Scraped			
98N7844041a	Plain	A11	5.37	1.1761	Sand	Common	Fine/Med	Hand	P. Burn	P. Burn	Oxidize	Full	
98N7844042a	Plain	A11	3.19	1.4857	Sand	Common	Coarse	Hand	Smooth	Smooth	Oxidize	Full	
98N7844044a	Stamped	A6	6.27	1.0531	Sand	Common	Fine/Med		Smooth	Scraped	Oxidize	Partial	Slow
98N7844045a	Plain	A11	5.53	1.1761	Sand	Frequent	Fine/Med	Hand	Smooth		Oxidize	Full	
98N7844047a	Plain	B4	5.76	0.9731	Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7844048a	Plain	B6	7.59		Shell	Occasion	Fine/Med	Hand	Burnish		Reduce	None	Slow
98N7844049a	Plain	B3	5.31		Sand	Occasion	Fine/Med	Hand	P. Burn	Smooth	Reduce	None	Slow
98N7844051a	Plain	B4	7.02		Grog	Occasion	Fine/Med	Hand		P. Burn	Reduce	None	Slow
98N7844052a	Plain	B8	4.81		Sand	Occasion	Fine/Med			None	Reduce	None	Slow
98N7845021a	Glazed		5.08	1.4857	Sand	Occasion	Fine/Med						
98N7845023a	Glazed	A16	5.37	1.7202	Sand	Occasion	Fine/Med			Smooth			

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
98N7845025a	Glazed	A1	6.56	1.2430	Sand	Occasion	Fine/Med				Oxidize	Partial	Slow
98N7845039a	Plain	B7	5.50		Sand	Occasion	Fine/Med	Hand	None	None	Reduce	None	Slow
98N7845040a	Plain	A7	5.40		Grog	Occasion	Fine/Med	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
98N7845043a	Plain	A2	6.14	1.6693	Grog	Frequent	V. Coarse	Hand	Smooth	Smooth			
98N7845045a	Plain	B6	4.85		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7845046a	Plain	B4	5.89		Grog	Occasion	Coarse	Hand		P. Burn	Reduce	None	Slow
98N7845048a	Plain	B6	6.14		Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7846024a	Plain	B1	7.13		Grog	Abundant	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7846026a	Plain	B6	4.57		Sand	Occasion	Fine/Med	Hand	Burnish	Burnish	Reduce	None	Slow
98N7846027a	Plain	A2	5.99		Grog	Frequent	Coarse	Hand		Smooth	Oxidize	Partial	Slow
98N7846032a	Plain	A5	6.56	1.1644	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
98N7846034a	Plain	B2	5.70		Sand	Frequent	Fine/Med	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7846036a	Plain	A7	5.58	1.6107	Grog	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
98N7846047a	Plain	A5	5.97	1.1761	Sand	Occasion	Fine/Med	Hand	Smooth	None	Reduce	Partial	Rapid
98N7846047b	Plain	A8	5.73	1.2430	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Oxidize	Full	
98N7846048a	Plain				Sand	Occasion	Fine/Med	Hand		Smooth			
98N7846050a	Plain	B4	4.49		Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	None	Slow
98N7846051a	Plain	A5	4.31	1.6107	Sand	Occasion	Fine/Med	Hand	Smooth	Smooth	Reduce	Partial	Rapid
98N7846053a	Plain	A5	7.79	1.4200	Sand	Occasion	Fine/Med	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
98N7846062a	Glazed	B7	5.06	1.1644	Sand	Occasion	Fine/Med				Reduce	None	Slow
98N7846066a	Plain	A11	6.07	1.1761	Sand	Common	V. Coarse	Hand	Smooth	None	Oxidize	Full	
98N7846066b	Plain	A6	10.27	1.1173	Sand	Frequent	Coarse	Hand	Smooth	Smooth	Oxidize	Partial	Slow
98N7846068a	Glazed	B3	6.07	1.2430	Sand	Occasion	Fine/Med		Smooth	Smooth	Reduce	None	Slow
98N7846087a	Plain	A5	8.49	1.4200	Sand	Occasion	Coarse	Hand	P. Burn	P. Burn	Reduce	Partial	Rapid
98N7846087b	Plain	B4	4.82		Grog	Occasion	Coarse	Hand	Smooth		Reduce	None	Slow
98N7846087c	Plain	B1	6.08		Grog	Common	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N7846087d	Plain	B1	4.41		Grog	Frequent	Coarse	Hand			Reduce	None	Slow
98N7846088a	Plain	A7	5.52	1.0969	Grog	Occasion	Coarse	Hand	Smooth	P. Burn	Reduce	Partial	Rapid
98N7858006a	Colono	A2	6.75	1.0969	Grog	Frequent	V. Coarse	Hand	Burnish	P. Burn			
98N8221021a	Glazed	B2	5.00		Sand	Frequent	Fine/Med			Smooth	Reduce	Partial	Slow
98N8221022a	Glazed	A13	8.82	1.0969	Sand	Occasion	Fine/Med				Oxidize	Full	

Sample No.	Pottery Category	Sub-Cluster	Thick	Redness Index	Inclusion Type	Inclusion Abundance	Inclusion Size	Form	Interior Sh/Fin	Exterior Sh/Fin	Firing Atmos.	Oxid.	Cool Rate
98N8221024a	Glazed	A13	4.45	1.3096	Sand	Occasion	Fine/Med			Smooth	Oxidize	Full	
98N8221025a	Glazed	A16	3.94	1.2430	Sand	Occasion	Fine/Med			Smooth			
98N8221026a	Glazed	A16	5.32	1.5441	Sand	Occasion	Fine/Med	Wheel	None	Smooth			
98N8221036a	Plain	A6	4.91	1.6107	Sand	Frequent	Fine/Med	Hand	None	None	Oxidize	Partial	Slow
98N8221037a	Plain	A9	5.76	1.2430	Grog	Common	Coarse	Hand			Oxidize	Full	
98N8221038a	Slip/Pt	A9	7.18	1.0170	Grog	Frequent	Coarse	Hand	P. Burn		Oxidize	Full	
98N8221039a	Plain	B4	6.08		Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N8223009a	Glazed	A12	4.88		Sand	Occasion	Fine/Med			Smooth	Reduce	Partial	Rapid
98N8223011a	Glazed	A16	4.75	1.6693	Sand	Occasion	Fine/Med			Smooth			
98N8259008a	Plain	B1	9.23		Grog	Common	V. Coarse	Hand	P. Burn	None	Reduce	None	Slow
98N8262006a	Plain	A14	5.18	1.0531	Sand	Common	Fine/Med		None	Scraped	Oxidize	Full	
98N8262007a	Plain	A10	6.48	1.0170	Grog	Common	V. Coarse	Hand		Smooth	Reduce	Partial	Rapid
98N8265010a	Plain	B4	6.37		Grog	Occasion	Fine/Med			Scraped	Reduce	None	Slow
98N8266006a	Plain	A7	5.66	0.8921	Grog	Occasion	Fine/Med	Hand	None	Smooth	Reduce	Partial	Rapid
98N8266006b	Plain	B4	4.87		Grog	Occasion	V. Coarse	Hand	P. Burn	P. Burn	Reduce	None	Slow
98N8266014a	Glazed	A11	8.20	1.6693	Sand	Frequent	Fine/Med			Smooth	Oxidize	Full	
98N8266018a	Glazed	A13	5.51	1.6693	Sand	Occasion	Fine/Med				Oxidize	Full	
98N8435005a	Slip/Pt	A3	6.80	1.0969	Grog	Occasion	V. Coarse	Hand					

Note: For more information on sub-clusters (clusters within analytical sub-sets A and B) see Chapter 7. For details on attributes also see Chapter 7 and particularly Table 7.8. Thick = Average thickness (mm); Redness Index calculated from Munsell colors of oxidized pastes; Form = Primary Forming Techniques; Sh/Fin = Shaping and Finishing; Firing Atmos. = Firing Atmosphere; Oxid.= Oxidation; Stamped=Santa Maria Stamped; V. Fine = Very Fine; Fine/Med = Fine/Medium; V. Coarse = Very Coarse; Wheel = Wheel-thrown; Hand = Hand-built; P. Burn = Poorly Burnished. The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa María (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F).

APPENDIX C

PETROGRAPHIC ANALYSIS DATA

Table C.1. Petrographic Point Count Data

Sample ID	Pottery Category	Matrix	Silt	Grog	Shell	Calcareous	Bone	Quartz	PolyQ	Plagioclase	Muscovite	Ferruginous	Clay Pellets	Amphibole	Olivine	UID Mineral	Sed Rock	Vol Rock	UID Rock	Void	Total
03P0447004a	Glazed	178	10		5	2		6				2						1		13	217
03P0663001a	Plain	197	29		98			4								1				31	360
03P0664039a	Slip/Pt	373	40					37	3			16				1				17	487
03P0758020a	Colono	225	54					77						2						18	376
03P0851016a	Slip/Pt	291	52		12			10			5	2								30	402
03P0865009a	Dec NA	199	53					83	1		2		8			1				35	382
03P1045023a	Dec NA	197	30					64	1		2		9							20	323
03P1120015a	Dec NA	239	41					60	2		1	1	6			2				9	361
03P1339006a	Dec NA	167	26					64					1							20	278
03P1565002a	Colono	165	35				23	28			1					1				11	264
04P0340026a	Plain	251	42	28				49			1	2								33	406
04P0466018a	Glazed	176	15					7		2		11	2					9		13	235
04P0557014a	Slip/Pt	303	13					27	4	11		18	1	5	2		12	16		10	422
04P0573020a	Plain	167	53	36				26								9				11	302
04P0688020a	Glazed	203	29	6				44			1	6								23	312
04P0790006a	Plain	226	27					60			2									41	356
04P0859040a	Colono	267	37	2				28			2		3			2				42	383
04P0867025a	Colono	260	52	22				21			3	1	2							24	385
04P0968009a	Colono	450	20					18				25								16	529
04P1031010a	Plain	159	11	6	25			32			2	1			1					40	277
04P1071011a	Plain	285	67	21				52								1				20	446
04P1071017a	Glazed	231	56					48			2	1	1			6				12	357
04P1206041a	Slip/Pt	356	26					21	3			9	6							6	427
04P1409004b	Plain	252	56		31			15				1				2				37	394
04P1414011a	Plain	199	12	22				28			1		1							28	291
04P1447011a	Dec NA	249	43	16				38			2	4	1							58	411
04P1886010a	Dec NA	310	59	14				45			2					2				34	466
05F1985007a	Plain	243	3					54	1			2								22	325

Sample ID	Pottery Category	Matrix	Silt	Grog	Shell	Calcareous	Bone	Quartz	PolyQ	Plagioclase	Muscovite	Ferruginous	Clay Pellets	Amphibole	Olivine	UID Mineral	Sed Rock	Vol Rock	UID Rock	Void	Total
08M0045027a	Plain	270	22			1		42	15	1		2					6	1		29	389
08M0068070a	Glazed	193	17					19	2	6		3		2			1	4		14	261
08M0162008a	Slip/Pt	259	33					21		23		2		3	1			34		22	398
08M0162010a	Slip/Pt	271	27					8							2	10		181		79	578
08M0163026a	Plain	150	15					19		3		7		1			2	53	5	19	274
08M0171009a	Glazed	318	33					12		17		2	1	6	1			19		33	442
08M0365004a	Glazed	236	20					15	6	2		7					2	3		7	298
08M0437052a	Slip/Pt	210	15			95						7				3				19	349
08M0466010a	Slip/Pt	289	38					12					2	2						14	357
08M0466033a	Glazed	322	7	1		9		40	5				4			7	8			58	461
08M0471013a	Glazed	241	26					30	1	7				3		2		18		16	344
08M0473004a	Slip/Pt	338	33			1		5	1	1	2	1	1	2				4		44	433
08M0477008c	Slip/Pt	315	19		7	2		67	48		5	3		2		4	18	1		53	544
08M0488031a	Plain	198	4			19		10	7			8	25							32	303
08M0601011a	Plain	280	8		1	1		30	9			7	1	1			7	10		10	365
08M0614034a	Glazed	285	25					23		15		1		2		1	5	11		21	389
08M0720025a	Slip/Pt	360	12			2				1	1									13	389
08M0795005a	Glazed	288	9					6		2		4		1				13		25	348
08M0859001a	Slip/Pt	311	18			155		3				6	7							41	541
09F0538001a	Dec NA	373	61	12				50	5		6	4								48	559
10F1215001a	Dec NA	272	24	20	2			30	1			9								27	385
10F1302001a	Dec NA	248	13		32			8			1	1				2				11	316
10F1305004a	Dec NA	197	18					38	3											13	269
10F1306002a	Dec NA	311	44					74	6		1	1								12	449
10F1413019a	Dec NA	256	58	21				34			2					1				10	382
11F2120001a	Dec NA	263	25	32				17												34	371
11F2376005a	Dec NA	177	13	23				16				3								12	244
11F2511006a	Dec NA	249	15	32				4												10	310
11F2516004a	Dec NA	231	15		43			18	1			2								8	318
95N1609054a	Colono	314	33	41				28												25	441

Sample ID	Pottery Category	Matrix	Silt	Grog	Shell	Calcareous	Bone	Quartz	PolyQ	Plagioclase	Muscovite	Ferruginous	Clay Pellets	Amphibole	Olivine	UID Mineral	Sed Rock	Vol Rock	UID Rock	Void	Total
95N1774046a	Plain	205	29	18				27	1			3	7							27	317
95N1776034b	Plain	264	19		52			50								1				43	429
95N1811022a	Plain	181	63	1	18			10	1		10	9								15	308
96N4542007a	Glazed	168	4		6			3				4								12	197
96N4542009b	Plain	339	6			4		41	18	2		5	2				8	4		29	458
96N4549015a	Plain	198	22	35				40	1		2	3	11			2	5			17	336
96N4659021a	Slip/Pt	191	15	28				27			3	7	9							9	289
96N4850009a	Colono	244	44		15			26			4	11				1	1			21	367
96N4934032a	Slip/Pt	176	11					33	30			1					1			18	270
96N5345001a	Colono	257	22	4				20	1				11							22	337
98N6982029a	Plain	448	14	1				15	2			5				1				45	531
98N7241009a	Slip/Pt	184	29	6				23			1	3				5				21	272
98N7842037a	Stamp	175	13					64			1									48	301
98N7844047a	Plain	227	26	12				28				2	3			2		1		29	330
98N7845043a	Plain	208	26	15				35			2	11	7			2				31	337
98N8221038a	Slip/Pt	321	20	39				29			2	15	2							22	450
98N8267005a	Dec NA	179	22	30				25					3			5				35	299

Notes: Slip/Pt = Slipped or Painted; Stamp = Santa Maria Stamped; Colono = Colono Ware; Dec NA = Decorated Florida native pottery; Ferruginous = Ferruginous nodules, PolyQ = Polycrystalline Quartz, Sed Rock = Sedimentary Rock, Vol Rock = Volcanic (Igneous) Rock; UID = Unidentified; Shell include shell fragments, platy voids, and blocky voids; UID Minerals includes some opaque minerals and UID feldspar; Sedimentary rock includes sandstone and chert; Volcanic rock is mainly basalt and intermediary rock (e.g., andesite), and some felsic rock (e.g., rhyolite); Calcareous inclusions includes limestone, metamorphic limestone, and bioclastic concretions. The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa Maria (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F)

Table C.2. Petrographic Point Count Data with Particle Size Percentages

	Pot								Sand						Grog	Shell	Ferr	Calc	Clay	Bone
Sample ID	Cat	Mtx	Silt	vf%	f%	m%	c%	vc%	g%	vf%	f%	m%	c%	vc%	g%	%	%	%	Plt%	%
03P0447004a	Glz	87.3	4.9	2.0	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.0	1.0	0.0	0.0
03P0663001a	Pln	59.9	8.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.8	0.0	0.0	0.0	0.0
03P0664039a	S/P	79.4	8.5	6.2	2.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.0
03P0758020a	Cln	62.8	15.1	12.0	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03P0851016a	S/P	78.2	14.0	3.5	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.5	0.0	0.0	0.0
03P0865009a	Dec	57.3	15.3	11.0	4.9	6.9	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0
03P1045023a	Dec	65.0	9.9	12.5	2.6	4.6	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
03P1120015a	Dec	67.9	11.6	4.8	1.4	5.1	6.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	1.7	0.0
03P1339006a	Dec	64.7	10.1	5.4	1.6	6.6	8.1	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
03P1565002a	Cln	65.2	13.8	6.7	1.2	1.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
04P0340026a	Pln	67.3	11.3	4.3	0.8	2.9	5.1	0.3	0.0	0.0	0.0	0.0	2.9	4.6	0.0	0.0	0.5	0.0	0.0	0.0
04P0466018a	Glz	81.9	7.0	2.3	1.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.1	0.0	0.9	0.0
04P0557014a	S/P	73.5	3.2	8.0	6.1	3.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	0.2	0.0
04P0573020a	Pln	57.4	18.2	7.6	1.4	0.3	1.4	1.0	0.3	0.3	0.7	3.4	6.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0
04P0688020a	Glz	70.2	10.0	2.1	3.8	6.9	2.4	0.3	0.0	0.3	0.3	1.4	0.0	0.0	0.0	0.0	2.1	0.0	0.0	0.0
04P0790006a	Pln	71.7	8.6	5.1	1.3	4.4	7.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04P0859040a	Cln	78.3	10.9	6.2	0.9	2.1	0.3	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.9	0.0
04P0867025a	Cln	72.0	14.4	4.7	0.8	0.8	0.3	0.0	0.0	0.0	0.6	1.1	2.8	1.4	0.3	0.0	0.3	0.0	0.6	0.0
04P0968009a	Cln	87.7	3.9	2.3	0.6	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0	0.0
04P1031010a	Pln	67.1	4.6	1.3	8.9	2.1	1.3	1.3	0.0	0.0	0.0	0.0	1.3	1.3	0.0	10.5	0.4	0.0	0.0	0.0
04P1071011a	Pln	66.9	15.7	9.2	2.8	0.0	0.5	0.0	0.0	0.0	0.0	0.2	0.9	3.5	0.2	0.0	0.0	0.0	0.0	0.0

Sample ID	Pot Cat	Mtx	Silt	Sand vf%	f%	m%	c%	vc%	g%	Grog vf%	f%	m%	c%	vc%	g%	Shell %	Ferr %	Calc %	Clay Plt%	Bone %
04P1071017a	Glz	67.0	16.2	10.1	3.5	0.9	1.2	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0
04P1206041a	S/P	84.6	6.2	4.3	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0	1.4	0.0
04P1409004b	Pln	70.6	15.7	2.8	0.6	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.3	0.0	0.0	0.0
04P1414011a	Pln	75.7	4.6	3.4	3.4	3.0	1.1	0.0	0.0	0.0	0.0	0.4	1.5	1.5	4.9	0.0	0.0	0.0	0.4	0.0
04P1447011a	Dec	70.5	12.2	3.4	1.4	1.7	3.4	1.4	0.0	0.6	0.0	1.1	0.8	2.0	0.0	0.0	1.1	0.0	0.3	0.0
04P1886010a	Dec	71.8	13.7	3.9	0.7	2.8	3.7	0.2	0.0	0.0	0.0	0.9	1.6	0.2	0.5	0.0	0.0	0.0	0.0	0.0
05F1985007a	Pln	80.2	1.0	2.6	2.3	4.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
08M0045027a	Pln	75.0	6.1	3.9	1.4	1.9	8.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0
08M0068070a	Glz	79.1	7.0	4.1	6.1	1.2	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0
08M0162008a	S/P	68.9	8.8	8.2	5.3	4.8	1.3	1.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
08M0162010a	S/P	54.3	5.4	7.4	10.8	12.6	6.8	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08M0163026a	Pln	58.8	5.9	4.3	11.0	11.0	3.5	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0
08M0171009a	Glz	77.8	8.1	4.4	4.6	3.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.2	0.0
08M0365004a	Glz	81.1	6.9	2.7	5.5	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0
08M0437052a	S/P	63.6	4.5	0.0	0.3	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	28.8	0.0	0.0
08M0466010a	S/P	84.3	11.1	3.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
08M0466033a	Glz	79.9	1.7	0.2	1.0	10.4	1.7	1.5	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	2.2	1.0	0.0
08M0471013a	Glz	73.5	7.9	7.9	5.8	4.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08M0473004a	S/P	86.9	8.5	2.6	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0
08M0477008c	S/P	64.2	3.9	3.1	7.5	14.9	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.6	0.4	0.0	0.0
08M0488031a	Pln	73.1	1.5	0.4	2.6	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	7.0	9.2	0.0
08M0601011a	Pln	78.9	2.3	5.6	5.1	3.7	1.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.0	0.3	0.3	0.0
08M0614034a	Glz	77.4	6.8	9.5	4.1	1.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
08M0720025a	S/P	95.7	3.2	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0

	Pot								Sand						Grog	Shell	Ferr	Calc	Clay	Bone
Sample ID	Cat	Mtx	Silt	vf%	f%	m%	c%	vc%	g%	vf%	f%	m%	c%	vc%	g%	%	%	%	Plt%	%
08M0795005a	Glz	92.0	2.9	1.9	1.0	0.6	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0
08M0859001a	S/P	62.2	3.6	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	31.0	1.4	0.0
09F0538001a	Dec	73.0	11.9	6.8	1.0	1.2	2.2	0.8	0.0	0.2	0.2	0.2	0.6	1.2	0.0	0.0	0.8	0.0	0.0	0.0
10F1215001a	Dec	76.0	6.7	5.9	1.4	0.8	0.6	0.0	0.0	0.0	0.0	0.0	2.5	1.4	1.7	0.6	2.5	0.0	0.0	0.0
10F1302001a	Dec	81.3	4.3	2.3	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	0.3	0.0	0.0	0.0
10F1305004a	Dec	77.0	7.0	1.2	0.4	2.3	5.5	6.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10F1306002a	Dec	71.2	10.1	3.2	3.9	5.5	4.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
10F1413019a	Dec	68.8	15.6	2.4	3.2	3.0	1.1	0.3	0.0	0.0	0.0	0.3	2.2	3.2	0.0	0.0	0.0	0.0	0.0	0.0
11F2120001a	Dec	78.0	7.4	1.5	1.5	0.9	1.2	0.0	0.0	0.0	0.0	0.0	0.9	3.9	4.7	0.0	0.0	0.0	0.0	0.0
11F2376005a	Dec	76.3	5.6	1.3	2.2	2.6	0.9	0.0	0.0	0.0	0.9	0.9	3.9	4.3	0.0	0.0	1.3	0.0	0.0	0.0
11F2511006a	Dec	83.0	5.0	0.7	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	2.3	2.3	6.0	0.0	0.0	0.0	0.0	0.0
11F2516004a	Dec	74.5	4.8	3.9	1.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	0.6	0.0	0.0	0.0
95N1609054a	Cln	75.5	7.9	1.7	0.7	2.4	1.4	0.5	0.0	0.0	0.7	2.2	5.5	1.4	0.0	0.0	0.0	0.0	0.0	0.0
95N1774046a	Pln	70.7	10.0	2.4	1.4	1.4	2.1	0.7	1.7	0.0	0.3	1.7	1.7	2.4	0.0	0.0	1.0	0.0	2.4	0.0
95N1776034b	Pln	68.4	4.9	7.5	5.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.5	0.0	0.0	0.0	0.0
95N1811022a	Pln	61.8	21.5	5.1	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	6.1	3.1	0.0	0.0	0.0
96N4542007a	Glz	90.8	2.2	1.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	2.2	0.0	0.0	0.0
96N4542009b	Pln	79.0	1.4	0.5	1.6	8.2	5.1	0.5	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.9	0.5	0.0
96N4549015a	Pln	62.1	6.9	8.5	3.1	2.8	0.0	0.0	1.3	0.3	0.6	3.4	5.6	0.9	0.0	0.0	0.9	0.0	3.4	0.0
96N4659021a	S/P	68.2	5.4	8.6	1.8	0.4	0.0	0.0	0.0	0.0	0.4	2.9	3.9	2.9	0.0	0.0	2.5	0.0	3.2	0.0
96N4850009a	Cln	70.5	12.7	4.9	1.7	2.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	3.2	0.0	0.0	0.0
96N4934032a	S/P	69.8	4.4	9.1	7.1	8.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0
96N5345001a	Cln	81.6	7.0	4.1	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.0	0.0	0.0	3.5	0.0
98N6982029a	Pln	92.2	2.9	2.1	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	1.0	0.0	0.0	0.0

	Pot			Sand						Grog						Shell	Ferr	Calc	Clay	Bone
Sample ID	Cat	Mtx	Silt	vf%	f%	m%	c%	vc%	g%	vf%	f%	m%	c%	vc%	g%	%	%	%	Plt%	%
98N7241009a	S/P	73.3	11.6	8.8	1.6	0.4	0.8	0.0	0.0	0.0	0.0	0.8	0.4	1.2	0.0	0.0	1.2	0.0	0.0	0.0
98N7842037a	Stp	69.2	5.1	4.7	6.3	11.9	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
98N7844047a	Pln	75.4	8.6	6.3	1.0	2.0	1.0	0.0	0.0	0.0	0.3	0.0	0.7	1.7	1.3	0.0	0.7	0.0	1.0	0.0
98N7845043a	Pln	68.0	8.5	5.2	2.6	3.6	0.3	1.0	0.0	0.0	0.0	0.0	0.3	0.0	4.6	0.0	3.6	0.0	2.3	0.0
98N8221038a	S/P	75.0	4.7	5.1	1.6	0.5	0.0	0.0	0.0	0.0	0.0	0.9	2.8	3.3	2.1	0.0	3.5	0.0	0.5	0.0
98N8267005a	Dec	67.8	8.3	5.7	3.0	1.9	0.8	0.0	0.0	0.0	0.4	3.4	6.8	0.8	0.0	0.0	0.0	0.0	1.1	0.0

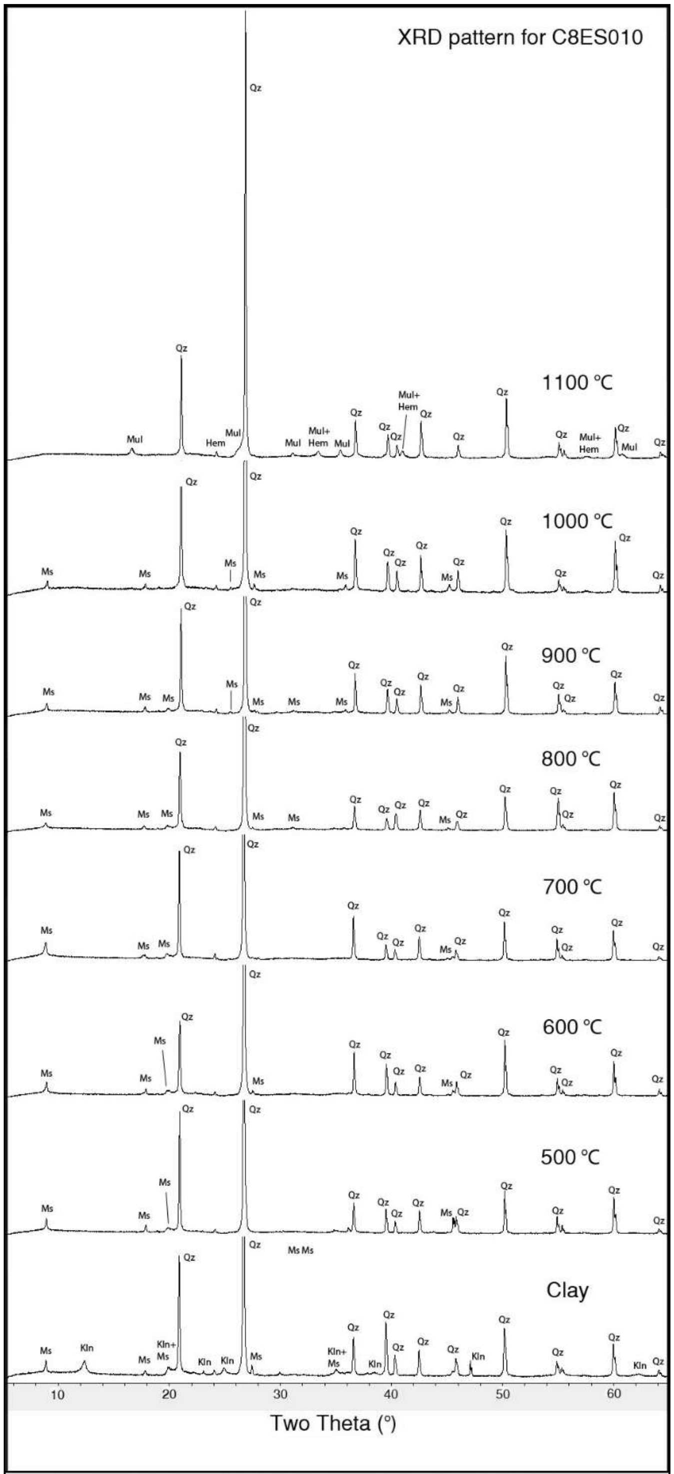
Notes: Glz = Lead-glazed; Pln = Plain; S/P = Slipped or Painted; Dec = Decorated Florida native; Cln = Colono ware; vf = very fine; f = fine; m = medium; c = coarse; vc = very coarse; g= gravel (particle sizes based on the Wentworth scale); pot cat = pottery category; Mtx = Matrix; Ferr = Ferruginous; Calc = Calcareous; Clay Plt = clay pellets. The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa Maria (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F)

APPENDIX D

X-RAY DIFFRACTION DATA AND ANALYSIS

Table D.1. Chemical Core Group 1 (Florida)

	Pottery	Temperature				
Catalog No	Catagory	Minimum	Maximum	Mineral Assemblage		
11F2376005a	Dec Indian	500	550	Kaolinite	Muscovite	Quartz
10F1284001a	Dec Indian	500	550	Kaolinite	Muscovite	Quartz
03P0865009a	Dec Indian	500	1000	Muscovite	Quartz	
03P1045023a	Dec Indian	500	1000	Muscovite	Quartz	
04P1886010a	Dec Indian	500	1000	Muscovite	Quartz	
09F0632003a	Dec Indian	500	1000	Muscovite	Quartz	
10F1305004a	Dec Indian	500	1000	Muscovite	Quartz	
10F1306002a	Dec Indian	500	1000	Muscovite	Quartz	
10F1705007a	Dec Indian	500	1000	Muscovite	Quartz	
11F2120001a	Dec Indian	500	1000	Muscovite	Quartz	
11F2272001a	Dec Indian	500	1000	Muscovite	Quartz	
11F2511006a	Dec Indian	500	1000	Muscovite	Quartz	
11F2902002a	Dec Indian	500	1000	Muscovite	Quartz	
04P0859040a	Colonoware	500	1000	Muscovite	Quartz	
04P0968009a	Colonoware	500	1000	Muscovite	Quartz	
04P1180005a	Colonoware	500	1000	Muscovite	Quartz	
04P1805021a	Colonoware	500	1000	Muscovite	Quartz	
04P0688015a	Plain	500	1000	Muscovite	Quartz	
04P0790006a	Plain	500	1000	Muscovite	Quartz	
04P1071011a	Plain	500	1000	Muscovite	Quartz	
04P1094012a	Plain	500	1000	Muscovite	Quartz	Hematite
04P1239034d	Plain	500	1000	Muscovite	Quartz	
04P1409004b	Plain	500	1000	Muscovite	Quartz	
04P1414011a	Plain	500	1000	Muscovite	Quartz	

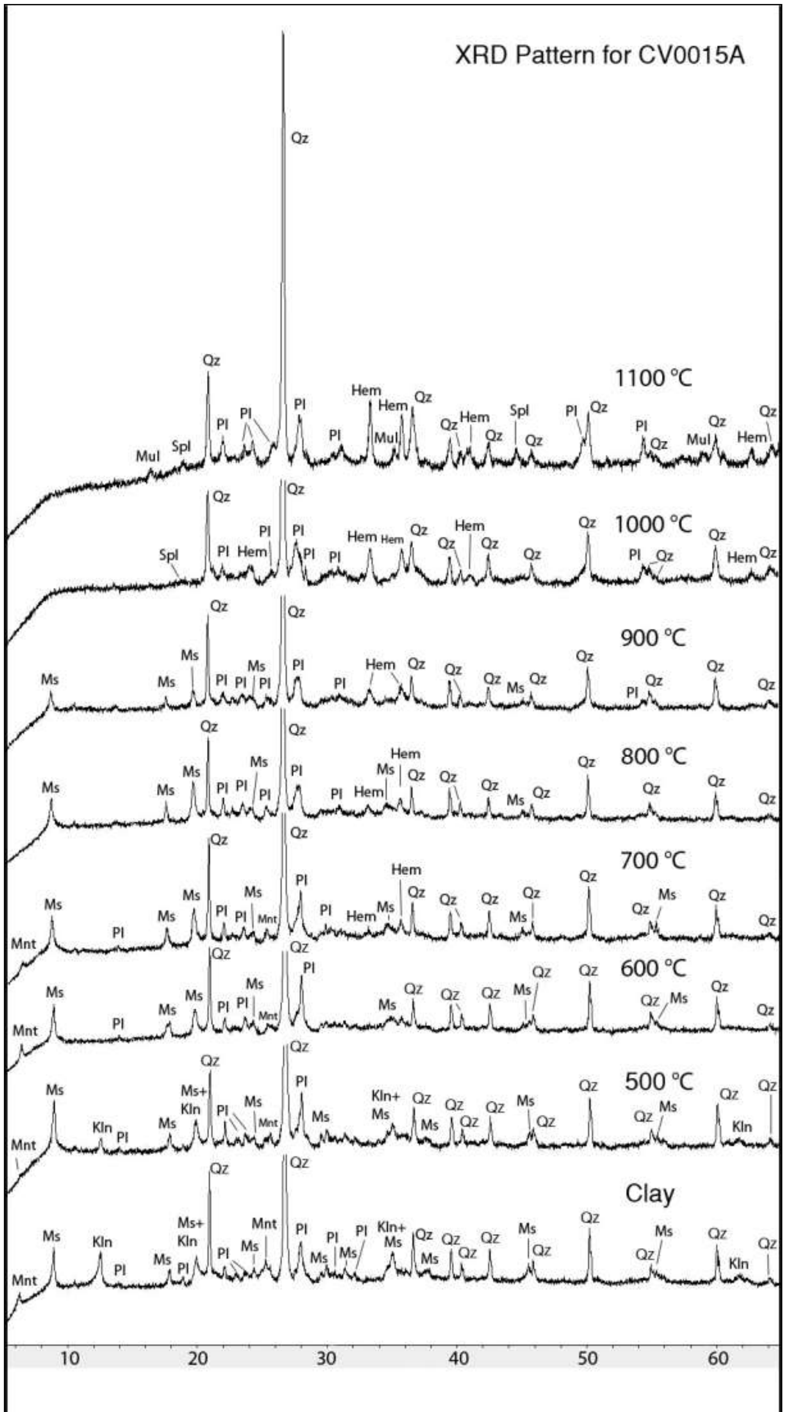


XRD pattern for C8ES010 (Mission Escambe, Florida). Indicated mineral phases are: Quartz (Qz), Muscovite (Ms), Hematite (Hem), Kaolinite (Kln), Mullite (Mul), Spinel (Spl)

Figure D.1. Chemical Core Group 1 (Florida)

Table D.2. Chemical Core Group 2A (Veracruz)

Catalog No	Pottery Category	Temperature Min	Max	Mineral Assemblage				
08M0365004a	Glazed	700	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0441011a	Glazed	700	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0426028a	Glazed	1050	1100	Quartz	Plagioclase	Hematite	Mullite	Spinel
04P0340037a	Glazed	1050	1200	Quartz	Plagioclase	Hematite	Mullite	Spinel
08M0365022a	Slipped	700	950	Muscovite	Quartz	Plagioclase	Hematite	
96N4668013a	Painted	600	800	Montmorillonite	Muscovite	Quartz	Plagioclase	Hematite
08M0466010a	Painted	700	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0473026a	Painted	700	950	Muscovite	Quartz	Plagioclase		
98N7842026a	Plain	700	1000	Muscovite	Quartz	Plagioclase	Hematite	
08M0601011a	Plain	700	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0762011a	Plain	1050	1100	Quartz	Plagioclase	Hematite	Mullite	
08M0808086b	Plain	700	1000	Muscovite	Quartz	Plagioclase	Hematite	
08M0428038b	Plain	700	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0426022a	Plain	700	950	Muscovite	Quartz	Plagioclase		
08M0193009a	Plain	700	950	Muscovite	Quartz	Plagioclase		

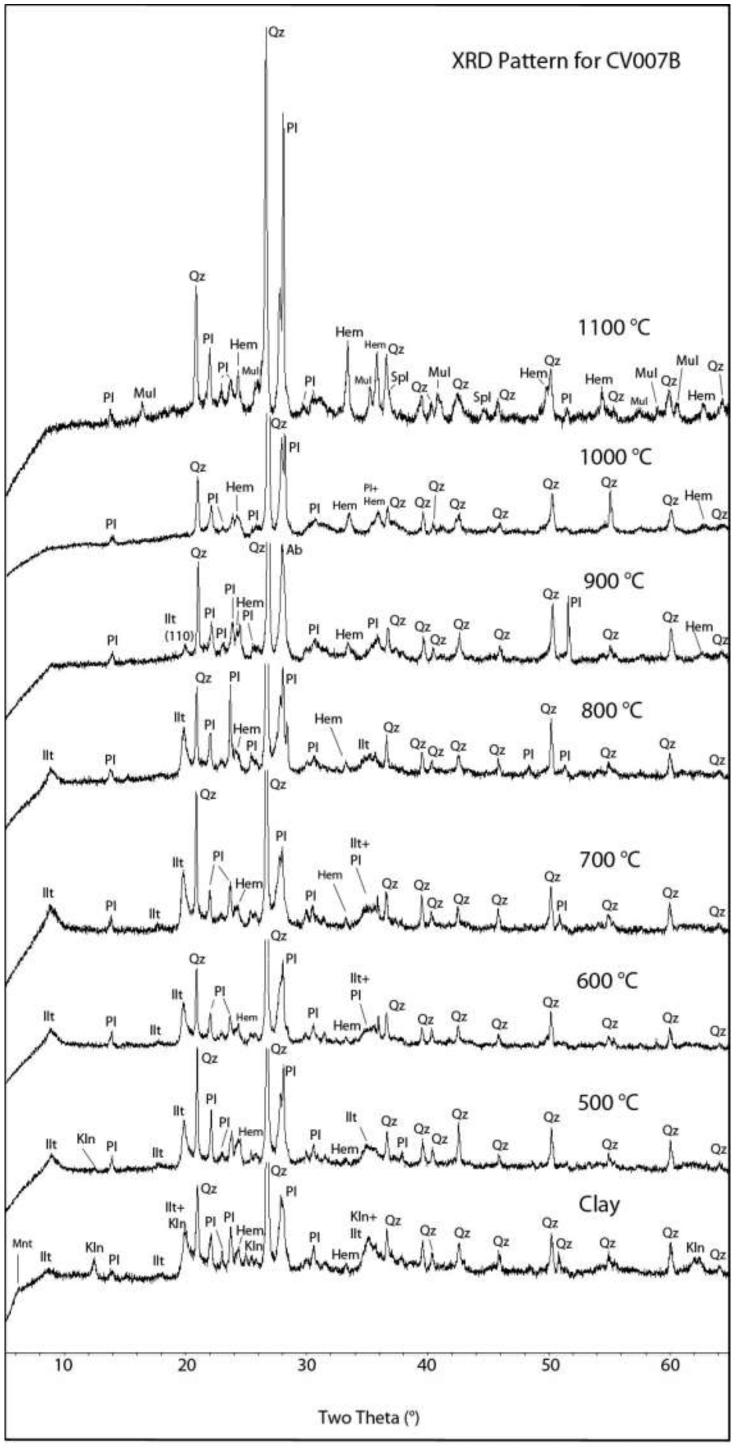


XRD Pattern for CV0015A (Tlacotalpan, Veracruz, Mexico). Indicated mineral phases are: Quartz (Qz), Plagioclase (Pl), Muscovite (Ms), Montmorillonite (Mnt), Kaolinite (Kln), Hematite (Hem), Spinel (Spl), Mullite (Mul)

Figure D.2. Chemical Core Group 2A (Veracruz

Table D.3. Chemical Core Group 2B (Veracruz)

	Pottery	Temperature						
Catalog No	Category	Min	Max	Mineral Assemblage				
08M0711012a	Plain	500	600	Kaolinite	Illite	Quartz	Plagioclase	
08M0486028b	Plain	500	600	Kaolinite	Illite	Quartz	Plagioclase	
08M0473007a	Plain	500	600	Kaolinite	Illite	Quartz	Plagioclase	
08M0437021a	Plain	500	600	Kaolinite	Illite	Quartz	Plagioclase	
08M0162007a	Plain	500	600	Kaolinite	Illite	Quartz	Plagioclase	Hematite
08M0614008d	Plain	500	900	Illite	Quartz	Plagioclase		
08M0478045a	Plain	500	900	Illite	Quartz	Plagioclase	Hematite	
08M0477008a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0441014a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0441013a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0430009a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0215062a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0045027a	Plain	500	900	Illite	Quartz	Plagioclase		
08M0477138a	Slipped	500	900	Illite	Quartz	Plagioclase		
08M0477008c	Slipped	500	900	Illite	Quartz	Plagioclase	Amphibole	

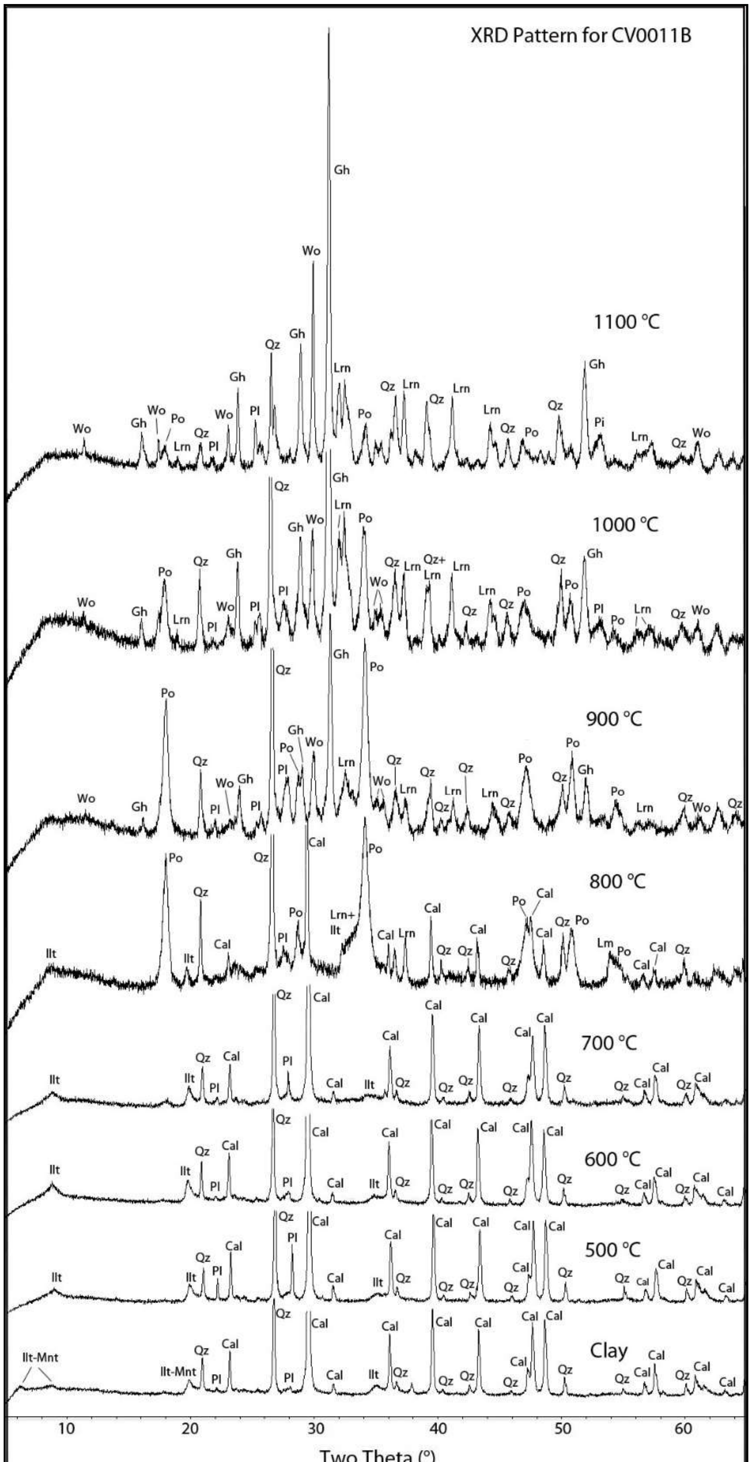


XRD pattern for V0007B (Villa Rica, Veracruz, Mexico). Indicated mineral phases are: Quartz (Qz), Illite (Ilt), Hematite (Hem), Plagioclase (Pl), Kaolinite (Kln), Spinel (Spl), Mullite (Mul), Montmorillonite

Figure D.3. Chemical Core Group 2B (Veracruz)

Table D.4. Chemical Core Group 5 (Veracruz)

Catalog No	Pottery Category	Temperature Min	Max	Mineral Assemblage		
08M0860018a	Painted	500	800	Illite	Quartz	Calcite
08M0859001a	Painted	500	800	Illite	Quartz	Calcite
08M0802083a	Painted	500	800	Illite	Quartz	Calcite
08M0614018a	Painted	500	800	Illite	Quartz	Calcite
08M0477037a	Painted	500	800	Illite	Quartz	Calcite
08M0473048a	Painted	500	800	Illite	Quartz	Calcite
08M0444031a	Painted	500	800	Illite	Quartz	Calcite
08M0437052a	Painted	500	800	Illite	Quartz	Calcite
08M0068072a	Painted	500	800	Illite	Quartz	Calcite
08M0012016a	Painted	500	800	Illite	Quartz	Calcite
08M0614028b	Plain	500	800	Illite	Quartz	Calcite



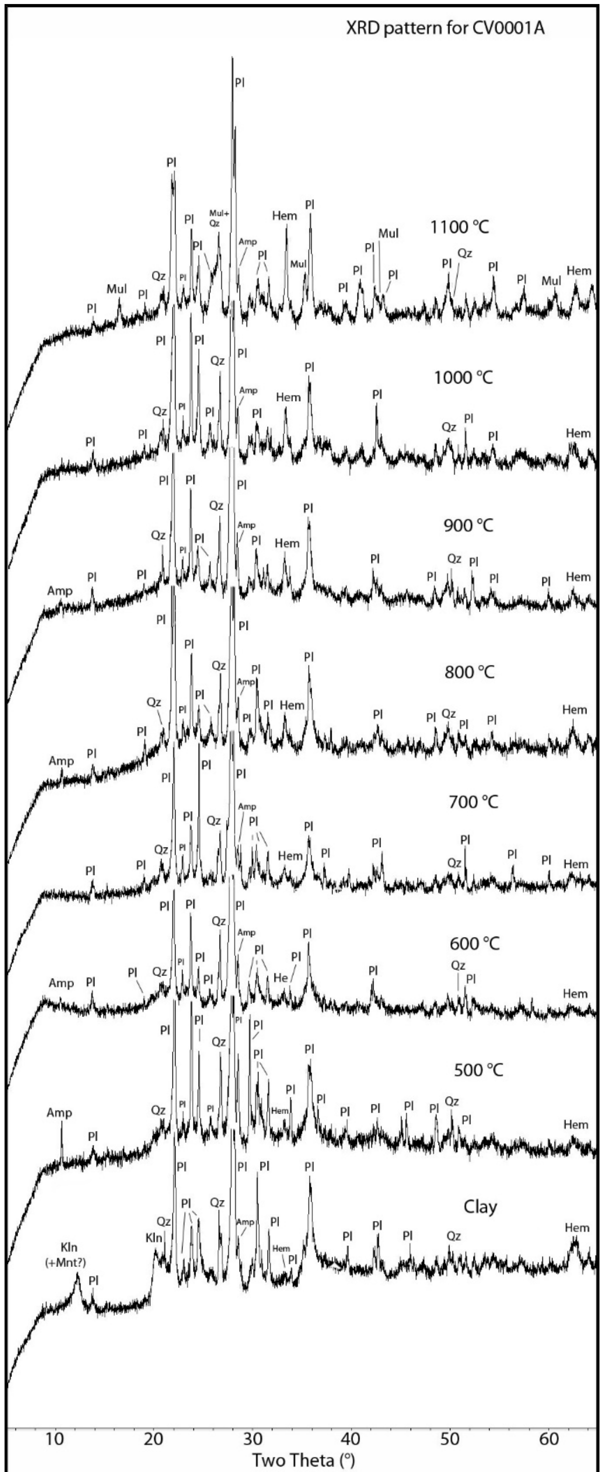
XRD pattern for CV0011B (Acazonica, Veracruz, Mexico). Mineral phases indicated are: Quartz (Qz), Plagioclase (Pl), Calcite (Cal), Larnite (Lrn), Gehlenite (Gh), Illite (Ilt), Illite-Montmorillonite (Ilt-Mnt), Lime (Lm), Portlandite (Po), Wollastonite (Wo)

Figure D.4. Chemical Core Group 5 (Veracruz)

Table D.5. Chemical Core Group 6 (Veracruz)

Catalog No	Pottery Category	Temperature Min	Max	Mineral Assemblage				
08M0471013a	Glazed	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0431033a	Glazed	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0426019a	Glazed	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0171009a	Glazed	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
98N8221026a	Glazed	500	950	Muscovite	Quartz	Plagioclase	Amphibole	
08M0463035a	Painted	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0162008a	Painted	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
04P0557014a	Painted	500	950	Muscovite	Quartz	Plagioclase	Amphibole	Hematite
08M0473004a	Painted	500	950	Muscovite	Quartz	Plagioclase	Hematite	
08M0720011a	Plain	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0435022a	Plain	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0163026a	Plain	500	950	Muscovite	Quartz	Plagioclase	Amphibole	Hematite
03P1587001a	Plain	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
98N7844041a	Plain	500	1050	Quartz	Plagioclase	Amphibole	Hematite	
08M0763019a	Slipped	500	1050	Quartz	Plagioclase	Amphibole	Hematite	

Detection of hematite in visibly “reduced” pottery further suggests temperatures below 900°C, at which point iron oxides alter to “black” oxides, such as magnetite (Maggetti 1982; Rye 1981:108).

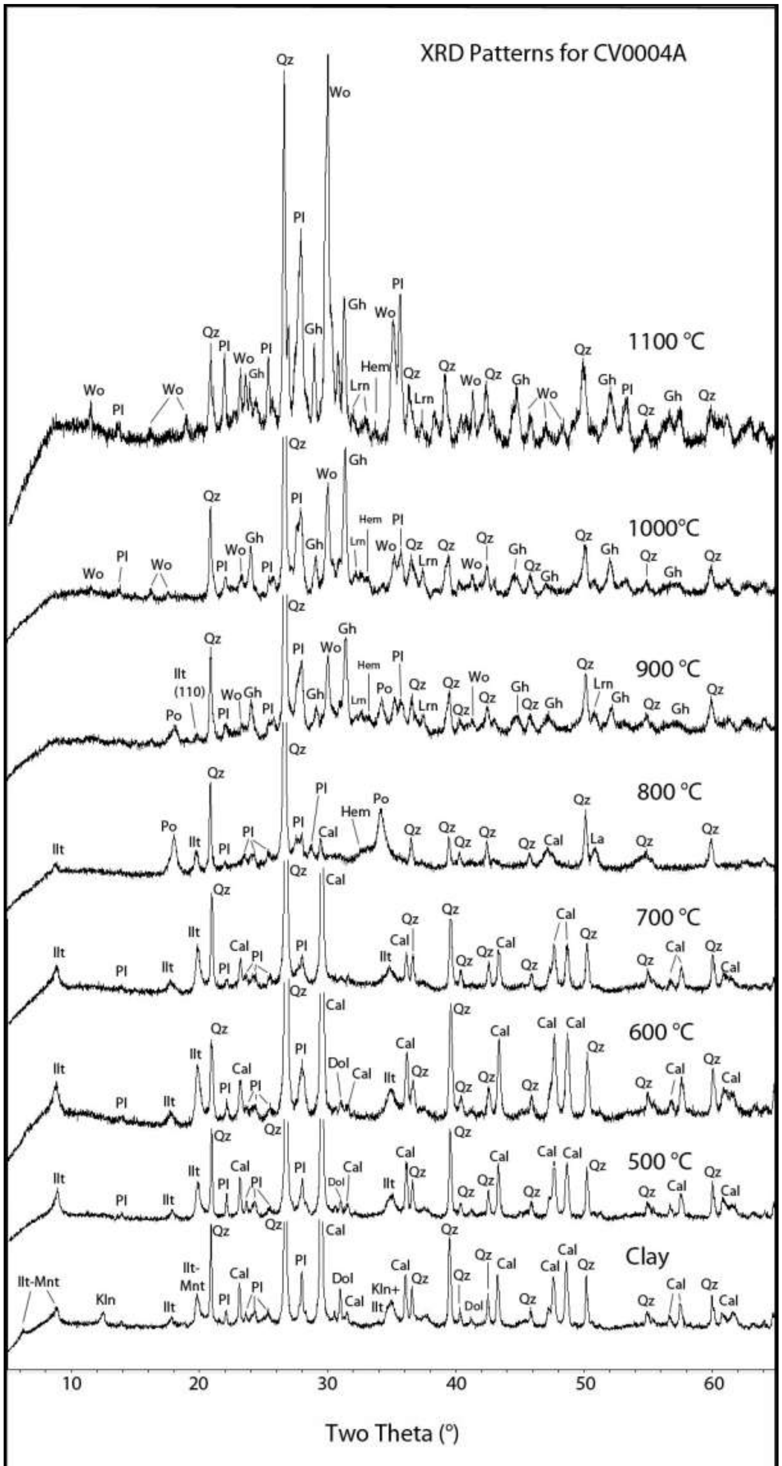


XRD Pattern for CV0001A (Medellin, Veracruz). Mineral phases indicated are: Quartz (Qz), Plagioclase (Pl), Amphibole (Amp), Montmorillonite (Mnt), Kaolinite (Kln), Hematite (Hem), Mullite (Mul)

Figure D.5. Chemical Core Group 6 (Veracruz)

Table D.6. Chemical Core Group 7 (Veracruz)

Catalog No	Pottery Category	Temperature Min	Max	Mineral Assemblage					
08M0477016a	Glazed	800	900	Illite	Quartz	Plagioclase	Gehlenite	Wollastonite	
08M0477012a	Glazed	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	Hematite
08M0466033a	Glazed	900	1100	Quartz	Plagioclase	Gehlenite	Larnite	Wollastonite	
08M0215033a	Glazed	900	1100	Quartz	Plagioclase	Gehlenite	Wollastonite	Hematite	
08M0720025a	Painted	600	900	Illite	Quartz	Plagioclase	Calcite		
08M0052001a	Painted	800	900	Illite (110)	Quartz	Plagioclase	Calcite	Gehlenite	Wollastonite
08M0437013a	Painted	800	900	Quartz	Plagioclase	Calcite	Gehlenite	Wollastonite	Hematite
08M0614010b	Painted	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	Hematite
08M0764007a	Plain	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	
08M0488031a	Plain	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	Hematite
08M0614008b	Plain	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	
08M0427009a	Plain	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	
08M0389007a	Plain	800	900	Illite	Quartz	Plagioclase	Calcite	Gehlenite	Wollastonite
08M0465033a	Plain	800	900	Illite	Quartz	Plagioclase	Gehlenite	Wollastonite	Hematite
08M0062023a	Plain	900	1100	Quartz	Plagioclase	Gehlenite	Wollastonite	Hematite	
08M0426023a	Slipped	600	900	Illite	Quartz	Plagioclase	Calcite		

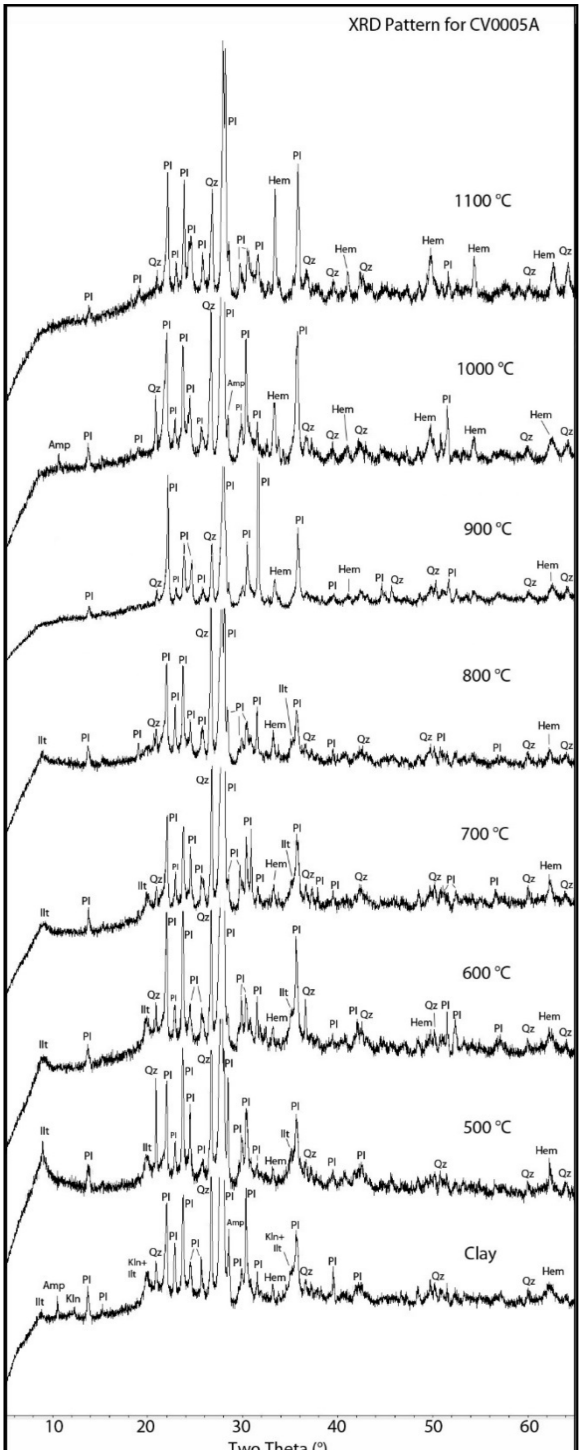


XRD Pattern for CV0004A (Tepetates, Veracruz, Mexico). Mineral phases indicated are: Quartz (Qz), Plagioclase (Pl), Calcite (Cal), Dolomite (Dol), Larnite (Lrn), Wollastonite (Wo), Montmorillonite (Mnt), Illite (Ilt), Gehlenite (Gh), Portlandite (Po)

Figure D.6. Chemical Core Group 7 (Veracruz)

Table D.7. Chemical Core Group 9 (Veracruz)

Catalog No	Pottery Catalog	Temperature Min	Max	Mineral Assemblage			
08M0720013a	Glazed	800	900	Quartz	Plagioclase	Hematite	
08M0614034a	Glazed	800	900	Quartz	Plagioclase	Amphibole	Hematite
08M0711015a	Painted	800	900	Quartz	Plagioclase	Amphibole	Hematite
08M0063011a	Plain	800	900	Quartz	Plagioclase	Hematite	
08M0443029a	Slipped	500	900	Illite	Quartz	Plagioclase	Hematite
08M0215060b	Slipped	700	900	Illite	Quartz	Plagioclase	Hematite
08M0162010a	Slipped	800	900	Quartz	Plagioclase	Hematite	
08M0067035a	Slipped	800	900	Quartz	Plagioclase	Hematite	

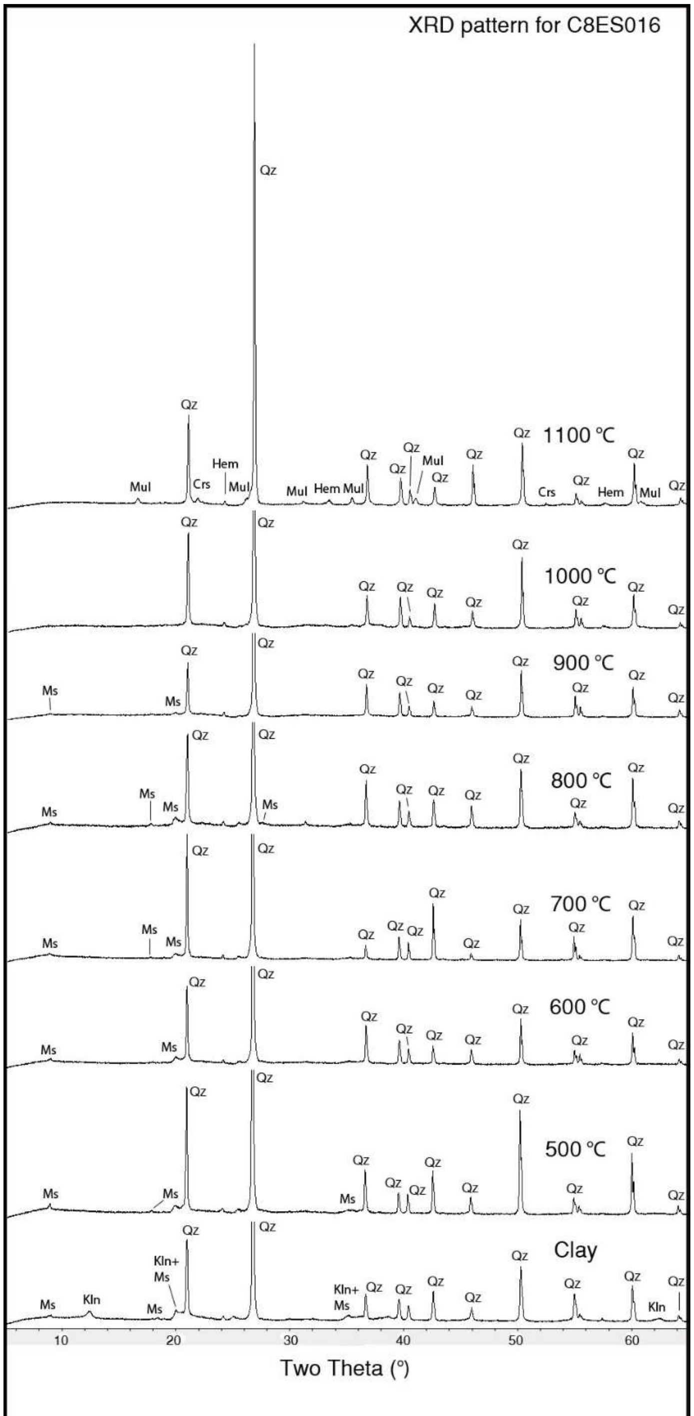


XRD pattern for CV0005A (Cempoala, Veracruz, Mexico). Mineral phases indicated are: Quartz (Qz), Plagioclase (Pl), Illite (Ilt), Kaolinite (Kln), Hematite (Hem), Amphibole (Amp)

Figure D.7. Chemical Core Group 9 (Veracruz)

Table D.8. Chemical Core Group 10 (Florida)

Catalog No	Pottery Category	Temperature Min	Max	Mineral Assemblage		
04P1197037a	Colonoware	500	1000	Quartz	Muscovite	
96N4795027a	Colonoware	500	1000	Quartz	Muscovite	
95N1551044a	Colonoware	500	1000	Quartz	Muscovite	
04P0688020a	Glazed	500	1000	Quartz	Muscovite	
04P1071017a	Glazed	500	1000	Quartz	Muscovite	Hematite
10F1413019b	NA Dec	500	1000	Quartz	Muscovite	
03P1120015a	NA Dec	500	1000	Quartz	Muscovite	
10F1413019a	NA Dec	500	1000	Quartz	Muscovite	
98N8267005a	NA Dec	500	1000	Quartz	Muscovite	
11F2629003a	NA Dec	500	1000	Quartz	Muscovite	
10F1215001a	NA Dec	500	1000	Quartz	Muscovite	
96N4542009a	Plain	500	1000	Quartz	Muscovite	Hematite
98N7241009a	Plain	500	1000	Quartz	Muscovite	
04P1031010a	Plain	500	1000	Quartz	Muscovite	
98N7845043a	Plain	500	1000	Quartz	Muscovite	
04P0573020a	Plain	500	1000	Quartz	Muscovite	
04P0573016c	Plain	500	1000	Quartz	Muscovite	
04P0340026a	Plain	500	1000	Quartz	Muscovite	
95N1776024a	Slipped	500	1000	Quartz	Muscovite	
96N5601001a	SM Stamp	950	1100	Quartz	Hematite	



XRD pattern for C8ES016 (Gabaroone, Florida). Indicated mineral phases are: Quartz (Qz), Muscovite (Ms), Hematite (Hem), Kaolinite (Kln), Mullite (Mul), Cristobalite (Crs)

Figure D.8. Chemical Core Group 10 (Florida)

APPENDIX E

PIXE COMPOSITIONAL DATA WITH GROUP ASSIGNMENTS

Table E.1. PIXE Compositional Data for Pottery Samples (PPM)

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
03P0447004a	Glz	8		6309.5	171197.5	245761.9	3612.7	8990.6	6175.7	24588.7
03P0447011b	Pln	U		15551.5	131479.6	236068.6	19797.8	6768.4	4735.9	45743.8
03P0447011c	Pln	9		15098.7	108255.9	238326.6	20400.7	45598.8	4330.4	41939.1
03P0453004a	Pln	U		4510.6	164536.8	289451.7	2213.2	973.6	4352.7	9195.8
03P0595001a	S/P	4		6332.3	119277.8	243836.6	5762.9	7695.7	5036.3	60476.0
03P0663001a	Pln	R		15173.9	108836.4	210239.2	18689.7	26718.5	4572.1	44134.8
03P0663002a	Pln	10		5720.5	136472.0	292377.0	7069.6	2713.5	5760.4	25694.3
03P0664039a	S/P	4		6685.3	121240.6	239264.9	5679.0	6560.3	5131.9	57316.1
03P0694029a	S/P	4		7250.2	145096.2	256437.5	6464.9	7714.5	4933.6	51415.0
03P0694032a	Glz	U	Mex	5128.0	147909.0	276572.1	4615.9	12158.6	6878.1	30015.4
03P0694035a	Glz	8		7027.7	188392.0	265195.4	5042.1	8306.2	5806.7	22412.6
03P0694036b	Glz	8		7864.1	204038.8	245245.8	4098.4	10311.6	5447.3	20464.4
03P0694037a	Pln	10		5891.4	157907.5	295078.0	4582.7	2277.7	6137.9	25472.4
03P0711029a	Glz	U		12078.9	179088.3	248721.9	14983.6	10515.1	3770.8	23960.4
03P0711032a	Glz	U	Mex	6135.6	179129.9	257390.7	5734.8	8658.6	6202.1	24001.7
03P0711048a	Pln	10		6380.9	175672.4	286031.1	4892.3	2153.1	5622.4	18344.6
03P0711048b	Pln	U		5520.6	110344.3	257667.5	3128.1	2091.0	5233.2	49735.5
03P0736012a	Glz	8		6895.9	199056.2	248833.4	7343.0	10659.9	6681.4	27540.6
03P0758020a	Cln	U		3718.5	118774.7	366050.1	2256.1	1643.9	5583.2	7998.8
03P0758024a	Dec	U	FL	5503.0	118769.2	327848.2	6406.5	1661.6	5287.7	27825.8
03P0809009a	Pln	U		10166.5	164555.5	253331.3	9512.8	5677.2	4811.9	40488.8
03P0819011a	Pln	10		7303.2	208822.6	229879.8	4010.0	3690.1	5044.0	25443.5
03P0851010a	Glz	U	Mex	4789.6	143023.9	280319.7	5558.3	12273.0	6956.5	32172.6
03P0851011a	Glz	3		4084.1	141708.5	279668.2	4469.0	12380.8	8208.6	32106.2
03P0851016a	S/P	10		7169.0	151917.4	240515.3	11629.6	4522.1	6392.6	30225.7
03P0865009a	Dec	1		3668.5	96900.1	370745.8	5169.3	1197.7	4352.5	21497.9

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
03P1045023a	Dec	U	FL	3825.6	118891.8	324246.8	4084.2	1843.0	3972.4	18499.4
03P1120015a	Dec	10		7917.3	182282.0	270215.4	4791.1	2217.3	5249.3	17550.7
03P1339006a	Dec	U		6966.0	135250.3	317252.6	4323.0	1435.2	3219.5	12979.9
03P1565002a	Cln	U		4584.9	132608.2	222199.2	3152.7	26219.6	3217.2	11483.8
03P1587001a	Pln	U	Mex	7275.4	122485.3	284616.1	6588.3	15750.0	5642.2	38153.2
03P1593002a	Glz	8		7592.3	216794.3	232167.5	4377.2	6136.2	5766.6	29042.9
03P1628005a	Pln	1		4473.9	152898.5	308282.3	4181.6	1184.4	6160.1	24561.9
03P1628007a	Pln	U	FL	3469.4	121468.8	313837.1	4191.5	1541.1	6644.4	28648.6
03P1698001a	Glz	8		6681.8	196831.2	214148.8	4028.0	10045.5	6245.2	26153.3
03P1703002a	Glz	U	Mex	5405.5	169660.0	250044.2	4560.3	7253.2	5921.5	24207.6
04P0001088a	Cln	U		4559.4	88749.9	219190.3	3333.9	7304.4	4097.0	28454.6
04P0119007a	Pln	10		9135.7	204314.5	270509.1	6360.2	3986.5	5553.2	17579.1
04P0157006a	Glz	8		6846.7	199032.1	246314.0	4201.0	10954.0	7075.4	25341.5
04P0157007a	Glz	8		5735.9	155010.6	282651.5	3963.2	8529.9	6563.0	26838.8
04P0157015a	Pln	3		4916.6	126048.5	333559.8	7346.1	12301.6	6271.3	18956.3
04P0157017a	Pln	10		4950.6	114259.4	344500.0	5369.2	2110.9	4680.1	20670.2
04P0251036a	Dec	1		6187.2	121372.2	329315.7	5086.8	1008.2	4805.3	21077.7
04P0320005a	Pln	U	FL	3904.3	113129.3	325205.7	5639.0	1773.1	5443.5	24833.7
04P0320005b	Pln	10		6483.7	164126.6	294548.1	6488.1	2919.4	6058.3	17674.1
04P0340026a	Pln	10		9354.4	202057.3	249166.3	5087.7	2634.9	4496.2	23882.5
04P0340037a	Glz	2		11475.9	149846.4	289057.0	18705.0	7692.9	4768.1	30116.0
04P0401002a	Dec	U	FL	4321.4	129927.2	397569.8	6988.4	1828.2	5671.3	29400.5
04P0465015a	Glz	8		7498.3	199901.3	229900.4	3961.0	9147.2	5451.7	29293.0
04P0465016a	Glz	U	Mex	5276.6	163761.6	272295.1	6147.0	8176.1	6418.5	29360.0
04P0465038a	Pln	1		3969.3	133535.8	293938.8	11383.0	1549.7	7328.0	13558.5
04P0466006b	Pln	10		4180.2	134388.8	324984.3	5628.6	2144.0	6174.3	23275.7
04P0466013a	Pln	10		6371.1	143766.9	317956.1	6322.3	2680.7	4661.0	19845.5

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
04P0466018a	Glz	8		7453.8	195460.0	263155.0	4540.6	9414.1	5567.2	27318.1
04P0520009a	Pln	10		3480.7	138092.7	306068.9	4218.1	2561.8	5801.0	25912.5
04P0557014a	S/P	6		9371.5	147432.8	285754.7	9110.1	15491.2	5103.0	37285.2
04P0573016c	Pln	10		5125.4	131846.2	329210.9	6850.4	2669.1	5226.8	21523.4
04P0573020a	Pln	10		4647.3	159958.3	270712.7	4699.7	3120.5	5829.6	27991.2
04P0608013a	Cln	10		4148.1	117858.6	314247.5	6149.7	2654.7	4438.5	20684.1
04P0688013a	Pln	1		3753.7	107699.4	321232.0	4919.9	1280.2	5790.2	27501.0
04P0688015a	Pln	1		4279.7	148177.8	281951.0	7812.7	1089.6	5515.9	35613.3
04P0688018a	Pln	1		3720.9	140404.3	301238.9	4863.2	1123.7	6013.5	32369.9
04P0688018b	Pln	U	FL	5326.9	152407.5	286383.9	5132.2	1575.5	5652.1	26854.4
04P0688018c	Pln	1		4407.1	135054.1	323754.4	4641.8	1121.7	5609.8	20304.1
04P0688018d	Pln	10		4841.2	111163.6	358639.6	7122.7	3549.7	5245.9	20981.8
04P0688020a	Glz	10		8787.6	180212.5	285386.2	5735.5	2738.6	5868.6	35307.7
04P0688026b	Glz	8		8438.5	202925.6	237888.6	4526.2	7113.1	5997.6	23959.4
04P0688027c	Glz	10		7478.5	162091.8	313662.9	4998.8	1810.0	5678.3	37689.8
04P0690005a	Glz	U	Mex	6081.1	171701.3	294161.0	9696.6	9246.7	7637.6	38434.4
04P0690006a	Glz	8		7783.1	190548.0	275472.5	4740.0	9377.6	6149.4	30318.8
04P0690007b	Glz	3		3363.5	139232.1	323135.7	4885.6	7013.8	7431.2	28516.5
04P0690010a	S/P	U		13770.1	187433.0	171851.9	2210.3	85515.7	4596.7	40622.9
04P0694022a	Pln	10		5157.6	107738.0	297282.6	6497.4	2528.9	4548.9	25175.3
04P0694022d	Pln	U	FL	4656.4	146004.8	284504.6	4671.9	1350.0	5505.6	22192.4
04P0694025a	Pln	U		4450.5	92761.5	302820.7	5941.9	5350.4	4415.6	17567.2
04P0694025b	Pln	10		6207.3	156274.1	263605.3	5768.0	2052.6	4714.4	18828.0
04P0694025c	Pln	10		4532.7	122818.3	260168.4	5152.6	1939.5	5465.5	42904.5
04P0694026b	Pln	U	FL	4028.8	122520.1	300427.0	5891.4	1785.8	4864.3	17336.9
04P0694027a	Pln	10		4854.8	168415.2	241162.3	3498.0	1723.7	4444.0	18954.7
04P0727025a	S/P	4		9518.1	139634.4	237682.5	6904.1	9171.4	4296.6	52170.4

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
04P0779009a	Glz	8		6736.0	182111.0	243332.8	4505.9	8634.8	6743.9	30818.2
04P0779016a	Glz	3		3369.5	141814.2	276250.0	5835.6	7908.4	5833.9	31926.8
04P0780001a	Pln	1		4844.1	123634.0	321263.4	5150.2	1073.1	3484.4	15442.4
04P0790006a	Pln	1		3633.8	99213.6	339582.3	4984.1	1102.9	4439.8	18035.9
04P0790013a	Pln	10		6442.6	182154.1	212638.3	10003.3	3676.7	5427.3	32599.7
04P0802009b	Pln	4		5438.7	127493.5	256208.1	6283.2	4174.5	6132.6	47350.5
04P0812002a	Pln	10		4890.4	117130.2	292325.7	8439.8	2407.8	6055.6	26386.9
04P0813007a	Glz	8		6378.6	168317.6	246403.9	4672.1	10001.7	5807.8	31663.6
04P0820017a	Dec	10		5031.3	126583.0	333411.1	5607.7	2351.0	4543.0	26106.6
04P0856054a	Cln	1		5480.2	142756.6	277291.3	5820.7	1261.3	4948.1	37408.9
04P0859040a	Cln	1		3703.1	113891.8	328700.3	7558.2	1193.8	5105.6	23034.8
04P0867017a	Dec	U		6180.5	131460.7	327110.7	7366.3	4082.1	6039.6	19898.9
04P0867025a	Cln	U	FL	6690.0	148258.1	305797.9	5239.1	1371.6	4989.8	20665.3
04P0875008a	Glz	3		6617.4	173250.9	212733.6	9185.0	6233.7	5419.3	21896.2
04P0875010a	Glz	U		7480.9	196394.1	168601.1	5658.6	6184.9	5092.0	22213.0
04P0875011a	Glz	8		7465.0	192988.9	215279.9	6660.4	9467.9	5889.3	30266.2
04P0950011a	Glz	U	Mex	6439.0	154233.7	239365.3	5025.0	10334.2	5189.2	24815.0
04P0968009a	Cln	1		4840.8	169716.2	265999.5	11182.2	1144.0	5455.8	31327.0
04P0974015a	Glz	U		6266.3	169507.2	253143.4	5408.3	5910.7	5817.7	24967.4
04P0974019a	Pln	U		7190.7	154170.0	309761.8	4789.3	2329.3	3055.9	15630.2
04P0993006a	Glz	3		4743.8	159269.8	279771.8	6837.8	7496.1	5019.8	26092.9
04P1031005a	Glz	3		4618.3	154010.9	273302.6	4992.1	6344.3	5938.8	25939.3
04P1031010a	Pln	10		6350.1	170033.8	248397.0	6287.6	2790.2	4762.3	26759.9
04P1071011a	Pln	1		4824.5	128565.4	362586.4	5395.8	1080.4	6118.0	16227.1
04P1071017a	Glz	10		6749.3	183736.9	295488.4	5454.4	2161.9	5513.7	13533.1
04P1071018a	Glz	U		16788.6	162877.1	256052.4	21214.0	40206.9	4002.4	37038.4
04P1092006a	Glz	8		6346.6	196963.7	252703.6	4907.9	6312.0	6145.7	26395.2

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
04P1094012a	Pln	1		6315.1	172873.0	251181.2	6892.8	826.4	6492.4	41979.6
04P1180005a	Cln	1		4101.9	148779.3	282701.9	6507.1	1101.9	5336.4	32735.7
04P1197037a	Cln	10		4225.4	112031.3	281555.2	4602.2	3131.6	4196.8	25569.3
04P1206041a	S/P	4		6272.6	143357.8	252532.0	6711.1	5351.8	5615.9	59367.8
04P1206045a	Glz	8		7798.5	194816.5	265022.7	6624.4	9081.4	6956.4	30868.7
04P1206045d	Glz	8		7608.7	223874.8	264096.8	4242.6	8781.2	5652.5	28048.0
04P1206046a	Glz	U	Mex	6070.3	170068.6	239929.9	7002.3	13077.0	7182.7	30251.6
04P1239019a	Pln	U		6791.6	144864.8	217996.1	9264.5	43712.9	4871.3	17510.8
04P1239026a	Pln	U	FL	5169.4	133319.1	246272.1	6199.5	3869.6	6331.3	45427.0
04P1239032a	Glz	3		4715.9	147866.0	268560.2	10488.1	5575.1	5209.0	23897.1
04P1239033d	Glz	U	Mex	5370.9	154983.6	280165.4	6278.4	8696.2	7424.3	26144.0
04P1239034b	Glz	U		16832.9	132181.9	194680.2	6382.1	27933.5	5980.5	42199.9
04P1239034d	S/P	U		5263.8	128216.8	320925.8	4730.1	1664.4	3821.7	15662.9
04P1289010a	Pln	U		6383.2	128917.9	287978.6	5057.4	1507.8	5783.6	56840.3
04P1289015a	Pln	3		6258.7	142312.4	268273.5	7931.5	10972.9	6190.6	28079.3
04P1289016a	S/P	4		8238.9	130684.6	255112.0	7320.0	6332.0	5773.9	58049.1
04P1289019a	S/P	U		2576.0	148861.6	271561.1	1556.1	1555.4	3106.1	21649.2
04P1289024a	Glz	3		4219.8	132954.6	307739.9	7794.4	6537.7	7234.5	27382.1
04P1346014a	Pln	3		6291.8	110228.2	314040.1	9897.1	6228.7	5050.4	22621.9
04P1409004b	Pln	1		3061.9	126058.6	298071.3	7539.6	860.2	6858.3	17850.3
04P1409014a	Glz	3		2861.6	123466.8	306209.8	5052.7	5849.1	7384.4	27284.8
04P1414008b	S/P	10		6516.8	140631.9	247632.0	8874.2	2543.1	5362.4	30513.2
04P1414009a	Pln	10		5480.2	144188.6	242586.6	7412.5	2948.0	5307.9	32978.5
04P1414011a	Pln	1		4941.1	137586.9	278751.2	7596.5	1232.3	5622.7	29497.6
04P1414013a	Glz	3		4462.3	144504.8	289234.1	5654.9	6669.4	6658.1	29427.0
04P1414015a	Glz	3		5235.0	136105.5	309547.4	5804.3	4832.2	7588.0	28925.4
04P1414015b	Glz	8		6599.7	189410.5	308547.5	5756.8	6035.2	7878.3	28882.7

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
04P1429010a	Dec	U	FL	3905.6	98318.5	337868.9	4556.1	1709.2	4739.7	25101.4
04P1432043a	Dec	1		3130.8	86478.1	322583.7	5246.0	1021.0	3884.5	13564.8
04P1447011a	Dec	4		6518.6	103517.6	325456.3	6897.1	0.0	4874.2	30392.8
04P1461012a	Glz	3		4590.6	162770.8	309834.2	4368.9	6891.0	7955.8	28561.5
04P1461015a	Glz	3		4346.6	137394.7	301883.8	11735.2	7528.0	7196.8	35087.9
04P1461016a	Glz	U		1971.5	107617.6	320362.9	4145.6	4812.6	6564.7	30615.1
04P1461017a	Pln	10		4416.9	147797.5	309856.9	4155.1	1973.4	5695.9	23677.7
04P1805021a	Cln	1		2752.9	120979.3	318445.5	6335.0	1555.6	4374.3	8670.5
04P1816013a	Glz	3		3670.3	145685.8	310154.7	6589.5	5995.2	6695.7	27191.5
04P1871010a	Cln	U	FL	4854.2	157083.5	262916.7	6891.4	1518.1	4692.6	33206.1
04P1886010a	Dec	1		5746.7	104013.1	326592.5	6425.2	677.3	5222.3	28854.9
04P1924007a	Dec	4		4277.0	110241.0	321377.6	4549.8	5248.3	4201.9	35641.5
05F1021001a	Pln	3		5619.2	127649.1	349842.8	7490.1	8874.9	6070.5	22152.4
05F1984004a	Glz	10		8650.7	156967.3	294734.7	17011.5	4073.8	5938.8	32535.1
05F1984007a	S/P	U		10620.5	174668.2	192656.4	32491.6	46316.5	5304.4	57712.6
05F1984012a	Glz	U	Mex	5380.2	161278.6	265700.9	6733.4	8984.0	8002.4	40821.5
05F1985007a	Pln	U		4340.4	135363.5	309914.5	5531.1	11296.5	6100.8	15519.5
05F2007002a	Glz	8		6174.2	175830.6	256223.1	6216.6	10622.5	6805.8	36893.4
05F2041009a	Glz	3		4528.4	142632.6	271979.5	6432.7	11494.9	6721.3	29391.6
05F2041011a	Pln	U		4835.1	155970.4	281763.3	5683.7	9987.5	6086.8	14482.3
05F2060002a	Glz	U		8518.2	143149.8	208845.8	8353.6	51731.9	4005.5	47878.5
05F2098001a	Glz	3		5376.7	131816.7	289475.8	10021.9	10249.2	8647.7	37839.3
05F2100001a	Glz	3		3427.4	111418.0	290164.3	5910.0	12961.0	6132.0	25836.9
05F2244004a	S/P	4		7201.3	92946.9	259222.6	7345.8	16378.3	4066.3	52585.1
05F2259001a	Pln	3		6174.2	113270.5	359353.9	7738.0	7463.5	5522.9	15803.2
05F2259003a	Glz	3		5086.2	139098.3	277223.7	5599.1	13399.1	6045.3	37639.3
05F2265003a	Glz	3		3590.5	122711.9	330396.9	5230.2	7491.3	7046.2	31694.9

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
05F2267001a	Pln	9		11572.8	109964.6	236818.5	22683.2	30160.0	4928.1	45677.3
05F2268001a	Glz	3		4741.2	125961.4	317865.7	6593.6	9258.3	6149.5	29170.2
05F2371002a	Glz	9		10482.2	128745.0	247833.6	23734.9	25701.4	4931.7	43674.8
05F2466001a	S/P	U		3937.3	81059.0	338447.6	7537.3	9672.6	3913.6	20254.6
05F2466004a	S/P	U		4561.4	169156.0	145471.6	2368.7	16460.8	5854.7	43160.4
05F2484001a	Pln	U		3439.4	116128.0	332351.9	3745.5	8784.3	4550.4	12023.6
05F2536002a	Glz	U	Mex	5150.1	144466.1	298696.7	5729.8	9784.6	7349.4	32351.6
05F2537002a	Pln	U		4291.2	137098.3	270942.0	9883.1	7816.1	6912.6	14650.5
05F2584002a	Pln	U		3461.4	107681.3	342274.4	8349.3	6371.6	6083.3	42639.2
08M0011016a	Glz	6		10542.0	155652.8	263565.6	10040.4	29087.0	3710.8	35236.1
08M0011025b	Pln	2		9528.9	114846.5	342973.6	18048.9	8131.2	5096.2	40991.9
08M0012007a	Pln	2		8374.1	116899.3	328558.0	17187.0	9279.5	5106.2	38110.9
08M0012016a	S/P	5		7203.0	72082.5	120652.6	6117.5	262694.3	1609.2	19333.7
08M0019001a	Glz	7		13785.7	112290.6	269476.8	18494.4	60239.8	5385.5	38775.8
08M0030011a	Pln	2		11809.4	122673.5	360312.2	20775.3	8293.4	4946.1	37763.2
08M0030015a	Glz	3		3098.9	153489.1	333517.2	11044.1	10609.6	6450.3	32134.4
08M0030018a	Glz	6		11523.1	172640.9	256942.2	7757.4	24746.4	4767.1	39398.0
08M0045027a	Pln	2		9380.3	121687.9	330657.5	18871.0	10233.2	5248.0	41495.0
08M0052001a	S/P	7		15145.7	96092.0	254524.3	24863.7	104342.6	3736.9	32013.3
08M0053002a	Pln	7		12354.8	92791.1	246255.4	22013.0	113738.6	3337.6	38274.2
08M0054009a	Glz	3		4849.8	150174.4	337827.3	6380.3	7807.6	6581.7	25180.8
08M0054010a	Pln	U		4440.8	114291.1	316890.2	20111.0	10251.3	3032.7	25004.0
08M0057015a	Pln	2		8966.4	112247.6	337041.2	16431.5	8030.9	5591.3	40514.1
08M0059008a	S/P	5		4374.9	77545.4	120291.2	8267.6	267122.5	2479.8	22869.0
08M0062014a	Pln	2		8765.8	119184.5	325261.8	16130.1	12365.0	5086.9	50181.5
08M0062023a	Pln	7		12881.5	93449.9	253214.9	20258.2	108441.7	3901.0	36548.2
08M0063011a	Pln	U		9152.5	142390.7	276790.7	28909.3	25877.3	5033.0	33664.9

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0063011b	Pln	2		7953.3	116726.7	364781.8	16720.6	10565.2	5149.2	37296.9
08M0063012a	Glz	3		4620.5	133020.4	334044.8	6380.6	15663.5	6910.1	28587.4
08M0065036a	Glz	6		7126.3	137363.1	320369.3	7466.8	19342.6	4326.1	35351.3
08M0065037a	Glz	3		6026.4	148184.4	317241.1	12483.9	13177.9	4711.4	33432.0
08M0065038a	Glz	U		7706.9	158107.8	308786.6	9675.9	21004.6	4375.3	25790.7
08M0067035a	S/P	9		18598.8	118885.5	207330.2	9380.6	32629.7	8316.8	58685.5
08M0068001a	Glz	3		4750.8	145603.5	308856.2	5506.3	7604.0	5685.3	28255.8
08M0068024a	Glz	3		5177.4	136613.1	317655.5	9609.1	9430.2	6018.7	28222.1
08M0068070a	Glz	8		7760.0	210887.9	282597.8	7015.8	12942.7	7508.1	28963.6
08M0068070b	Glz	3		5301.4	150954.2	335668.6	11644.2	11591.0	5856.7	33780.3
08M0068072a	S/P	U		7981.2	138550.3	172363.8	9345.2	152645.8	3214.0	27168.6
08M0131009a	Pln	2		10490.7	120729.8	302481.6	17961.3	12696.7	6491.4	48073.8
08M0131026a	Glz	3		4082.6	175930.4	329591.5	6686.1	7291.7	7147.8	30495.8
08M0162007a	Pln	2		9601.3	133105.4	327389.1	15961.4	9334.0	5343.7	39355.9
08M0162008a	S/P	6		6978.1	109750.1	240830.0	6532.9	23283.7	4818.7	41506.4
08M0162010a	S/P	9		18274.6	153622.9	193098.0	8983.3	39205.1	8781.1	62346.7
08M0162018a	Pln	2		8736.1	111299.3	319683.4	14367.0	8757.0	4822.7	43440.3
08M0163026a	Pln	6		8535.8	146217.6	260575.9	8773.1	27312.4	4675.5	45463.4
08M0163027a	Glz	U		7358.8	157056.1	249322.9	7865.5	19228.2	6075.4	44831.8
08M0165011a	S/P	9		19834.6	138580.5	233995.1	12344.6	31587.2	8134.0	56180.1
08M0171004b	Pln	2		9185.2	134751.6	333745.9	13224.4	8526.0	5326.1	36218.4
08M0171009a	Glz	6		5702.9	118786.7	274064.0	7927.2	24940.8	4188.2	35780.3
08M0193009a	Pln	2		8912.6	138687.3	322537.2	12874.9	7105.5	5480.5	36081.5
08M0193009b	Pln	2		8709.4	134360.9	313222.3	13360.0	9687.7	5409.1	36217.2
08M0193009d	Pln	2		8534.8	127372.0	317096.9	12449.4	6826.6	5050.3	34049.7
08M0193012a	Pln	7		16482.8	109543.0	240198.2	24488.4	67771.8	3993.4	40161.0
08M0193022a	Pln	2		9478.2	121672.5	264582.0	19725.0	12797.0	6244.7	42045.8

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0202012a	Pln	6		7927.4	108851.9	276995.6	9672.5	28840.4	5043.8	41395.6
08M0215033a	Glz	U		18288.5	75679.2	237024.6	11931.5	109306.7	3466.8	33142.2
08M0215038k	Glz	6		7324.5	129400.6	260791.3	7213.7	22351.8	4273.9	31146.4
08M0215038o	Glz	6		7030.7	141460.9	244445.4	7344.1	24966.7	5012.2	40371.9
08M0215038p	Glz	6		5487.1	108275.3	279365.1	7678.7	23687.6	4361.4	34436.7
08M0215060b	S/P	9		15132.1	116425.9	228174.3	11494.1	31168.5	8163.9	52546.9
08M0215062a	Pln	2		7451.0	96365.7	319530.5	13740.4	9567.8	4484.5	33525.6
08M0217010a	Pln	3		6201.0	96103.3	322345.3	9490.4	14005.9	6110.6	39647.9
08M0217013a	Glz	U		5133.8	116840.6	274530.4	10201.0	20417.5	5239.6	40730.7
08M0361005a	Glz	U		6322.3	110836.3	316313.8	26566.2	4244.8	3888.9	33934.1
08M0365004a	Glz	2		10701.5	143832.0	291896.5	18008.8	7002.5	5762.2	42659.0
08M0365007a	Pln	7		9585.5	70350.4	270753.9	19216.3	95776.2	3443.0	28832.5
08M0365008a	Glz	2		10823.5	134247.8	279320.1	22035.3	6785.1	5073.9	36755.1
08M0365018a	Pln	2		7810.7	107980.3	305442.6	15922.8	9295.0	4644.5	31409.6
08M0365018b	Pln	6		7460.6	129469.4	282489.1	11283.6	18291.6	3788.7	28427.3
08M0365019a	Pln	U		14774.8	105597.3	248210.2	32194.2	22699.9	7210.8	50254.5
08M0365022a	S/P	2		8178.8	111022.7	299001.3	16863.9	6766.6	5254.6	45154.7
08M0365026a	Glz	6		8890.8	148018.0	245440.7	5947.5	30356.4	4196.3	31540.2
08M0366002a	Glz	6		9862.7	176573.2	243808.9	7316.4	17494.5	5493.3	39363.5
08M0389007a	Pln	7		16761.3	78428.1	238865.6	22904.3	92289.4	4034.8	37514.7
08M0389012a	Pln	6		8753.7	110889.8	256110.9	10740.1	26814.8	5146.2	39610.1
08M0412007b	Pln	U		5380.5	140321.0	264679.0	5376.5	8325.8	7079.4	37551.3
08M0412014c	Pln	2		7394.3	89519.1	319659.7	15098.0	10252.9	5450.0	35079.2
08M0426019a	Glz	6		9160.9	130360.8	281179.4	9500.6	20060.8	3767.4	28895.2
08M0426022a	Pln	2		8021.2	111233.5	298187.6	13445.3	8665.5	4406.0	35608.9
08M0426023a	S/P	7		10498.6	57522.3	243690.1	21078.6	101013.4	3397.0	24484.4
08M0426024a	Glz	U		7438.4	154014.8	260681.4	4427.8	16400.8	3785.9	33438.9

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0426028a	Glz	2		8786.7	132967.4	282458.1	14373.3	7437.4	4736.9	34444.5
08M0427009a	Pln	7		13643.5	73007.3	252847.8	18385.1	100839.3	3547.8	29670.6
08M0427009c	Pln	2		8677.1	108070.8	315179.4	16935.2	11683.4	5468.7	36427.4
08M0427026b	Glz	6		9432.5	138703.6	278113.0	9549.3	21982.9	4639.2	34312.4
08M0428024a	Glz	6		6311.7	124120.4	294793.8	7379.5	19002.6	4088.2	29951.3
08M0428038a	Pln	7		16138.5	79944.3	239147.0	29275.4	104698.2	3348.2	37726.2
08M0428038b	Pln	2		10887.1	161746.7	297710.9	13468.2	8384.3	4819.8	39294.8
08M0430009a	Pln	2		8429.0	104276.1	334789.3	16419.4	8732.2	4898.3	39177.3
08M0431033a	Glz	6		8422.8	120321.6	255030.5	9763.8	22549.9	4461.9	33809.4
08M0434009a	Pln	2		9727.0	137750.4	284074.6	19481.8	8411.1	5411.6	36710.5
08M0435022a	Pln	6		6422.1	126973.7	251346.1	10855.2	23011.5	4314.7	33221.7
08M0437009a	Glz	2		8694.1	130612.9	278264.3	17776.6	10949.2	4734.4	33461.5
08M0437013a	S/P	7		12298.4	72298.8	225764.5	20510.8	100529.8	2988.0	28661.4
08M0437021a	Pln	2		6962.3	90517.9	305446.2	15308.6	11166.9	4530.7	33549.3
08M0437052a	S/P	5		6256.1	72844.5	121367.3	6791.8	220199.7	2275.0	22155.1
08M0441003a	Glz	U		5346.8	123703.1	256795.2	8874.2	18865.2	5119.4	38770.3
08M0441011a	Glz	2		9081.1	115737.4	275148.8	18556.9	8056.7	5021.9	30992.9
08M0441013a	Pln	2		10056.5	111150.5	313932.9	18453.7	11984.8	5131.4	38532.8
08M0441014a	Pln	2		8408.8	125274.2	324407.3	15195.9	12777.1	5047.7	37206.0
08M0443025a	Pln	2		8931.0	115349.8	278836.6	14890.5	12418.5	4347.8	34606.1
08M0443029a	S/P	9		18082.3	109952.3	247975.4	14378.6	29622.5	6730.9	49656.7
08M0444031a	S/P	5		5766.6	69918.9	117867.8	7368.4	230185.0	1921.7	15677.8
08M0444058a	Pln	U		5761.6	103122.5	282700.6	21037.5	12100.8	6269.4	39315.9
08M0444061a	S/P	U		3048.2	112854.5	285774.0	33487.5	7725.9	3175.3	25384.8
08M0459006a	Glz	6		8576.3	129522.6	270343.3	9983.6	23667.9	4199.0	32148.8
08M0462002a	Glz	6		6464.5	128818.3	253306.7	7332.8	27091.0	3749.8	27710.2
08M0463028a	Glz	U		6947.3	104414.8	316049.8	6097.0	16053.6	3448.3	28849.4

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0463035a	S/P	6		9245.2	161295.0	260272.0	7852.8	25649.8	4767.0	36361.5
08M0465019a	Glz	3		3468.6	156406.9	241230.7	9006.7	16406.3	6922.6	33950.8
08M0465033a	Pln	U		20770.3	86067.0	244395.2	21297.2	81456.0	3436.9	41897.9
08M0466010a	S/P	2		11253.1	137372.2	268331.3	17625.6	7647.4	6156.2	43264.1
08M0466033a	Glz	U		14044.9	84730.0	249041.6	22609.8	61496.1	3442.1	36169.8
08M0471013a	Glz	6		7391.4	142850.6	263930.0	9874.1	21024.9	4363.5	34119.5
08M0473004a	S/P	6		7233.3	119284.4	282089.5	10328.6	24773.3	3705.9	29528.0
08M0473007a	Pln	2		8058.0	97040.2	310413.4	14138.5	12053.5	4858.7	32770.5
08M0473008b	Pln	2		7868.0	109291.9	297048.2	15576.1	9293.3	4799.2	32827.8
08M0473024a	Pln	U		12294.8	107324.9	190104.3	7451.9	109876.5	3081.0	26329.9
08M0473026a	S/P	2		11822.5	154436.3	270749.5	16540.1	9763.2	7178.6	44071.3
08M0473048a	S/P	5		5319.1	61198.1	102991.3	6710.1	204195.4	1652.9	13914.6
08M0477001a	Glz	6		7162.8	117106.0	247368.7	12322.4	22183.7	3651.5	29936.7
08M0477002a	Glz	6		4591.6	114935.8	205681.0	8288.0	17917.3	3592.8	27236.6
08M0477008a	Pln	2		7700.8	91021.4	308538.0	14318.4	13300.8	3992.5	29520.7
08M0477008b	Pln	2		7997.1	91606.6	313903.1	15733.5	15882.4	3988.7	34012.6
08M0477008c	S/P	2		7056.9	85583.5	279873.6	15088.7	14122.6	4392.0	31265.6
08M0477012a	Glz	9		10349.8	90259.2	278977.8	27947.2	49751.0	3661.3	34783.2
08M0477016a	Glz	7		15509.7	82065.3	244976.7	20757.5	90792.7	3330.2	30364.2
08M0477017a	Glz	6		6925.4	112640.5	295571.9	10280.2	17998.3	5181.9	37388.5
08M0477037a	S/P	5		4782.3	75167.9	116617.7	5241.2	228143.4	2233.5	19295.7
08M0477054a	S/P	2		8699.2	97182.6	312976.5	16600.1	12497.7	4823.4	34509.9
08M0477138a	S/P	2		9593.1	128393.6	300077.9	14998.8	12051.4	5325.1	40038.9
08M0478018a	Glz	6		9072.6	139644.1	267638.1	8669.1	25830.4	4657.3	34816.0
08M0478019a	Glz	6		7388.7	136363.8	316594.9	10985.5	23286.6	3897.4	32629.4
08M0478028a	Glz	6		7574.9	143084.4	248929.3	8749.7	20755.5	4270.8	33753.1
08M0478032b	Pln	2		8403.8	98617.1	286516.7	17080.9	12614.2	4884.5	32573.4

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0478045a	Pln	2		9296.1	115309.8	285599.3	17878.8	10060.7	5525.7	42758.2
08M0479007a	Pln	2		7619.1	104644.5	249592.8	12538.7	7061.1	4190.5	31190.3
08M0486024a	Pln	2		9377.0	122287.8	276607.1	14954.8	9847.4	6348.6	44026.0
08M0486027a	Pln	U		12448.6	70406.8	203143.6	19313.2	68534.1	2932.5	28177.1
08M0486028b	Pln	2		8753.7	109989.4	322856.5	15954.4	9399.7	4678.9	33938.3
08M0486029a	Glz	6		6499.4	140819.4	273781.3	8677.9	21661.9	3937.3	30834.0
08M0486048a	Glz	6		7500.4	151921.8	251647.2	7655.5	19823.9	4004.3	33185.8
08M0486048b	Glz	6		6976.4	143949.2	263112.0	7604.5	20742.7	4438.2	31776.3
08M0486048c	Glz	6		7204.1	124678.5	256082.1	7108.2	22049.1	4193.7	33068.9
08M0486067a	Glz	U		10008.1	148375.9	306987.2	8937.7	9840.1	4366.2	29289.9
08M0486072a	Pln	2		9334.2	144757.8	277771.0	14204.5	9017.1	5179.0	36555.1
08M0488024a	Pln	2		10093.0	136582.0	283334.9	15040.2	8525.6	4899.8	33299.5
08M0488031a	Pln	7		14139.5	89303.6	243058.5	21799.9	81492.4	3615.9	33882.5
08M0489001a	Glz	6		8235.8	168892.9	277767.7	7191.5	20663.4	4653.3	31803.4
08M0489002a	Glz	6		9668.3	170325.2	204456.1	6410.9	22455.7	4013.8	35592.9
08M0493031a	Pln	7		16475.8	104450.3	239267.5	14087.7	114921.5	3353.1	29031.4
08M0595015a	Glz	3		3934.3	149363.1	306516.5	4818.5	12451.3	7722.8	32741.8
08M0595015b	Glz	6		10223.1	170702.7	262850.0	5736.2	27613.9	4580.4	34762.8
08M0601011a	Pln	2		9855.1	129306.8	278198.4	16226.4	9058.2	6454.4	37761.5
08M0601012a	Glz	6		8754.3	138477.8	251643.0	5407.1	28065.4	4251.5	34174.1
08M0601012b	Glz	6		9450.7	161091.5	257249.5	5690.2	27235.9	4207.6	32090.4
08M0613139b	Pln	3		5193.5	126093.5	250047.3	9825.0	19684.7	5607.5	28010.7
08M0613140h	Glz	U		5554.7	111219.2	293096.4	13641.0	11161.0	3900.6	22410.6
08M0613140i	Glz	U		7141.9	147362.3	279228.2	14178.1	10611.4	3579.3	21432.0
08M0613142a	Pln	2		11571.2	148587.6	240462.6	16404.5	9156.1	4914.5	35648.9
08M0613142d	Pln	U		6814.2	112284.9	319110.3	11695.3	11781.4	4661.8	27140.2
08M0613142e	Pln	2		10335.9	115363.4	293685.7	15496.8	11243.7	5389.8	40086.5

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0614008b	Pln	7		14259.8	78208.1	246114.2	22744.3	95667.8	3489.6	33313.2
08M0614008d	Pln	2		6885.2	106550.8	308390.5	12657.2	10169.5	4396.0	34506.9
08M0614010b	S/P	7		14737.6	66833.2	217603.7	17220.0	111226.4	2661.7	25814.2
08M0614018a	S/P	5		5244.1	78597.9	112469.1	3305.8	230918.1	2744.8	19783.2
08M0614028b	Pln	5		5566.7	80801.6	122157.6	6173.4	220954.5	2702.1	24527.9
08M0614034a	Glz	U		8863.6	147097.7	239083.8	21749.9	23280.4	4607.9	34920.3
08M0614076a	Pln	2		10513.2	132272.1	258435.3	18052.8	11460.5	6576.2	44261.4
08M0711001a	Glz	8		6741.0	178406.4	278753.3	4865.7	8400.1	5533.0	23538.3
08M0711009a	Glz	6		6330.8	137538.4	258572.6	9363.9	18973.4	5035.3	42354.2
08M0711009c	Glz	3		4746.6	134093.2	296619.8	10343.9	19103.3	5878.0	28004.0
08M0711010a	Glz	3		3897.4	119877.0	348749.1	7441.8	11637.2	6051.6	25982.1
08M0711012a	Pln	2		10641.4	124991.8	279290.2	19038.4	9602.9	5960.6	44001.5
08M0711015a	S/P	U		14391.8	151256.8	235757.3	17532.0	29977.4	5207.6	36946.6
08M0720011a	Pln	U		5955.3	141408.7	251984.9	8420.6	19085.9	4860.8	36407.1
08M0720013a	Glz	U		10137.0	152437.2	253230.9	13127.9	58372.1	6724.5	38682.0
08M0720025a	S/P	7		12333.2	81957.8	222374.8	19173.2	117539.9	3269.2	25506.7
08M0755005a	Pln	2		10099.8	111716.9	310019.1	18723.5	10419.6	6154.3	44853.8
08M0756002a	Glz	3		4257.7	139709.0	303266.4	12839.3	10154.9	5489.7	25766.6
08M0762011a	Pln	2		8541.7	127895.4	312450.6	13112.7	6990.6	5268.0	35312.2
08M0763019a	S/P	U		6833.6	131004.9	266316.4	8386.5	17862.7	5331.1	37464.1
08M0763021a	Pln	3		3460.1	124230.2	344229.8	5311.6	6357.6	4737.1	22136.6
08M0763062a	Glz	3		3717.8	112355.0	304691.3	8997.2	13678.1	5377.5	31147.1
08M0763080b	Glz	3		4031.7	143352.9	267033.5	8327.9	9599.5	6487.7	26301.4
08M0764007a	Pln	7		13141.8	69044.5	213007.7	21562.8	116728.3	2725.6	26580.3
08M0764026d	Glz	6		7412.5	132356.3	270521.4	8754.5	24621.8	4077.6	32011.3
08M0765006a	Pln	U		9319.1	205458.2	240338.7	9078.6	24326.8	5980.3	36980.1
08M0765007a	Pln	U		10067.7	130619.9	222260.5	6152.6	28527.9	4138.1	48693.6

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
08M0765007b	Pln	2		6530.1	101042.2	326032.5	10655.1	12200.4	4812.7	34799.2
08M0794034a	Pln	U		2976.6	112825.1	340023.1	15261.4	13098.8	5802.3	31292.5
08M0795005a	Glz	3		4190.3	144203.7	343754.2	5733.1	7110.1	6721.9	24820.8
08M0802083a	S/P	5		4210.0	82834.7	121249.2	5615.5	280721.0	2814.3	23612.4
08M0806060a	Pln	U		5827.4	112917.7	323038.5	14902.0	8818.4	5457.1	39328.7
08M0808086b	Pln	U		7327.8	131544.4	323323.7	14237.3	7049.0	5099.8	47125.4
08M0808089a	Glz	U		6729.5	143935.7	293808.3	17104.6	17975.3	5516.2	36264.1
08M0811105a	Pln	6		11051.9	141052.5	251456.0	9946.8	29976.7	5312.2	38621.2
08M0822002a	Glz	3		5010.9	149070.1	289191.8	5425.9	15157.9	5109.8	21473.3
08M0822014a	Glz	6		10311.3	148388.4	241910.7	9616.0	28382.5	5257.3	39699.9
08M0830012a	Pln	U		6252.0	129623.6	283913.8	21568.1	13903.5	5259.5	45173.2
08M0837023a	Glz	3		4254.3	157694.0	319730.8	8283.7	9264.2	7688.2	32119.1
08M0837023b	Glz	6		6186.5	135913.9	261863.5	8901.1	31305.2	4767.8	43743.7
08M0837023c	Glz	U		5224.7	172148.3	251057.6	7675.7	11360.8	7797.6	35065.7
08M0837023e	Glz	3		3504.0	145372.4	296328.9	9435.6	7587.3	7325.8	37545.0
08M0838070a	S/P	9		15891.8	153136.6	204334.1	10615.8	36267.6	8354.5	57513.8
08M0846042a	Glz	3		5522.4	134656.8	271531.4	15213.9	13574.5	5863.9	33322.4
08M0846042b	Glz	3		5008.2	141989.3	287990.2	8717.7	7411.2	6627.9	37431.6
08M0846042d	Glz	U		6595.2	120887.0	291445.6	13791.8	14178.3	3854.2	25604.3
08M0846042e	Glz	6		8687.6	156306.5	247651.4	5214.7	20282.7	4154.4	29798.3
08M0846053a	Pln	2		10128.4	159421.8	269147.4	18372.1	5971.5	4676.1	39493.2
08M0859001a	S/P	5		7118.1	72354.4	120850.7	4598.2	280001.4	2224.3	20747.0
08M0860018a	S/P	5		7056.0	76390.3	116684.2	4590.0	275110.4	2399.8	23353.3
09F0538001a	Dec	U		3335.4	110334.6	307634.1	9047.9	0.0	5551.7	33255.6
09F0580002a	Dec	1		5192.9	131879.7	311697.0	8552.2	826.8	7060.9	24399.3
09F0632003a	Dec	1		3684.4	129922.1	275704.9	4372.9	1150.0	6449.6	39443.9
10F1183021a	Dec	1		3346.2	100655.8	398747.0	6753.9	0.0	5182.8	13966.3

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
10F1215001a	Dec	10		6917.0	133249.2	307714.2	10562.7	2110.6	6755.1	43682.4
10F1229001a	Dec	1		6405.6	128832.4	369108.0	6795.7	0.0	5861.3	22155.4
10F1229001b	Dec	1		2702.8	110594.3	398503.9	6882.4	1308.4	5373.3	15098.7
10F1247001a	Dec	1		3773.5	159653.6	302237.6	6287.9	0.0	8349.4	17906.1
10F1283001a	Dec	1		5530.1	124616.4	341940.3	7063.1	931.3	6214.0	18398.2
10F1284001a	Dec	1		5633.9	180365.5	256303.4	7358.2	1062.3	8881.2	20225.8
10F1302001a	Dec	U		3626.5	162892.1	284936.2	7349.4	2164.7	8177.8	17681.6
10F1305004a	Dec	1		5342.1	120651.7	345063.0	6237.9	813.9	5867.3	20634.5
10F1306002a	Dec	1		2799.2	104965.9	368087.9	5748.8	1264.4	4955.1	11456.6
10F1346001a	Dec	U		4334.9	153490.5	283202.1	5638.8	0.0	7310.5	20597.5
10F1413011a	Dec	10		5344.0	128531.3	314667.3	12530.7	1840.2	5949.5	24145.6
10F1413019a	Dec	10		5576.3	126125.2	321101.8	12211.2	2966.3	5860.4	27807.7
10F1413019b	Dec	10		4937.8	133898.9	323215.9	9554.6	2105.8	6401.2	24233.4
10F1413019c	Dec	1		4049.7	121734.3	353106.7	7942.4	852.5	5779.0	19648.1
10F1435001a	Dec	U	FL	4800.4	132485.3	352229.0	9468.9	1566.6	6373.3	29691.1
10F1465001a	Dec	U	FL	3355.5	99570.0	414935.9	7298.0	0.0	5227.7	14446.7
10F1705007a	Dec	1		4436.8	135861.0	366591.5	6712.5	827.4	5814.5	22881.7
10F1705007b	Dec	1		4497.5	121666.3	347132.8	7295.1	766.7	6443.7	23568.7
11F2120001a	Dec	1		5005.5	129260.7	339285.3	11197.7	1091.5	7342.3	23518.9
11F2225001a	Dec	U	FL	5196.5	129584.8	337529.3	8844.5	1753.2	5899.2	26731.1
11F2271001a	Dec	1		5851.2	129762.7	294190.4	7285.6	0.0	6855.4	46452.3
11F2272001a	Dec	1		3571.2	103431.0	416848.2	6928.4	876.9	5069.5	14600.7
11F2360001a	Dec	10		5270.6	122787.7	394290.5	3523.8	0.0	6638.9	11506.3
11F2376005a	Dec	1		5838.5	162229.2	305058.7	8208.1	0.0	6723.2	20132.9
11F2378001a	Dec	1		5431.6	133632.0	325221.6	10753.5	963.3	6963.7	24472.6
11F2453001a	Dec	1		4102.4	142285.6	298409.9	11328.9	0.0	8422.5	31467.8
11F2453004a	Dec	U		3478.1	154153.5	290526.0	7948.2	609.6	7046.3	23782.2

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
11F2456001a	Dec	1		5375.8	123569.5	330605.9	11617.4	1199.3	7280.2	26093.2
11F2457002a	Dec	1		3348.6	100648.6	386286.9	6683.9	0.0	5838.6	24008.0
11F2458002a	Dec	10		6052.8	138059.1	334460.8	8143.0	2683.7	6212.4	31175.6
11F2511005a	Dec	U	FL	5229.8	157650.5	234576.3	5791.6	1423.5	6307.4	24119.7
11F2511006a	Dec	1		6334.1	143413.0	305190.3	12951.0	816.9	7890.6	27308.2
11F2516004a	Dec	U		5359.1	183760.5	260456.4	5893.9	1640.7	7645.5	21317.0
11F2629003a	Dec	10		8080.9	157149.8	304964.8	8556.9	2235.1	5200.9	22160.4
11F2674001a	Dec	U	FL	5397.5	141482.4	331881.2	8266.3	1665.5	7530.8	34977.5
11F2881002a	Dec	1		4045.8	133158.0	378857.8	9611.6	0.0	6407.0	18519.4
11F2886005a	Dec	U		3752.1	168721.3	272275.3	8312.4	0.0	8535.7	19632.9
11F2886006a	Dec	10		3579.7	141655.3	366617.7	7217.1	2195.4	4865.6	14115.8
11F2902001b	Dec	U	FL	5332.1	162675.3	275827.0	5043.1	1583.6	5270.7	13938.0
11F2902002a	Dec	1		3282.5	123086.9	297250.2	8949.7	1392.0	6514.2	20225.7
11F2991001a	Dec	10		5078.1	150648.1	288946.0	7324.8	2120.8	6529.1	24017.4
95N1479011b	Glz	U	Mex	6661.8	168194.7	280457.3	7442.6	11785.5	6298.2	30849.9
95N1551044a	Cln	10		4121.7	105870.3	283208.8	8319.5	3028.2	4930.4	21338.2
95N1569032a	Cln	U		5478.8	133034.0	237462.8	5979.9	10546.8	5797.2	45866.9
95N1609054a	Cln	4		5927.6	104304.4	240049.4	4940.7	5958.6	5987.8	54625.6
95N1611015a	Cln	4		5417.9	130391.8	253455.4	6952.7	6931.3	5079.7	54149.1
95N1659010a	Cln	U	FL	2942.1	106260.3	259807.9	6677.1	3721.1	6025.7	55706.2
95N1774012c	Glz	3		4728.6	150168.2	257904.7	11271.7	7831.4	6933.1	24733.9
95N1774012d	Glz	8		6209.2	198893.9	213587.7	5231.8	11457.2	6374.8	35971.8
95N1774012h	Glz	3		4558.2	148907.2	255153.4	6517.4	12380.0	4950.1	29321.3
95N1774035a	Pln	3		4050.1	131835.7	288712.5	5980.9	6699.4	6087.2	24794.4
95N1774035e	Pln	3		5653.6	147083.3	292693.0	6192.0	9385.2	5998.7	24473.1
95N1774046a	Pln	4		6982.7	154944.8	247294.9	5753.4	6234.7	5517.8	56914.5
95N1774054b	Pln	4		6956.0	137403.8	262584.0	5701.0	4711.6	5953.2	51604.7

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
95N1776024a	S/P	10		9232.6	190147.9	254871.0	9538.3	2867.7	5033.0	29685.5
95N1776028a	Pln	4		5454.2	133859.2	238175.5	13507.9	8108.5	5763.0	58738.3
95N1776028b	Pln	U	FL	9758.7	204801.9	229732.7	4722.0	4625.5	5216.2	46748.4
95N1776032a	Pln	4		3958.5	142132.3	276626.1	5300.5	5713.3	4588.1	37257.5
95N1776034b	Pln	R		4900.8	157901.0	288209.2	5510.3	8221.4	5271.8	19344.8
95N1811022a	Pln	3		6037.6	122897.9	292098.7	12066.0	7697.5	6136.4	33313.8
95N1811025a	S/P	4		5006.0	124440.8	271448.5	7382.8	8006.1	5313.4	53750.3
95N1867020a	Cln	4		5392.4	161736.9	199724.3	5426.2	6006.1	4529.8	42582.9
96N2173029a	Pln	4		4273.7	130695.6	269995.0	7736.0	6604.2	5143.1	38484.4
96N2173030e	Pln	4		4456.4	136698.0	277519.0	8088.2	4934.7	5311.2	38655.6
96N2177011b	Pln	4		6316.9	126272.0	281753.9	9322.3	7978.8	4574.3	44439.0
96N2177014a	Pln	U		5670.9	157620.3	241060.4	3842.0	5604.3	6387.9	42437.6
96N2184010a	Glz	U	Mex	4492.5	158291.5	230215.0	3884.3	8252.6	6816.8	27614.1
96N2870001a	Pln	U		9031.3	110187.8	244294.9	8739.8	18617.4	5127.8	52418.4
96N3651001a	Glz	3		5156.0	159359.3	247119.7	9677.0	11423.8	6210.3	36459.9
96N4398047a	Glz	8		5176.6	178819.3	216082.0	5093.1	10356.3	6786.2	33093.7
96N4398048a	Glz	3		4110.6	141010.6	241852.8	10189.2	13063.7	5812.9	31097.9
96N4538009a	Glz	3		3684.5	144685.3	262543.8	4638.3	7622.1	6971.1	27865.3
96N4538010a	Glz	3		3759.8	126693.4	246815.9	9072.7	12170.2	6423.2	35546.4
96N4541009a	Pln	4		7672.6	104572.9	271337.8	6591.2	8807.9	4617.6	46613.0
96N4541010a	Glz	3		4505.6	143751.7	285852.2	6681.5	14880.8	6185.2	28745.9
96N4541010b	Glz	U	Mex	6771.3	145935.6	257508.0	6690.8	13020.8	5744.2	27256.3
96N4542001a	Glz	U	Mex	5449.7	146319.2	269485.2	5231.6	13755.9	6677.1	25333.5
96N4542001b	Glz	3		4935.1	119309.3	307380.5	7663.5	14931.6	6354.0	25135.2
96N4542002d	Pln	4		4492.1	113990.1	302746.5	6387.2	4911.3	5444.1	35981.7
96N4542005a	Pln	4		4049.9	119520.1	292561.7	6304.8	5404.0	5646.7	37734.6
96N4542007a	Glz	8		6051.3	175505.5	266938.8	4470.0	7370.1	6377.1	26529.8

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
96N4542009a	Pln	10		8604.1	210631.3	253961.2	6848.6	2604.0	4406.7	31532.3
96N4542009b	Pln	9		12141.8	134530.5	227215.5	18842.3	37240.5	4329.5	41850.7
96N4542023a	Glz	3		4296.1	131987.1	281138.5	5083.2	12468.5	6321.0	29975.9
96N4549015a	Pln	4		5645.3	126464.0	249592.5	7768.3	9157.5	4987.6	41410.0
96N4578010a	Glz	3		3595.1	149362.3	265242.3	8598.5	7459.5	6453.5	26460.8
96N4589028a	Pln	4		3671.9	126161.0	248556.8	7205.1	5552.7	5689.1	62496.6
96N4589029a	Pln	U	FL	3818.4	111772.9	280742.2	7101.6	3281.9	4951.9	39235.9
96N4644030a	Pln	10		5133.6	133576.0	290263.9	4317.7	3446.1	5743.9	30686.9
96N4644030c	Pln	4		6051.6	119032.5	249928.7	3767.4	3750.1	5199.2	52838.5
96N4644030d	Pln	4		4587.6	111981.2	266578.4	5550.4	5116.3	5078.4	55133.8
96N4644030e	Pln	U		5063.9	145641.4	274029.2	5728.3	8553.3	5579.9	43038.6
96N4644032a	S/P	4		2873.6	120011.1	265465.5	6765.8	5780.1	6001.4	59803.0
96N4644034a	S/P	U	FL	4670.1	120706.4	272294.7	7905.0	4918.1	4850.5	34039.8
96N4644036a	S/P	4		4996.4	126439.6	265589.4	6357.7	5625.9	5772.7	57757.7
96N4644042a	Glz	3		3985.9	129804.2	259181.0	3823.4	10087.7	6027.1	33856.0
96N4659020a	Pln	U	FL	4739.5	143017.5	253359.5	4502.5	3099.8	5910.3	45858.4
96N4659021a	S/P	4		5171.9	141945.6	269096.4	7428.8	6934.8	5256.7	70641.9
96N4664013a	Glz	U	Mex	5326.3	157715.9	251279.2	5421.1	10985.9	5738.7	36120.8
96N4664014a	Glz	3		4371.7	146392.0	245673.6	6330.8	8295.0	5756.0	33328.6
96N4668011a	Pln	4		7507.2	146690.7	269408.7	5516.4	5701.9	6359.7	55445.1
96N4668013a	S/P	2		10328.5	135701.6	250468.9	13651.4	7585.4	5978.4	46557.8
96N4693001a	Glz	9		14997.6	128230.9	236652.5	19862.3	39259.6	4220.0	44642.6
96N4795027a	Cln	10		5498.8	135333.3	269786.7	10747.8	3043.4	5266.4	34261.9
96N4818003a	Pln	3		3812.8	118663.0	268802.9	5988.3	5441.0	5827.5	23630.3
96N4850009a	Cln	U		9055.3	171623.8	235876.1	8683.7	5447.0	4399.4	36588.6
96N4888012a	Glz	U	Mex	6468.6	167807.7	234332.9	8235.2	12582.0	7442.5	28893.9
96N4934021f	Glz	U	Mex	5261.5	160925.5	269508.9	5373.7	9352.2	5798.6	30065.4

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
96N4934021g	Glz	3		5173.0	180387.9	257714.4	5765.9	7839.7	4979.7	26767.9
96N4934030a	Pln	4		5719.7	131282.4	262618.2	3900.5	5566.3	5270.7	50320.5
96N4934032a	S/P	4		5038.1	138856.0	272693.3	3746.4	4330.5	5851.4	53354.0
96N4934034a	Pln	4		5954.7	106976.7	259031.7	3977.1	7899.4	4604.5	49009.9
96N4934037a	Glz	8		7053.1	194198.4	226766.7	4802.6	10940.5	6984.9	38812.5
96N4934042a	Pln	4		5631.0	135649.3	310833.7	4173.9	3716.6	5012.3	48023.5
96N4934048a	Pln	4		5801.9	136181.3	280836.9	4605.5	6097.5	6263.8	42366.7
96N4934062a	S/P	U		3510.1	156988.8	267038.9	1204.6	6939.7	2736.8	14985.7
96N5004013a	Pln	U		6598.7	129302.1	279022.7	11981.8	6392.8	5984.9	39297.8
96N5015001a	Cln	4		5964.4	119181.0	221516.0	6764.8	5954.9	3899.7	43900.6
96N5019001a	Pln	9		15663.9	108444.5	257121.9	22966.1	37943.7	4380.8	47170.4
96N5105006a	Glz	U	Mex	5210.4	157206.6	292934.5	3849.1	8562.0	7449.2	23982.2
96N5121005a	Pln	4		4606.2	118443.4	255811.9	7342.1	4618.8	5819.3	59719.1
96N5139001a	Glz	8		6730.5	183237.8	248028.3	4385.1	8878.2	4776.2	30653.7
96N5139001b	Glz	3		3400.5	119087.1	299083.0	4532.0	8856.3	5773.2	25875.7
96N5150001a	Glz	8		5373.0	168613.0	218931.7	4402.9	11040.0	6336.4	40448.1
96N5156021a	Pln	4		4230.6	128222.8	261750.4	9234.4	6099.4	6545.1	69243.4
96N5345001a	Cln	4		5027.4	108596.0	252114.9	8941.8	7784.4	5338.1	63577.9
96N5601001a	Stp	U	FL	7363.9	144825.5	290489.0	3923.7	2713.9	4986.3	50195.7
98N6982029a	Pln	4		6359.1	174346.0	242718.3	8180.4	6772.2	5788.0	73969.9
98N6995016a	Cln	4		3891.2	100200.3	271380.8	8204.9	5787.8	5534.8	54596.5
98N7241009a	S/P	10		4529.4	134896.6	269834.8	8252.5	2648.3	6337.4	49263.6
98N7242012a	Pln	U	FL	5794.3	126371.7	277808.2	6103.7	3709.3	6146.8	54842.8
98N7242013a	Glz	3		4790.4	175321.5	247321.6	7444.6	8518.1	6539.6	34141.5
98N7441015a	Pln	4		6812.1	94803.3	287572.5	6204.9	9470.1	5102.6	48462.6
98N7441026a	Glz	3		4510.3	160416.4	272788.6	5455.1	8949.8	5980.0	30660.4
98N7842026a	Pln	U		7705.2	152199.7	318554.2	10502.0	6493.4	4740.4	33450.4

Sample ID	Cat	Grp	Prov	Mg	Al	Si	K	Ca	Ti	Fe
98N7842037a	Stp	U	FL	3376.0	105782.4	337853.4	5700.6	3731.5	4440.4	30817.9
98N7842041a	Pln	4		6622.1	122089.4	335995.3	3859.6	5695.9	5263.1	46972.3
98N7842045a	Pln	4		4276.6	136823.8	271117.4	7406.1	6191.9	6062.9	64270.0
98N7844037a	Pln	4		4364.5	110100.0	299548.1	5052.9	9546.9	4838.7	43621.4
98N7844041a	Pln	6		7137.7	146084.8	240977.4	6918.1	24797.2	4616.1	41594.1
98N7844047a	Pln	4		6059.9	116592.1	228884.3	5486.8	9056.0	5474.6	49300.1
98N7845023a	Glz	U	Mex	5015.8	151233.6	270783.2	6175.0	9666.2	6864.5	34365.8
98N7845025a	Glz	U	Mex	5050.0	144847.6	270506.3	4497.3	12320.1	7856.3	35413.3
98N7845043a	Pln	10		5518.2	128068.6	264893.6	8242.5	2854.7	5942.4	49650.1
98N7846047a	Pln	4		6318.1	126102.9	264923.5	5018.2	9018.0	6105.9	52192.7
98N7846062a	Glz	3		4166.7	129116.9	273593.0	7289.9	9987.8	7442.5	38735.2
98N7846066b	Pln	U		6234.8	113887.1	296418.2	10536.4	5890.2	4378.8	35879.7
98N7846068a	Glz	3		4173.9	122464.5	297709.4	5488.9	9727.4	6125.5	32330.5
98N7846087a	Pln	4		5363.4	107965.4	264146.6	3972.6	7619.8	5537.7	49275.6
98N7858006a	Cln	4		6192.3	112810.9	273366.9	10023.7	6118.9	5183.8	44479.1
98N8221024a	Glz	U	Mex	6042.4	166920.6	236895.8	5368.5	11249.6	5790.4	29373.2
98N8221025a	Glz	3		4941.9	142032.5	243075.6	6305.3	10174.5	5986.4	35364.5
98N8221026a	Glz	6		7502.6	150159.5	242281.4	4322.8	22139.0	4132.2	34555.3
98N8221036a	Pln	U		5427.2	122903.6	315510.6	7278.7	10384.5	3850.3	29795.7
98N8221038a	S/P	4		5048.1	110465.8	256417.8	7253.5	9204.1	5440.8	70479.7
98N8267005a	Dec	10		4614.2	118966.0	299147.7	8639.0	1934.6	5229.2	43737.5
98N8333009a	Pln	U		4305.2	124382.8	285373.9	6273.4	4537.4	5109.7	28654.5

Notes: Cat = Pottery Categories; Grp = Core/Non-Core Groups Assignments; Prov = Provisional Groups Assignments; Pln =Plain; Glz = Lead-Glazed; S/P = Slipped or Painted; Cln = Colono ware; Stp = Santa Maria Stamped; Dec = Decorated Florida native; U = Unassigned; R = removed from analysis because intact shell inclusions led to questionable group assignment; Mex = Mexico; FL = Florida

Table E.2. PIXE Compositional Data for Clay Samples (PPM)

Sample ID	Location	Mg	Al	Si	K	Ca	Ti	Fe
1BA001	Perdido Bay	3446.7	50313.6	268745.2	3360.8	2447.9	2732.1	2678.3
1BA003	Perdido Bay	3033.9	96262.7	421462.7	3199.8	521.4	5124.4	5825.2
8ES001	UWF	4839.3	146022	241131.5	16930.1	0	5248.5	30227.7
8ES002	UWF	3825.9	153265.9	329260	8870.2	0	8749.4	11706.5
8ES004	Escambe	2937.5	63608.1	392546.7	4283.5	1097.3	4504.1	9663.5
8ES006	Carpenter Creek	753.6	46790.7	461602.7	965.5	540.2	4256.7	5843.5
8ES010	Escambe	3752.5	98726.7	354609	7887.7	927	4926.7	10464.3
8ES016	Gaberonne	4761.6	232586	327431.2	3570.1	2776.4	5444.6	10865
8ES018	Scenic	2563.4	184341.5	183383.2	5117.1	0	5417.9	8993.1
8SR001	Blackwater	2036.2	103174.1	333012	4207	24.9	9466.4	6969.6
8SR007	Garcon Point	2816.4	93986.2	400527	3928.8	779.8	3134.6	9993.1
8SR008	East River	3279.3	99196.4	218093.8	3032.1	10828.2	6279.9	34321.1
V0001A	Medellin	7483.3	123986.2	226257.9	6114.3	18998.1	6799.3	53733.8
V0003A	Jamapa	8418.8	115643	224284.3	7187.2	24922.8	5442.7	47627.2
V0004A	Tepetates	14047.6	67382.6	225122.1	19783.9	128684.9	3224.4	27240.6
V0005A	Cempoala	13792.1	134982.8	268586.1	15491.3	29511.6	7365.7	50310.3
V0006B	La Antigua	5147.6	80566.3	372367.3	7811.2	6545.9	8863.8	50874.4
V0007B	Villa Rica	6978.8	100583.5	249487.2	14803.1	12903.9	5193.2	41892.9
V0008A	Actopan	6141.4	123073.9	187174	5402.6	61690.4	5615.3	42161.1
V0009C	Oceloapan	7763.5	124613	253000.9	12440.7	21650.4	6650.9	48236.3
V0010B	Jalcomulco	15747.3	68100.1	230462.1	21312.4	131939	2996.8	24042.2
V0010C	Santa Maria	7132.7	93543.6	199548.9	10667.6	90165.1	5054.1	39823.6
V0011B	Acazonica	9790.8	47862.6	170124.6	10063.8	243893.9	2641.8	22602.8
V0012A	Soledad de Doblado	6161.7	101144.5	255881.7	6865.8	21154	4801.3	38023

V0015A	Tlacotalpan	10862.8	105377.2	264313.6	20780.3	14204.5	6271.4	51825.6
V0016A	Rio Cotaxtla	8003.9	121958.4	246973.7	9469.4	29936.3	4767.1	35172.8
V0016B	Rio Cotaxtla	3676.2	219891	204647.4	3210.9	7315.3	7386	70491.5

Note: The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa Maria (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F)

APPENDIX F

NAA COMPOSITIONAL DATA ANALYSIS AND COMPARISON TO PIXE RESULTS

In 2014, I submitted 50 pottery samples and 10 clay samples to MURR. Samples were selected following the identification of compositional groups using PIXE. I selected samples from all PIXE compositional groups and some unassigned sherds for comparison to MURR's extensive NAA database. In this appendix, I briefly summarize the analysis and resulting interpretation of NAA data provided in a report by MURR (Boulanger and Glascock 2015). I compare the resulting MURR interpretations to the results of the PIXE compositional analysis described in Chapter 8. Based on MURR's analysis of the pottery samples, I approximate a provenance location for two groups that did not include any of the Veracruz or Florida clay samples. I briefly consider points of disagreement between the two interpretations. Finally, I provide a list of the samples with raw NAA data in PPM.

Boulanger and Glascock's (2015) analysis consisted mainly of *k*-nearest neighbor searches of the MURR database to identify the 10 most compositionally similar specimen included in MURR's database. This included samples previously submitted from the Florida Panhandle, Mesoamerica, Caribbean, Central America, Iberia, and colonial sites in Texas. Boulanger and Glascock used square mean Euclidean distance as a distance metric in their search algorithm. They consider distance values below 0.02 as "strong" matches. This approach has some drawbacks as it only compares individual samples instead of group membership probabilities. I, therefore, consider these results preliminary. I have begun work to create regional reference groups from MURR's database so that I can project my samples and evaluate group memberships, but that work is not yet complete.

I summarize Boulanger and Glascock's (2015) results and compare their interpretations to my analysis of PIXE data. A summary of that comparison is presented in Table F.1. Analyses of NAA and PIXE data and resulting interpretations of provenance agree in 18 cases (36 percent of sample). In two additional cases (4 percent), neither technique could approximate a production zone or region. In another 17 cases (34 percent of sample), provenance was approximated only by one of the techniques, while the sample was left unassigned by the other approach. Six of those samples belonged to one of the two PIXE groups that did not include a clay sample. Boulanger and Glascock's (2015) analysis found that all of those samples were similar to pottery found in the Valley of Mexico, which included strong matches (distances < 0.02). Based on this analysis, I interpreted PIXE core groups 3 and 8 as having a central Mexican provenance in Chapters 8 and 9.

Table F.1. Summary Comparison of NAA and PIXE Assignments

Alternate ID	ANID	Category	Dist Weak	NAA/PIXE Disagree	NAA	PIXE	PIXE Groups
08M0471013a	KLE026	Glazed		x	VM	Ver	6
08M0473004a	KLE027	Painted		x	VM	Ver	6
98N8221026a	KLE050	Glazed		x	VM	Ver	6
08M0427009a	KLE022	Plain		x	Spain	Ver	7
08M0488031a	KLE030	Plain		x	Spain	Ver	7
08M0162010a	KLE020	Slipped		x	VM	Ver	9
03P0663001a	KLE002	Plain		x	Spain	R	R
03P0664039a	KLE003	Painted	x	x	SM?	FL	4
96N4549015a	KLE045	Plain	x	x	Ver	FL	4
08M0437052a	KLE023	Painted	x	x	Yucatan?	Ver	5
08M0477037a	KLE029	Painted	x	x	Yucatan?	Ver	5
08M0859001a	KLE034	Painted	x	x	Yucatan?	Ver	5
96N4542009b	KLE044	Plain	x	x	Spain	Ver	9
04P1071011a	KLE010	Plain			FL	FL	1

04P1414011a	KLE013	Plain		FL	FL	1
10F1305004a	KLE036	Dec NA		FL	FL	1
04P1447011a	KLE014	Dec NA		FL	FL	4
95N1774046a	KLE040	Plain	x	FL	FL	4
96N4659021a	KLE046	Slipped		FL	FL	4
03P1120015a	KLE005	Dec NA		FL	FL	10
04P0340026a	KLE006	Plain		FL	FL	10
04P1071017a	KLE011	Glazed	x	FL	FL	10
10F1413019a	KLE037	Dec NA		FL	FL	10
98N7842037a	KLE049	Stamp	x	FL	FL	U
95N1776034b	KLE041	Plain	x	FL	R	R
95N1811022a	KLE042	Plain		FL	R	R
03P0711029a	KLE004	Glazed		FL	U	U
05F1985007a	KLE016	Plain	x	FL	U	U
09F0538001a	KLE035	Dec NA		FL	U	U
08M0477008c	KLE028	Slipped		SM?	Ver	2
04P0557014a	KLE008	Painted	x	SM?	Ver	6
04P1071018a	KLE012	Glazed		Spain	U	U
08M0466033a	KLE025	Glazed		Spain	U	U
11F2511006a	KLE038	Dec NA	x	U	FL	1
04P0688020a	KLE009	Glazed	x	U	FL	10
08M0068072a	KLE019	Painted	x	U	U	U
11F2516004a	KLE039	Dec NA	x	U	U	U
98N7842026a	KLE048	Plain		Ver	U	U
08M0045027a	KLE017	Plain		Ver	Ver	2
08M0365004a	KLE021	Glazed		Ver	Ver	2
08M0466010a	KLE024	Painted		Ver	Ver	2
96N4668013a	KLE047	Painted		Ver	Ver	2
08M0720025a	KLE032	Painted		Ver	Ver	7
08M0614034a	KLE031	Glazed		VM	U	U
04P1816013a	KLE015	Glazed		VM	U	3
08M0795005a	KLE033	Glazed		VM	U	3
03P0447004a	KLE001	Glazed		VM	U	8
04P0466018a	KLE007	Glazed		VM	U	8
08M0068070a	KLE018	Glazed		VM	U	8
96N4542007a	KLE043	Glazed		VM	U	8

Notes: VM = Valley of Mexico; FL = Northwest FL; SM = Southern Mexico (includes Veracruz); Ver = FL; Dec NA = Decorated FL native; U = Unknown/Unassigned; R = Removed from PIXE analysis because intact shell inclusions led to questionable results.

Outright disagreement between the NAA and PIXE results was found in 13 cases (26 percent of the sample). However, for nearly half of those samples the matches were very weak (distance > 0.02). Boulanger and Glascock's (2015) suggested a provenance for those cases based mainly on the similarity among the proveniences of the top 10 matches, but generally describe their assignments for these samples as equivocal. In most of these cases, and in the few cases of stronger disagreement (n=7; 14 percent of sample), the pottery belonged to PIXE compositional groups with approximate production zones in central Veracruz. These groups included clays from geographic zones for which MURR did not already have comparative specimen prior to the submission of my samples. This would prove particularly problematic for a nearest neighbor search of similar composition. They did include my samples in these searches, but there were only a few samples from each PIXE group, limiting variability for one-to-one comparisons. In cases of disagreement, I rely on the more rigorous group assignments made using the PIXE analysis. This judgement was further supported by a close inspection of additional petrographic, XRD, and technological data.

Table F.2. NAA Compositional Data (PPM)

Sample ID	ANID	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu
03P0447004	KLE001	3.1267	25.7525	0.3834	19.8347	4.8197	3.6126	2.1055	48.0846	8.6483	113.87	3.0831	1.3044
03P0663001	KLE002	6.8620	39.3207	0.3853	33.9590	7.3206	1.7919	2.6093	79.5197	14.8723	73.69	6.6004	1.4957
03P0664039	KLE003	8.6141	17.1087	0.4152	20.8010	4.8637	1.4807	2.9403	36.9952	20.8942	98.90	3.8840	1.2569
03P0711029	KLE004	6.7668	40.0494	0.5032	33.4698	6.9892	3.5974	3.1951	79.7378	12.6362	73.94	5.3212	1.3540
03P1120015	KLE005	6.5483	44.7105	0.5440	39.4937	7.9289	4.7092	3.6959	90.9556	5.2875	88.34	3.8754	1.4191
04P0340026	KLE006	12.6277	50.0193	0.6629	50.0632	9.5844	4.8019	3.4502	106.4442	4.4989	99.94	3.8810	1.7627
04P0466018	KLE007	2.3121	25.7456	0.3481	22.1781	4.9473	3.2998	1.9291	52.2196	10.6665	114.48	3.6215	1.3318
04P0557014	KLE008	3.2930	28.6148	0.3824	26.5627	5.7289	2.2824	2.3441	56.4711	20.6629	125.77	8.2967	1.4655
04P0688020a	KLE009	29.7241	30.8538	0.5072	26.0996	5.4076	3.8581	2.9949	65.0383	5.9537	111.92	4.2567	0.9529
04P1071011	KLE010	2.5625	32.4666	0.6381	28.2709	5.9866	4.6812	4.2126	71.2724	6.9936	92.94	4.2245	1.0180
04P1071017	KLE011	15.4573	41.8949	0.6499	37.2332	7.9017	5.1528	3.7993	89.9869	4.6361	96.17	4.3531	1.3335
04P1071018	KLE012	6.3071	37.5201	0.4096	33.0805	6.7540	3.4994	2.6997	77.7025	14.3685	94.83	6.2772	1.2882
04P1414011a	KLE013	25.1706	49.4497	0.4613	38.8999	7.5772	3.9733	2.9666	97.4489	7.1579	112.29	5.3046	1.3915
04P1447011	KLE014	10.4879	45.8495	0.5419	42.5827	8.8070	5.6404	3.3538	97.1914	5.5653	94.19	4.5426	1.6033
04P1816013	KLE015	2.5938	26.2239	0.4748	23.2007	5.0038	3.3247	2.2990	55.7413	5.5959	116.08	2.9621	1.3393
05F1985007	KLE016	9.0067	20.1989	0.3292	13.0239	2.6773	2.6657	2.0119	37.6065	3.0052	97.78	5.3130	0.4555
08M0045027a	KLE017	9.0641	27.8798	0.3629	23.7906	5.6166	2.5087	2.1880	52.2431	17.0915	110.16	4.8872	1.3212
08M0068070a	KLE018	3.7729	20.4941	0.3983	19.6686	3.8808	3.0068	1.7744	40.5594	7.1965	137.81	2.4688	1.2373
08M0068072a	KLE019	16.9780	4.9169	0.1301	4.3256	1.0255	1.2494	1.0593	36.8966	4.8583	57.62	1.2709	0.1586
08M0162010	KLE020	4.1815	31.8861	0.3240	28.7111	6.5539	1.7589	2.1689	55.2915	24.5904	171.66	1.7214	1.8959
08M0365004	KLE021	7.2832	32.0404	0.4096	28.5250	6.1022	3.4639	2.5355	66.9056	14.8195	110.01	5.5771	1.3423
08M0427009a	KLE022	9.3642	32.9166	0.4092	27.2140	5.9532	3.1326	2.6493	65.9784	9.0515	89.31	5.5837	1.1832
08M0437052	KLE023	11.7104	20.6306	0.3707	20.3133	4.6464	1.5167	2.5844	92.7299	8.1236	59.35	1.4728	0.7699
08M0466010	KLE024	5.8471	38.2646	0.5064	36.1762	7.8123	3.7397	3.3805	79.9723	17.4178	148.88	6.7453	1.7251
08M0466033	KLE025	16.4808	32.7847	0.3390	28.0952	5.7454	2.8083	2.1208	63.9144	14.2836	95.76	7.0844	1.1874
08M0471013	KLE026	2.6453	21.3107	0.2362	21.1499	4.9415	1.1551	1.8403	43.8965	18.1829	119.41	3.6423	1.3412

Sample ID	ANID	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu
08M0473004	KLE027	14.1658	21.8627	0.2725	22.8312	4.9707	1.2732	1.8198	44.7338	11.7381	73.74	2.2689	1.3045
08M0477008c	KLE028	24.8166	25.5985	0.3295	24.8383	5.2273	2.0390	2.1670	51.2302	14.5900	106.62	4.4844	1.2796
08M0477037	KLE029	12.2832	12.5870	0.2729	12.7735	3.0950	0.9908	1.9947	46.4439	3.8163	44.51	1.7146	0.5167
08M0488031	KLE030	16.2052	33.0655	0.3414	28.9041	5.8067	2.7005	2.2533	63.9989	12.9095	87.92	5.8053	1.1925
08M0614034	KLE031	3.8857	17.9306	0.2172	17.1574	4.3458	1.6001	1.4897	39.2988	16.1124	106.40	2.9195	1.1868
08M0720025	KLE032	5.8911	21.9503	0.3255	19.9318	4.3968	2.3524	2.0487	43.2153	8.8861	51.04	5.8498	0.8840
08M0795005a	KLE033	1.3184	23.3866	0.2733	20.0002	4.4236	4.1666	1.8776	47.6239	7.6222	117.38	2.4479	1.1074
08M0859001	KLE034	7.1511	14.9253	0.2450	14.5783	3.0665	1.4866	1.6880	45.0435	6.5370	42.57	1.6878	0.5106
09F0538001	KLE035	11.5300	47.8784	0.5327	42.8053	9.2124	3.6828	3.5360	100.7087	5.5821	96.09	4.7581	1.7097
10F1305004	KLE036	3.0778	32.4594	0.4663	27.7641	6.0168	3.8636	2.9343	75.5430	10.2857	103.91	4.8200	1.1600
10F1413019a	KLE037	3.0218	47.7640	0.5719	37.5239	7.6811	4.1894	3.6039	98.2983	9.1959	111.96	5.4235	1.3528
11F2511006	KLE038	2.8959	44.5814	0.5534	34.7387	7.1636	4.0194	3.6076	94.3082	12.1963	119.45	7.0563	1.2259
11F2516004	KLE039	5.3113	33.5079	0.4741	29.0669	5.5672	4.1739	3.1224	70.9647	3.8841	124.02	4.7158	0.9711
95N1774046	KLE040	26.0836	58.3573	0.6445	47.8973	9.7668	4.6267	4.0606	119.4877	7.9161	113.01	4.0053	1.7084
95N1776034b	KLE041	4.2186	47.9217	0.4518	38.9631	7.4869	3.4378	3.0224	94.3246	3.6258	77.88	4.2956	1.3277
95N1811022	KLE042	4.8099	48.4467	0.5624	39.6757	8.5826	3.9745	3.9643	98.2325	13.1252	90.90	4.4111	1.5885
96N4542007	KLE043	3.4401	29.6607	0.3931	26.3421	6.0159	3.8847	2.4709	51.3348	8.7734	108.05	3.0620	1.5451
96N4542009b	KLE044	9.4045	36.9587	0.3620	31.6467	6.4760	2.3098	2.3550	75.3418	19.0020	100.58	6.9439	1.3326
96N4549015a	KLE045	25.1670	33.6279	0.3760	23.8006	4.5609	3.0824	2.3359	60.6158	4.1230	101.14	4.8764	0.7516
96N4659021	KLE046	12.5018	44.3051	0.4548	38.4785	6.4605	3.7468	2.8084	89.8234	6.1301	117.74	5.9300	1.0836
96N4668013	KLE047	6.6440	35.2542	0.4736	33.7070	7.3367	2.7930	3.0010	74.6672	16.8530	142.12	6.1590	1.5702
98N7842026a	KLE048	6.5141	27.0870	0.3369	27.7986	5.6295	2.3704	2.3196	56.8365	14.2276	95.98	4.9196	1.2526
98N7842037	KLE049	14.9004	25.5940	0.3152	17.7496	3.4505	2.8727	1.8471	45.3168	2.6785	85.84	4.1999	0.5682
98N8221026	KLE050	10.6071	20.0251	0.2264	23.4214	4.8029	1.4413	1.6030	35.8467	12.1167	104.54	3.6440	1.2769
C1BA003	KLE051	1.7446	17.9402	0.2921	13.5921	2.8809	2.0996	1.7522	33.9987	1.7347	39.73	2.5251	0.4875
C8SR007	KLE052	4.9545	19.8246	0.1865	11.8289	2.0419	2.2119	0.9794	32.6388	1.6758	43.54	1.9087	0.3332
C8SR008	KLE053	20.7344	46.7547	0.7720	33.5195	6.3022	7.2586	4.4258	105.8978	4.4409	115.83	5.3410	1.0480
C8ES010	KLE054	1.7323	45.8274	0.6362	37.6252	7.9168	3.8254	4.1361	97.5036	2.6040	73.92	2.2676	1.1795

Sample ID	ANID	As	La	Lu	Nd	Sm	U	Yb	Ce	Co	Cr	Cs	Eu
CV0001A	KLE055	1.4315	27.9337	0.2561	22.7453	5.7921	2.3262	1.8880	62.2217	27.6240	108.55	1.9965	1.5935
CV0004A	KLE056	5.1545	19.7995	0.2727	16.0248	4.0537	2.0106	1.8623	39.9164	8.9169	53.20	6.3640	0.8430
CV0005a	KLE057	1.9778	36.6232	0.2799	29.4316	6.7065	2.4584	2.0811	72.5938	24.9926	166.03	2.9868	1.9136
CV0007B	KLE058	4.4284	30.4781	0.2389	27.8293	5.4118	4.1018	1.3829	59.2292	18.0667	37.38	6.8022	1.3891
CV0011B	KLE059	22.1623	16.3217	0.2505	13.5710	3.2999	2.9230	1.2830	31.5555	5.7153	40.59	3.9801	0.7184
CV0015A	KLE060	11.6417	38.1798	0.4864	34.8355	7.7906	3.1278	3.4817	80.4491	21.3367	137.90	6.4469	1.7696

Sample ID	ANID	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr	Al
03P0447004	KLE001	32418.9	9.0676	40.87	29.26	0.9602	12.4682	195.92	1.4393	0.6373	11.7693	51.48	264.62	96238.6
03P0663001	KLE002	36853.6	4.1315	0.00	102.66	0.5478	12.9913	258.79	1.0172	1.0058	11.1510	77.57	121.07	73119.8
03P0664039	KLE003	59038.1	5.1183	39.02	34.93	1.4280	26.7329	132.03	0.4647	0.8049	5.1233	229.96	130.44	101147.0
03P0711029	KLE004	31755.0	8.2758	54.58	96.83	1.2925	11.1680	143.53	1.0826	0.8526	11.9337	112.41	222.48	70041.4
03P1120015	KLE005	20794.0	10.7066	0.00	48.42	0.4243	11.8492	63.59	1.2840	1.1564	12.5076	42.91	307.42	66596.4
04P0340026	KLE006	30405.7	9.7279	0.00	45.31	0.5805	13.1733	38.71	1.2276	1.2804	13.5900	51.21	261.49	77136.3
04P0466018	KLE007	29932.5	7.8017	29.27	33.90	0.4488	12.0942	211.26	1.2687	0.6929	10.2125	53.99	207.04	96982.0
04P0557014	KLE008	45525.3	5.3692	59.52	99.10	0.7242	18.1345	244.81	0.6429	0.8418	6.5053	141.35	128.22	92425.7
04P0688020a	KLE009	35343.5	11.1889	0.00	51.95	2.4619	14.8197	48.81	1.6023	0.7822	16.3641	67.15	266.00	91411.2
04P1071011	KLE010	18477.8	16.9113	0.00	43.63	0.5828	11.2776	0.00	1.4498	1.1028	12.8131	64.30	404.30	63303.3
04P1071017	KLE011	15903.1	15.8182	0.00	51.21	1.3907	13.9020	0.00	1.4937	1.0433	14.5135	62.79	399.61	84809.5
04P1071018	KLE012	39422.3	6.7361	53.53	129.69	2.1692	14.6553	219.90	1.1922	0.8679	11.7838	96.27	198.20	77774.3
04P1414011a	KLE013	28278.0	7.4780	51.45	59.04	0.7505	15.8814	36.64	1.3887	0.9931	15.5451	67.70	219.35	93472.3
04P1447011	KLE014	28451.4	10.1706	40.95	54.53	0.5031	12.7556	35.22	1.2878	1.1214	13.3478	69.44	268.53	70609.5
04P1816013	KLE015	29372.6	9.5087	0.00	28.12	0.5021	12.3444	111.17	1.3915	0.6848	11.9270	51.56	260.73	94923.1
05F1985007	KLE016	15396.5	6.3403	0.00	63.54	0.9106	14.0066	80.00	1.4600	0.3754	13.7655	44.18	150.85	94436.0
08M0045027a	KLE017	41147.9	5.3301	84.58	82.85	1.3148	15.7904	201.77	0.7618	0.7621	7.2667	88.25	142.42	84609.7
08M0068070a	KLE018	31839.5	9.8101	0.00	29.10	0.6840	10.6504	290.15	1.4098	0.5526	10.3501	45.89	276.15	98271.9

Sample ID	ANID	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr	Al
08M0068072a	KLE019	28699.2	6.4224	32.02	27.58	1.7197	12.2061	536.41	1.2469	0.2715	17.0734	75.08	111.90	99020.9
08M0162010	KLE020	62105.5	5.9707	60.18	39.73	0.2246	22.0627	590.14	1.1768	0.8766	6.2335	90.17	166.41	98335.5
08M0365004	KLE021	38962.9	6.5885	52.82	99.22	1.1038	15.5053	146.21	1.0566	0.9015	9.9099	89.38	155.84	85528.3
08M0427009a	KLE022	33091.4	6.5755	0.00	102.42	1.0261	12.0272	494.40	1.0717	0.9070	9.7527	73.30	174.38	61304.4
08M0437052	KLE023	27392.0	5.7424	58.76	28.68	1.2404	9.8758	520.22	0.9910	0.7179	12.4202	52.20	139.83	73480.2
08M0466010	KLE024	43843.9	7.1648	73.28	110.28	1.1606	21.6128	130.77	1.0782	0.9966	10.8260	120.87	169.05	103025.7
08M0466033	KLE025	38199.8	3.7124	0.00	128.46	1.3747	13.7225	397.70	1.0214	0.7679	9.4258	75.99	112.11	77904.1
08M0471013	KLE026	39189.7	5.0681	60.16	61.55	0.4685	13.3234	430.55	0.6030	0.6231	5.7875	69.44	126.55	101169.9
08M0473004	KLE027	32310.8	4.7709	0.00	56.41	0.3724	10.9951	778.78	0.5595	0.6802	4.9988	64.41	154.14	89165.9
08M0477008c	KLE028	36345.1	5.3141	53.10	84.21	0.9023	15.6778	380.05	0.7721	0.6779	7.1904	92.52	136.50	78131.6
08M0477037	KLE029	22322.2	4.5170	24.54	27.00	1.1393	8.4655	513.05	0.8861	0.4628	10.1881	58.76	97.46	65241.2
08M0488031	KLE030	37938.0	3.7262	51.24	113.27	0.9987	13.1072	476.98	0.9854	0.7847	9.0075	85.03	98.72	67952.7
08M0614034	KLE031	36113.4	4.7595	40.05	104.10	0.5513	12.1470	529.90	0.6134	0.5966	5.2369	57.45	109.68	93653.5
08M0720025	KLE032	30399.9	4.2524	34.79	90.87	0.5630	11.7516	474.53	0.6818	0.5622	7.1422	83.79	117.55	61616.9
08M0795005a	KLE033	28361.8	7.2671	0.00	28.81	0.4828	11.7358	156.60	1.3327	0.5723	10.8578	44.05	194.73	85623.4
08M0859001	KLE034	18996.5	3.9577	50.41	29.53	1.0478	7.6577	314.04	0.7627	0.4157	8.4057	57.82	81.19	59152.6
09F0538001	KLE035	29819.4	10.7105	39.29	63.24	0.5881	11.8279	0.00	1.2862	1.2548	11.3377	61.82	263.82	79477.9
10F1305004	KLE036	20015.1	8.8596	0.00	40.40	0.6636	13.4878	0.00	1.3372	0.8674	11.8855	82.10	285.80	83745.9
10F1413019a	KLE037	25928.1	12.0139	0.00	61.87	0.6970	14.3949	0.00	1.5573	1.0597	13.8249	79.63	289.46	87545.3
11F2511006	KLE038	25688.3	12.0030	0.00	82.94	1.3313	15.2673	0.00	1.6723	1.0597	14.8980	84.60	281.82	90376.0
11F2516004	KLE039	20928.3	9.4596	0.00	40.76	2.5051	16.6766	0.00	1.8901	0.8889	16.5398	45.39	229.32	125099.0
95N1774046	KLE040	58224.7	12.2330	37.06	42.02	0.6236	14.6517	128.44	1.5793	1.2255	15.7401	83.89	385.29	95431.6
95N1776034b	KLE041	22599.0	10.6558	0.00	52.44	0.4727	11.2154	114.27	1.3983	1.1362	10.6852	70.40	241.62	77913.1
95N1811022	KLE042	34750.3	11.6029	29.74	88.20	0.4251	14.7586	153.36	1.4994	1.1822	12.9952	112.86	285.27	82607.3
96N4542007	KLE043	33164.5	7.7533	0.00	30.88	0.6775	13.2483	152.14	1.3890	0.8128	11.1833	70.40	202.72	98451.2
96N4542009b	KLE044	46310.3	3.8982	46.71	114.62	1.0589	15.3337	311.48	1.1130	0.8140	10.4924	298.86	77.69	84749.1
96N4549015a	KLE045	40190.0	11.7640	42.64	59.48	0.9439	14.9074	80.01	1.3340	0.6911	13.2353	147.25	330.21	48156.1

Sample ID	ANID	Fe	Hf	Ni	Rb	Sb	Sc	Sr	Ta	Tb	Th	Zn	Zr	Al
96N4659021	KLE046	69295.3	8.6864	0.00	70.87	0.5483	16.2220	100.99	1.7146	0.9714	13.9139	61.17	203.53	101133.1
96N4668013	KLE047	45618.9	7.1591	54.49	101.58	0.8556	19.0191	69.59	1.0899	0.9909	9.2898	121.95	159.58	95704.0
98N7842026a	KLE048	37334.5	5.4345	61.55	68.86	1.0705	15.5759	118.38	0.7957	0.8191	7.8029	123.38	131.97	82919.4
98N7842037	KLE049	27737.1	8.6070	0.00	49.45	0.4825	12.1504	122.65	1.1206	0.4479	10.8953	62.99	204.47	73324.2
98N8221026	KLE050	38627.7	4.4671	0.00	49.46	0.5565	12.9811	572.96	0.6012	0.6180	5.0053	76.36	113.56	112446.8
C1BA003	KLE051	4777.9	10.6658	0.00	17.86	0.3074	5.4825	0.00	0.9705	0.3910	7.2612	24.78	267.52	45482.5
C8SR007	KLE052	6757.6	6.8123	0.00	16.38	0.3386	5.3783	0.00	0.7008	0.2152	6.9755	20.00	167.38	43742.0
C8SR008	KLE053	51606.4	16.5271	0.00	34.27	1.5483	13.9888	84.36	2.6958	0.8856	24.4602	107.31	428.27	108671.3
C8ES010	KLE054	9898.0	25.8365	0.00	32.02	0.4930	10.1082	0.00	1.3920	1.1816	15.5794	28.78	667.71	58714.6
CV0001A	KLE055	58643.4	6.2139	45.43	24.98	0.2794	18.0942	396.08	0.6649	0.6661	7.1046	103.47	184.07	113687.4
CV0004A	KLE056	28951.6	4.0712	24.69	91.42	0.5701	11.7571	441.59	0.5947	0.6946	6.3914	77.20	89.83	60378.9
CV0005a	KLE057	55946.1	6.5174	63.26	71.61	0.3932	16.6967	525.21	1.6452	0.8134	8.9810	104.38	197.43	90844.5
CV0007B	KLE058	43843.7	4.9839	0.00	80.77	0.6498	14.7424	452.35	1.1828	0.5847	11.1696	158.53	151.79	93658.8
CV0011B	KLE059	21209.0	3.1274	12.45	44.54	0.5226	7.1294	582.26	0.5182	0.4132	4.3132	64.81	97.46	44133.8
CV0015A	KLE060	54160.6	7.0095	70.42	107.08	1.5209	20.3159	109.16	1.0757	1.3358	9.8597	147.47	202.81	96682.8

Sample ID	ANID	Ba	Ca	Dy	K	Mn	Na	Ti	V
03P0447004	KLE001	381.7	10737.0	3.7010	7472.4	476.09	9610.0	7976.6	72.39
03P0663001	KLE002	545.9	97563.0	5.1473	17569.3	657.03	3603.5	4229.2	102.64
03P0664039	KLE003	376.5	7770.6	5.1116	7118.1	743.67	9724.8	5848.0	122.88
03P0711029	KLE004	698.3	12853.6	5.3551	22713.0	879.13	7456.7	4607.6	87.14
03P1120015	KLE005	239.4	993.1	6.1806	9189.4	73.81	2494.5	5613.5	83.49
04P0340026	KLE006	148.8	996.7	6.8324	8027.0	61.05	2364.3	5628.1	107.73
04P0466018	KLE007	435.5	10670.2	3.4574	9258.0	1082.42	11134.8	7734.8	77.40
04P0557014	KLE008	471.8	17655.5	4.2805	9826.6	278.11	10134.0	5783.7	153.59
04P0688020a	KLE009	149.3	1149.0	4.5220	7424.6	100.41	475.6	6087.6	119.08

Sample ID	ANID	Ba	Ca	Dy	K	Mn	Na	Ti	V
04P1071011	KLE010	280.0	767.1	5.4219	7353.0	72.94	1070.7	6909.0	92.07
04P1071017	KLE011	231.3	691.2	5.9806	7786.7	47.71	765.8	6646.5	85.92
04P1071018	KLE012	379.2	44033.5	5.0032	25310.4	422.59	5234.3	5384.9	104.74
04P1414011a	KLE013	204.6	889.6	4.8600	8921.3	60.98	1928.1	5804.6	140.45
04P1447011	KLE014	207.1	0.0	6.2237	7225.2	92.57	1119.7	5279.7	93.00
04P1816013	KLE015	273.1	7879.6	3.7444	7177.2	307.02	9406.4	7783.7	67.37
05F1985007	KLE016	245.5	8611.6	2.9121	6462.6	100.32	1090.2	5931.5	115.62
08M0045027a	KLE017	567.8	9818.1	4.0852	18025.6	374.86	8257.6	5103.6	139.55
08M0068070a	KLE018	292.2	15919.7	3.1401	10166.0	330.81	16601.4	9013.7	75.09
08M0068072a	KLE019	189.7	138292.0	0.9821	9461.1	434.47	3358.3	3803.7	85.99
08M0162010	KLE020	511.5	42062.4	4.8363	12686.6	1013.30	17481.8	8369.1	170.67
08M0365004	KLE021	589.6	9969.9	4.8774	20842.1	529.61	10313.0	6042.3	114.12
08M0427009a	KLE022	296.4	104062.6	4.4049	19847.4	381.04	4782.8	4908.8	89.81
08M0437052	KLE023	159.9	198195.2	3.9236	6292.3	325.17	1838.5	3552.5	59.91
08M0466010	KLE024	820.2	7304.6	5.8874	19876.4	341.42	7548.2	7624.7	164.48
08M0466033	KLE025	395.6	72144.1	4.3481	27640.7	428.02	5693.6	4724.6	132.81
08M0471013	KLE026	363.5	26617.4	3.4442	12014.5	832.03	18482.6	4488.7	73.00
08M0473004	KLE027	406.8	27608.4	3.4563	11727.6	492.28	14133.3	5129.9	58.61
08M0477008c	KLE028	701.8	17308.0	4.3431	18622.0	375.46	7987.7	5716.0	137.17
08M0477037	KLE029	105.5	226219.6	2.6344	5145.8	279.39	1546.9	3161.5	49.76
08M0488031	KLE030	361.7	94743.2	3.7602	22679.4	607.38	4711.9	4714.1	108.79
08M0614034	KLE031	466.2	28477.8	3.3575	29163.3	725.79	20898.6	4865.6	93.08
08M0720025	KLE032	235.9	127966.4	3.6215	21328.1	461.76	5674.0	3969.8	109.43
08M0795005a	KLE033	289.4	8072.5	3.2421	7006.3	326.82	8294.3	7488.0	60.22
08M0859001	KLE034	77.8	228165.9	2.3010	3656.5	689.0	1109.0	2953.8	44.4
09F0538001	KLE035	301.8	543.7	6.9734	9394.7	63.1	865.7	6182.5	101.1
10F1305004	KLE036	416.7	1035.2	5.3845	6942.7	70.7	1010.2	6013.9	107.6

Sample ID	ANID	Ba	Ca	Dy	K	Mn	Na	Ti	V
10F1413019a	KLE037	384.7	2790.2	6.4912	12768.3	139.8	1241.3	7214.7	119.0
11F2511006	KLE038	489.1	925.3	6.2840	13302.1	106.8	1000.2	7317.5	115.8
11F2516004	KLE039	345.1	1825.0	5.1115	7000.9	256.4	688.0	8250.2	140.0
95N1774046	KLE040	422.7	4511.5	6.7759	6245.5	170.3	974.4	6896.1	126.2
95N1776034b	KLE041	879.4	30140.9	6.3884	6738.4	73.6	1262.1	5972.7	94.9
95N1811022	KLE042	804.9	6743.2	6.5582	14509.2	461.5	3064.7	6821.9	109.2
96N4542007	KLE043	361.6	8479.0	5.1892	8371.0	1078.1	8901.5	7821.8	78.7
96N4542009b	KLE044	673.6	40693.4	4.7063	23593.5	2441.6	4741.4	3952.6	109.5
96N4549015a	KLE045	365.5	4040.0	1.6872	25432.1	420.4	20688.2	845.0	0.0
96N4659021	KLE046	343.9	7783.2	5.0947	9877.0	72.9	1713.3	6987.9	169.0
96N4668013	KLE047	844.4	8229.7	5.9226	16345.6	380.8	8288.0	7026.6	140.1
98N7842026a	KLE048	605.2	5907.7	4.5714	12896.9	291.7	7108.0	5473.3	112.8
98N7842037	KLE049	210.3	3015.3	2.6229	7162.8	79.2	1033.6	4745.5	98.4
98N8221026	KLE050	313.1	25903.8	3.4772	7853.4	533.3	16409.8	5616.5	90.3
C1BA003	KLE051	92.6	255.7	2.7792	3026.7	27.1	293.7	4630.9	47.2
C8SR007	KLE052	76.7	543.0	1.6401	2481.0	24.0	525.8	3722.9	38.6
C8SR008	KLE053	145.2	14718.0	6.5568	4286.2	268.8	1318.3	10487.6	171.5
C8ES010	KLE054	246.0	0.0	6.9847	7257.9	88.6	606.9	7134.0	94.1
CV0001A	KLE055	674.9	26585.6	3.9370	8238.9	1218.6	16977.8	7898.5	166.3
CV0004A	KLE056	280.4	138861.1	3.9058	20060.5	453.6	6279.6	4005.4	108.5
CV0005a	KLE057	734.3	38022.9	4.2076	19470.6	1217.8	19324.1	7667.9	147.7
CV0007B	KLE058	755.3	15003.0	2.8918	19204.3	899.2	16466.4	6065.7	170.2
CV0011B	KLE059	259.1	237711.2	2.2926	8636.6	385.6	3072.1	3263.2	79.4
CV0015A	KLE060	887.8	14839.9	6.4033	19690.9	741.9	9074.4	7145.4	159.0

Note: The first three letters of the sample ID is associated with the site as follows: Veracruz (08M), Presidio Santa Maria (95N-98N), Presidio Santa Rosa (02P-04P), Presidio San Miguel (05F-06F), Mission Escambe (09F-11F)